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Fernald Environmental Management Project Annual Epidemiologic Surveillance Report

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2001 Epidemiologic Surveillance Report

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Additional information about the Department of Energy's Office of Health Studies, the Epidemiologic Surveillance Program, and annual reports for DOE sites participating in this program can be found at:

http://tis.eh.doe.gov/health/epi/surv/index.html

ACKNOWLEDGEMENT

Fernald Environmental Management Project 2001

At A Glance

Beginning with the year 2001, FEMP chose to include absences with durations shorter than 5 days. Eleven events of less than 5 days duration were reported by 10 workers. Sixteen diagnoses were included in these events. Rates of OSHA events, reportable regardless of whether or not an absence is involved, will in general not be affected by this change in reporting.

There were 440 absences among Fernald employees in 2001 compared with 444 in 2000.

Male employees lost 10,321 workdays due to illness and injury in 2001. The leading causes of absence were due to muscles and skeleton conditions (20 percent), injuries (19 percent), and respiratory conditions (17 percent).

Female employees lost 8,552 workdays due to illness and injury in 2001. The leading causes for these absences were due to respiratory conditions (17 percent), injuries (17 percent), and conditions of the muscles and skeleton (14 percent).

Over the 9-year surveillance period, the most notable trends have been increases in muscles and skeleton conditions and injuries among men and women.

Nuclear Specialties workers had the highest absence rate among male workers; this job category has had the highest rate of absence among male employees since 1995. Among women, workers in the Security and Crafts and Repair groups had the highest absence rate.

There were very few, 8, OSHA events (illnesses and injuries that are associated with the work environment) recorded by Fernald in 2001. Seven of the events were due to accidents, such as falls, overexertion, and being struck by an object.

Introduction

The U.S. Department of Energy's (DOE) commitment to assuring the health and safety of its workers includes the conduct of epidemiologic surveillance activities that provide an early warning system for health problems among workers. The Epidemiologic Surveillance Program monitors illnesses and health conditions that result in absences, occupational injuries and illnesses, and disabilities and deaths among current workers.

This report provides a summary of epidemiologic surveillance data collected from the Fernald Environmental Management Project (FEMP) from January 1, 2001 through December 31, 2001. Epidemiologic surveillance has been ongoing at Fernald since 1993. The data were collected by a coordinator at FEMP and submitted to DOE's Epidemiologic Surveillance Data Center, located at Oak Ridge Institute for Science and Education, where quality control procedures and preliminary data analyses were carried out. The analyses were interpreted and the final report prepared by the DOE Office of Health Studies.

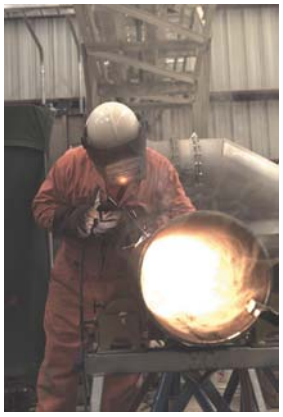
The information presented in this report provides highlights of the data analyses conducted. Earlier surveillance reports and additional supporting tables are posted on the Office of Health Studies' Web site **(http://tis.eh.doe.gov/health/epi/surv/index.html)**, or are available by request. The main sections of the report include: work force characteristics; absences due to injury or illness; workplace injuries, illnesses, and deaths that were reportable to the Occupational Safety and Health Administration ("OSHA-recordable" events); and disabilities and deaths among current workers. This report also includes sections on time trends that provide comparative information on the health of the work force from 1993 to 2001.

Note: In the figures and calculations that follow, percentages have been rounded to the nearest whole number.

DOE sites vary by mission, function, job classification, and worker exposures; therefore, comparisons of FEMP with other DOE sites should be made with caution. In addition, many factors can affect the completeness and accuracy of health information reported at the sites, thereby affecting the patterns of illness and injury observed.

Site Overview

The Fernald Environmental Management Project (FEMP), located approximately 20 miles northwest of downtown Cincinnati, Ohio, once produced pure uranium metal products used in various U.S. defense programs.



Construction began in 1951 in the midst of the Cold War era. Production operations started in 1953 and were suspended in July 1989. FEMP was originally called the Feed Materials Production Center (FMPC), because it produced "feed" in the form of purified uranium metal for use by other DOE sites that made nuclear weapons. The site was designed as a large-scale, integrated facility capable of converting uranium ore and recycled material into uranium metal through a series of chemical and metallurgical conversions. These activities resulted in contamination with radioactive wastes that include uranium tailings emitting radon gas, thorium, and radium, as well as other hazardous materials such as heavy metals, barium, and asbestos.

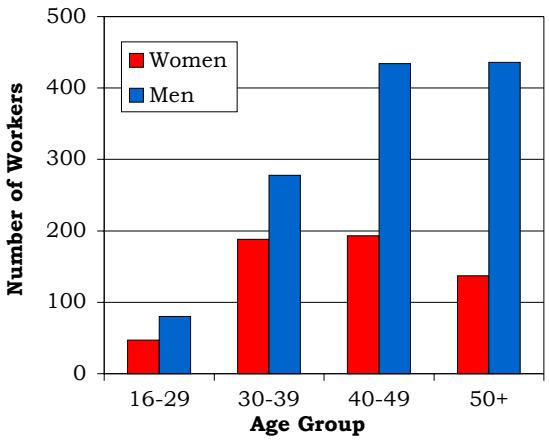
In November 1989, the site was added to the Superfund National Priority List, which requires site cleanup and remediation activities. Production activities officially ended in June 1991. Fernald, managed by Fluor Fernald since December 1992, has engaged in an environmental cleanup program to address concerns associated with the former production mission.

In November 2000, DOE awarded to Fluor Fernald a 10-year closure contract for the Fernald site that provided the framework for the final cleanup of the site. The final removal of soil and debris from the Southern Waste Unit at Fernald occurred in 2001. The cleanup of this 26-acre area was a milestone because much of the contamination lay in direct contact with the Great Miami Aquifer. All key cleanup decisions for the site are made with public participation from federal and state regulators and the public.

The Fernald Work Force - 2001

A total of 1,793 Fernald employees were included in epidemiologic surveillance in 2001, a decrease of 148 workers from 2000. The age and gender distribution of the 2001 work force is shown in Figure 1. There were 565 (32 percent) women and 1,228 (68 percent) men in the work force. The average age of male and female Fernald workers was 45 years and 42 years, respectively. The majority (88 percent) of the workers were White, 10 percent were African Americans, and the remaining 2 percent were Asians, Hispanics, and Native Americans.

Figure 1. The Work Force by Gender and Age



The distribution of workers by gender and job category is shown in Figure 2. As reported by Fernald, individual job titles were grouped together into 10 job categories. This is because there were either too few workers or health events within a particular job title, thereby limiting the type of analyses that could be conducted. Men and women were not

distributed equally among the various job categories. Among women, 34 percent were Clerical workers, while only 1 percent of males were in the same job category. Likewise, only 1 percent of female workers were in the Craft and Repair group, compared with 13 percent of the males in the same group.

Figure 2. The Work Force by Job Category and Gender

Job Category	Women	Men
Management	2 <1%	44 4%
Administration	17 3%	100 8%
Professional	83 15%	197 16%
Engineering, Scientific, & Health Care	89 16%	256 21%
Technical Support	37 6%	117 10%
Clerical	194 34%	17 1%
Service	104 18%	178 15%
Security	3 1%	28 2%
Craft & Repair	5 1%	163 13%
Nuclear Specialties	31 5%	128 10%

A Note to the Reader:

Prior to the Year 2001 report, epidemiologic surveillance at FEMP examined illness and injury absences of 5 or more consecutive workdays (also referred to as "5-day absences"). This approach is based on DOE Order 440.1 that requires contractor management to notify Occupational Medicine when a worker has been absent for 5 or more consecutive workdays. Eligible health events would also include those with an absence on a Friday that continued through Tuesday, the length of that absence including the weekend.

As indicated in Order 440.1, all injuries and illnesses due to a work-related incident must be reported. Non-occupational illnesses and injures that involve absences of fewer than 5 days do not routinely require a medical clearance for return to work and, as noted above, have been excluded from these analyses until now. Beginning with the year 2001, FEMP chose to include absences of shorter duration. Eleven absences of less than 5 days in duration were reported by 10 employees (6 females and 4 males). Rates of OSHA-recordable events, reportable regardless of whether or not an absence is involved, will in general not be affected by this change in reporting.

Number and Length of Absences

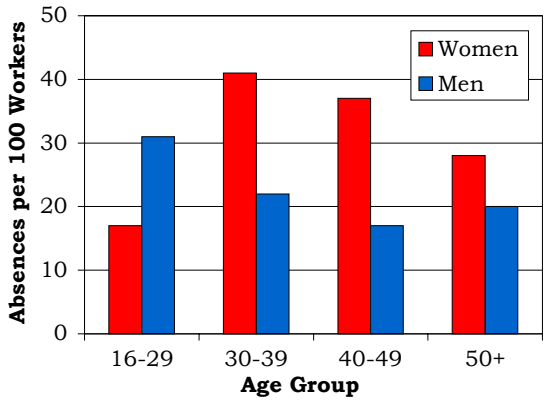
Epidemiologic surveillance examines absences from work. It is based on DOE Order 440.1 that requires contractor management to notify Occupational Medicine when a worker has been absent for 5 or more consecutive workdays. If an absence on a Friday continues through Tuesday, the length of that absence includes the weekend. Starting with the 2001 data, all reported absences are now included in the data collection and analyses, regardless of the length of absence. Eleven absences of less than 5 days duration were reported by 10 employees (6 females and 4 males): 3 Professional workers, 3 Service workers, 2 Clerical employees, and 1 each from the Engineering, Scientific, and Health Care and Technical Support occupational groups. Six of these workers were aged 30-39 (4 females and 2 males). All injuries and illnesses due to a work-related incident must be reported.

Certain types of health events were excluded from the analyses. These include 16 women with 16 reported absences related to normal pregnancy and 2 men with 2 reported absences due to elective surgical procedures not related to the treatment of an illness or injury.

Throughout this report, analyses take gender, age, and job category into account because the risk of illness and injury varies by these factors.

The rate of absences due to injury or illness varied by gender and age as shown in Figure 3. There were 195 absences among 565 women resulting in an absence rate of 35 per 100 workers (195/565). Among the 1,228 men, there were 245 absences resulting in an absence rate of 20 per 100 workers (245/1,228). The rate of absences peaked for 30-39 year old women and then decreased with age. Among men, workers under 30 years of age had the highest absence rate with the rate remaining fairly constant for older workers. These same patterns were seen among men and women in 2000.

Figure 3. Absence Rate by Gender and Age



The average length of absence by gender and age is shown in Figure 4. A total of 18,873 calendar days of work (10,321 days for men and 8,552 days for women) was lost at Fernald in 2001 due to reported illness or injury. The average length of absence was 42 days for men and 44 days for women. The youngest workers had the shortest average length of absence among men and women. The average length of absence varied little for workers 30 years of age and older.

Figure 4. Number of Days Absent by Gender and Age

Gender	Age	Number of Absences	Number of Days Absent	Average Number of Days Absent
Women	16-29	8	311	39
	30-39	77	3,511	46
	40-49	71	3,072	43
	50+	39	1,658	43
	Total	195	8,552	44
Men	16-29	25	514	21
	30-39	61	2,647	43
	40-49	73	3,489	48
	50+	86	3,671	43
	Total	245	10,321	42

The rate of absences due to illness or injury varied by job category for men and women as shown in Figure 5. Workers in the Management group did not report any absences in 2001. Among the remaining job categories, women generally had higher rates of absence compared with men. Nuclear Specialties workers had the highest absence rate among male workers (44 per 100 workers); this same job category has had the highest rate of absence among men since 1995. Among women, workers in the Security and Craft and Repair groups had the highest absence rate (100 per 100 workers).

Figure 5. Absence Rate by Job Category and Gender

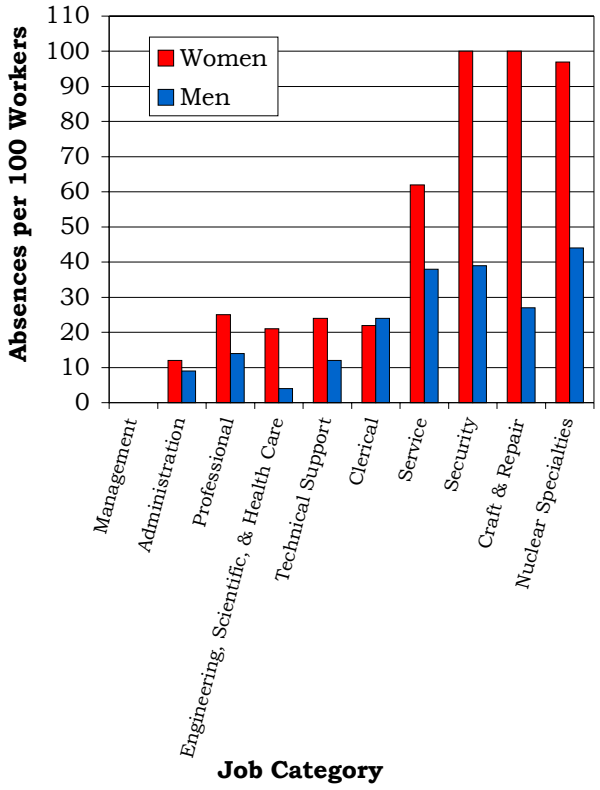
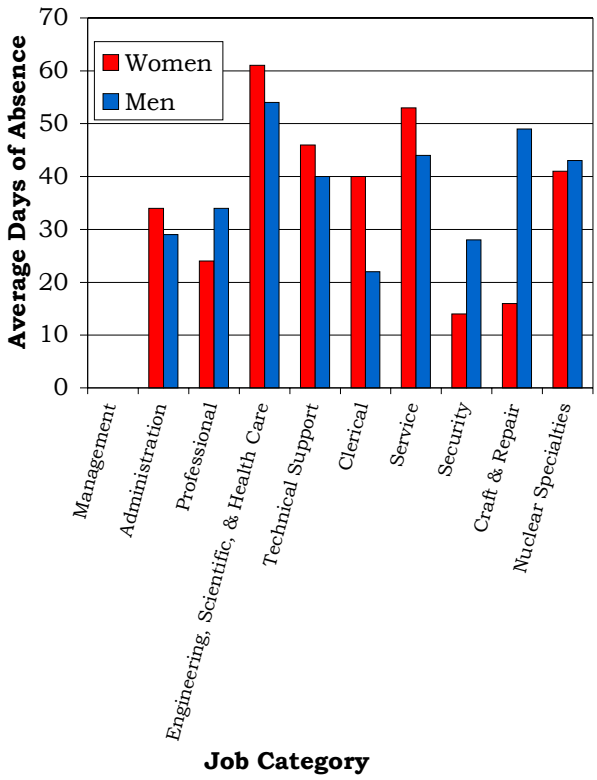


Figure 6. Average Duration of Absence by Job Category and Gender



The average duration of absence by job category and gender is shown in Figure 6. Within a job category, the average length of absence was not related to gender. Among women and men, the Engineering, Scientific, and Health Care group had the longest average length of absence, 61 days for women and 54 days for men.

Diagnostic Categories

Epidemiologic surveillance monitors *all* illnesses and injuries among active workers because it is not always possible to determine what health effects are due to occupational exposures and what are due to other causes. Most illness and injury diagnoses were reported to the occupational medicine clinic by workers who required return-to-work clearances. An absence due to illness or injury may involve more than 1 diagnosis, and epidemiologic surveillance includes all reported diagnoses. In addition, the OSHA 200 Log provides information on recorded occupational injuries and illnesses whether or not they involve absences.

This report organizes illness and injury categories based on a standard reference, the *International Classification of Diseases, 9th Revision, Clinical Modification* (ICD-9-CM). This reference is used to classify health events for statistical purposes. You can find specific health conditions in the Explanation of Diagnostic Categories.

The number of reported diagnoses categorized according to the ICD-9-CM and number of lost calendar days (may include weekends and holidays) are presented in Figure 7. Lost calendar days for each absence are counted more than once when multiple diagnoses occur in different diagnostic categories for the same absence. There were 346 diagnoses reported by female and 417 diagnoses reported by male Fernald employees in 2001. Of these diagnoses, 16 were reported for absences less than 5 days in duration (9 reported by women and 7 reported by men). Nine (56 percent) of the 16 diagnoses were for respiratory conditions, while the remaining 7 diagnoses were spread over 6 diagnostic categories. Among women, diseases of the respiratory system (17 percent), injuries (17 percent), conditions of the muscles and skeleton (14 percent), and psychological disorders (10 percent) accounted for 58 percent of all reported diagnoses. The respiratory conditions were due to acute respiratory infections (38 percent), bronchitis and asthma (32 percent), and flu and pneumonia (23 percent). Thirty-nine percent of the injuries were reported as sprains and strains and 22 percent were fractures. Among the 59 diagnoses for injuries, 6 were related to complications of medical care. Back disorders made up 49 percent of muscles and skeleton conditions. Ninety-one percent of the psychological diagnoses were adjustment disorders, anxiety, and depression.

Figure 7. Number of Diagnoses and Lost Calendar Days by Diagnostic Category (Categorized by ICD-9-CM) and Gender

Diagnostic Category	Women		Men	
	Number of Diagnoses	Number of Lost Calendar Days	Number of Diagnoses	Number of Lost Calendar Days
Benign Growths	14	726	4	99
Blood	3	117	1	15
Cancer	6	435	4	178
Digestive	19	765	21	529
Endocrine/ Metabolic	5	863	9	517
Existing Birth Condition	1	135	3	107
Genitourinary	28	919	10	194
Heart/ Circulatory	13	165	37	1,598
Infections/ Parasites	8	167	8	178
Injury	59	2,270	81	3,160
Miscarriage	2	25	NA	NA
Muscles & Skeleton	49	2,144	84	3,491
Nervous System	18	690	19	800
Psychological	35	1,181	25	830
Respiratory	60	947	71	979
Skin	3	97	6	212
Unspecified Symptoms	23	686	34	1,032

Note: Lost calendar days for each absence are counted more than once when multiple diagnoses occur in different diagnostic categories for the same absence.

The most frequently reported diagnoses varied little by gender. Among male workers, 56 percent of all reported diagnoses were due to muscles and skeleton conditions (20 percent), injuries (19 percent), and respiratory conditions (17 percent). A closer look at diagnoses affecting the muscles and skeleton showed that 46 percent were back problems, with rheumatism and conditions affecting the joints each contributing 23 percent. Frequently reported injuries were sprains and strains (52 percent), fractures (20 percent), and dislocations (15 percent). One complication of medical care was reported among the 81 diagnoses

categorized as injuries. Acute respiratory infections accounted for 48 percent of the respiratory conditions, followed by chronic obstructive pulmonary disease (38 percent) and pneumonia and flu (13 percent). Among the 27 diagnoses for chronic obstructive pulmonary disease, 70 percent were bronchitis and asthma and 26 percent were for chronic obstructive airway disease.

Among men, the above diagnoses did not vary much by age. Workers 50 years of age and older reported more heart/circulatory diseases. Fifteen men

in this age group reported 24 diagnoses: 5 diagnoses for hypertension, 6 for ischemic heart disease (restricted blood flow to an artery), and the remainder for a variety of other heart/circulatory problems.

Among women, the most frequently reported diagnoses were consistent among the various age groups with 1 exception. Heart/circulatory conditions replaced muscles and skeleton disorders as frequently reported diagnoses for workers 50 years of age and older; 3 women reported 10 diagnoses. Three diagnoses were for hypertension and none were for ischemic heart disease.

Figure 8 shows the frequency of reported diagnoses by job category for men and women. The types of diagnoses were similar among the job categories. Among men, injuries, respiratory disorders, muscles and skeleton conditions, and psychological conditions appeared most often in the job categories. Sixteen men reported 25 diagnoses for psychological disorders; stress, depression, anxiety, or adjustment reaction accounted for 22 of these diagnoses. Among women, respiratory diagnoses, injuries, conditions affecting the muscles and skeleton, and psychological disorders were common among the job categories.

Figure 8. Most Frequently Reported Diagnoses by Job Category and Gender

Job Category	Men	Women
Management	None	None
Administration	Psychological (3) Respiratory (3) Unspecified Symptoms (3)	Miscarriage (2) Benign Growths (1) Blood (1) Genitourinary (1) Psychological (1)
Professional	Muscles & Skeleton (11) Heart/Circulatory (9) Respiratory (7)	Respiratory (12) Injury (9) Nervous System (5)
Engineering, Scientific, & Health Care	Muscles & Skeleton (6) Psychological (5) Respiratory (4)	Genitourinary (8) Injury (7) Muscles & Skeleton (6)
Technical Support	Muscles & Skeleton (7) Respiratory (7) Heart/Circulatory (4)	Muscles & Skeleton (6) Injury (5) Respiratory (4)
Clerical	Nervous System (3) Genitourinary (1) Psychological (1) Respiratory (1)	Respiratory (20) Muscles & Skeleton (11) Digestive (9) Injury (9) Psychological (9)
Service	Injury (29) Muscles & Skeleton (29) Respiratory (15)	Injury (23) Muscles & Skeleton (17) Psychological (13) Respiratory (13)
Security	Injury (5) Genitourinary (3) Respiratory (3)	Psychological (3) Respiratory (2) Muscles & Skeleton (1) Nervous System (1)
Craft & Repair	Injury (15) Muscles & Skeleton (14) Unspecified Symptoms (11)	Heart/Circulatory (4) Psychological (3) Nervous System (1)
Nuclear Specialties	Respiratory (24) Injury (22) Muscles & Skeleton (15)	Respiratory (8) Unspecified Symptoms (7) Genitourinary (6) Injury (6) Muscles & Skeleton (6) Psychological (6)

Note: Numbers in parentheses represent the number of reported diagnoses.

Rates of Disease Occurrence

A Word about Rates: The previous section considered the number of absences and health conditions among various worker groups. For example, Figure 7 shows that men reported 81 diagnoses and women reported 59 diagnoses involving injuries during 2001. Men, therefore, reported over a third more injuries as women. As there were more than twice as many men as women at Fernald, it seems reasonable to expect more injuries among men than women. Does this mean that men were at greater risk of injuries compared with women in 2001? To correctly answer the question, the total number of men and women in the work force must be considered. To compare risk among men and women, it is necessary to calculate the injury rate for each gender. Rates are calculated by dividing the number of injury diagnoses in a given gender by the total number of employees of that gender. Multiply this number by 1,000 to get the diagnosis rate per 1,000 workers.

For example:

81 injury diagnoses ÷ 1,228 men = .066 x 1,000 = 66 injury diagnoses per 1,000 men

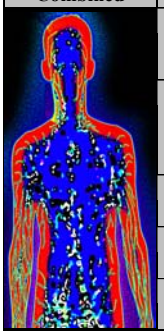
59 injury diagnoses ÷ 565 women = .104 x 1,000 = 104 injury diagnoses per 1,000 women

Comparing these rates now correctly suggests that the rate of reported absences due to injuries among women was over 50 percent higher than the rate for men. They are called **crude rates** because they do not account for possible differences between men and women such as age and other factors that might affect the individual's risk of having an injury. Because age is so strongly related to the risk of disease and injury, epidemiologists almost always take age into account when comparing groups. This is done by using age-specific categories or by statistical methods of adjustment.

The diagnosis rate, also called the illness and injury rate, is the number of occurrences of a given disease or health condition observed over the course of a year per 1,000 workers at risk of getting that condition (see shaded box). One health condition, arthritis for example, may result in several absences over a year. Conversely, 1 absence may be associated with multiple diagnoses (e.g., the flu and a sprained wrist) recorded on the return-to-work form.

In the following set of analyses, the 4 age groups were collapsed into 2 groups: workers less than 50 years of age and those 50 or older. In addition, the 10 occupational categories were combined into 5 larger groups. These groups were collapsed to ensure that the number of diagnoses in each group was large enough to analyze. The rates of all illnesses and injuries combined are presented in Figure 9. Four groups of diagnoses of particular interest to workers are presented in Figure 10: cancer, heart/circulatory system, respiratory system, and injury.

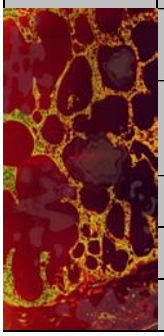
Figure 9. Rates for All Illnesses and Injuries Combined by Job Category, Gender, and Age

Diagnostic Category	Rate per 1,000			
All Illnesses & Injuries Combined	Job Category	Age	Men	Women
	Management/ Administration/ Professional	<50	161	390
		50+	261	450
	Engineering, Scientific, & Health Care/ Technical Support	<50	142	339
		50+	71	824
	Clerical	<50	429	496
		50+	0	311
	Service/Security/ Craft & Repair	<50	539	1,151
		50+	540	654
	Nuclear Specialties	<50	800	2,167
		50+	717	1,077

Rates of all illnesses and injuries combined were greater for workers less than 50 years of age compared with older workers among men and women. Rates for female employees were higher than those for males in the same job category. The highest illness and injury rates for all employees were among individuals classified as Nuclear Specialties. This occupational group has had the highest rates since 1995.

Cancer rates presented in this report are based on reported absences due to cancer. A worker may experience several periods of absence from 1 cancer diagnosis due to medical complications or treatment regimens. The cancer rates in this report are *not* comparable to the *incident rates* frequently published in many articles on cancer with which you may be familiar. Cancer *incident rates* are based on the number of new cancer cases diagnosed within a given time, usually a year.

Figure 10. Rates for Selected Diagnostic Categories by Job Category, Gender, and Age

Diagnostic Category	Rate per 1,000			
Cancer	Job Category	Age	Men	Women
	Management/ Administration/ Professional	<50	0	24
		50+	7	0
	Engineering, Scientific, & Health Care/ Technical Support	<50	0	0
		50+	0	176
	Clerical	<50	0	0
		50+	0	16
	Service/Security/ Craft & Repair	<50	0	0
		50+	24	0
	Nuclear Specialties	<50	0	0
		50+	0	0

Diagnostic Category	Rate per 1,000			
Heart/ Circulatory	Job Category	Age	Men	Women
	Management/ Administration/ Professional	<50	25	0
		50+	42	0
	Engineering, Scientific, & Health Care/ Technical Support	<50	11	18
		50+	9	176
	Clerical	<50	0	0
		50+	0	49
	Service/Security/ Craft & Repair	<50	12	0
		50+	79	154
	Nuclear Specialties	<50	27	56
		50+	132	0

Diagnostic Category	Rate per 1,000			
Respiratory	Job Category	Age	Men	Women
	Management/ Administration/ Professional	<50	45	134
		50+	7	50
	Engineering, Scientific, & Health Care/ Technical Support	<50	38	28
		50+	9	118
	Clerical	<50	71	120
		50+	0	66
	Service/Security/ Craft & Repair	<50	62	140
		50+	79	115
	Nuclear Specialties	<50	173	167
		50+	208	385

Diagnostic Category	Rate per 1,000			
Injury	Job Category	Age	Men	Women
	Management/ Administration/ Professional	<50	10	61
		50+	42	200
	Engineering, Scientific, & Health Care/ Technical Support	<50	0	101
		50+	18	59
	Clerical	<50	0	53
		50+	0	33
	Service/Security/ Craft & Repair	<50	165	233
		50+	71	115
	Nuclear Specialties	<50	253	222
		50+	57	154

Six absences related to cancer were noted with 6 diagnoses reported by 3 women and 4 diagnoses reported by 2 men. Three of the workers reporting cancer in 2001 reported cancer during the previous 8 years. The likelihood that an individual in the U.S. develops cancer increases with age; our data reflect this observation. Only 1 of the 5 workers reporting cancer was less than 50 years old.

Older male and female workers tended to have higher rates of heart/ circulatory problems. Twenty-four of the 37 diagnoses reported by men were among workers aged 50 and older; 5 diagnoses were for hypertension and 6 involved ischemic heart disease (restricted blood flow through an artery). Men categorized as Nuclear Specialties workers had the highest rate of heart/circulatory disorders. Four of the 9 diagnoses in this group were for hypertension or ischemic heart disease. Women reported 13 heart/circulatory diagnoses; 4 involved hypertension or ischemic heart disease.

Workers under age 50 tended to have higher respiratory rates compared with older workers for both men and women. Women had higher rates of respiratory disease than men with the exception of workers less than 50 years old in the Engineering, Scientific, and Health Care/Technical Support and Nuclear Specialties groups. The Nuclear Specialties workers were over 3 times as likely to report a respiratory diagnosis as other job categories.

Women younger than 50 years tended to have higher rates of injuries than older women. There was no pattern between injuries and age among men. As in 1999 and 2000, the highest injury rates in 2001 among men were in the Nuclear Specialties group. Among women in 2001, the highest rate occurred among Service/Security/Craft and Repair workers. Service and Nuclear Specialties workers were almost 3 times more likely to report an injury than other groups. An increased risk was seen in these 2 occupational groups in 2000. Service workers were almost 8 times more likely to report a back sprain or strain and over 3 times more likely to report a sprain or strain other than to the back. Nuclear Specialties workers were over 4 times more likely to report a lower limb fracture.

In another set of analyses, the risk of illness and injury among workers classified in 1 job category was compared with workers in the other 9 job categories. Service, Craft and Repair, and Nuclear Specialties workers were twice as likely to report an illness or injury compared with all other groups. These same occupational groups were also at a similar increased risk in 2000. They were at increased risk for other illnesses and injuries as well. The risk of muscles and skeleton disorders was almost 3 times higher among Service workers compared with other occupational groups. Craft and Repair workers had over 3 times the risk of psychological disorders and over 5 times the risk of nervous system conditions. Infectious diseases, benign tumors, psychological disorders, conditions of the digestive and genitourinary systems, and muscles and skeleton disorders were elevated 2- to 10-fold among workers in the Nuclear Specialties group compared with other workers. Among Security workers, psychological disorders and nervous system conditions were 5 times and genitourinary disorders were over 7 times more likely to be reported compared with other workers.

Time Trends

Why Are Rates Age-Adjusted?

The injury and illness rates in this section of the report are **age-adjusted**. Differences in the age composition among groups of workers are taken into consideration in the analyses, and 1 rate is calculated for an entire group. This allows us to make comparisons between groups of different ages. Age-adjusted rates are calculated using the age distribution of the 1970 U.S. population as a reference.

In 1995, Fernald began to report job categories that were not available in 1993 and 1994. In order to examine time trends from 1993 to 2001, some job categories used in 1995 through 2001 were combined to reflect the broader categories used in earlier years. The accompanying table shows how the categories were combined:

1995 – 2001 Job Category	1993 and 1994 Job Category
Management	Office Management and Administration
Administration	Office Management and Administration
Professional	Other Management and Administration
Engineering, Scientific, and Health Care	Engineering, Scientific, and Health Care
Technical Support	Technical Support
Clerical	Office Management and Administration
Service	Service
Security	Service
Craft and Repair	Craft and Repair
Nuclear Specialties	Nuclear Specialties

There are 9 years of epidemiologic surveillance data for Fernald workers. It is important to note that the age-adjusted rates for the years 1993 and 1994 presented in this report differ from the 1993 and 1994 *Annual Epidemiologic Surveillance Reports* due to the exclusion of absences resulting from maternity leave.

Age-adjusted rates for all diagnoses combined are shown in Figure 11. There was a steady increase in the rates for men and women from 1993 through 1997. This was followed by a decline or leveling off until a resumption in the increase in 2000. The increase seen in the 2000 rates continued in 2001 among women, but among men, the rates decreased. Figure 12 shows age-adjusted rates for selected diagnostic categories. The most notable trends over the 9-year period have been increases in muscles and skeleton conditions and injuries for men and women.

The age-adjusted rates for illnesses and injuries by job category are shown in Figure 13. The rates of diagnoses among women increased for most job categories in 2001. The large changes in the rates for women in the Technical Support, Service, Craft and Repair, and Nuclear Specialties groups are the result of small numbers of female workers in each of these groups.

Figure 11. Age-Adjusted Rates for All Diagnoses Combined Among Women and Men from 1993 to 2001

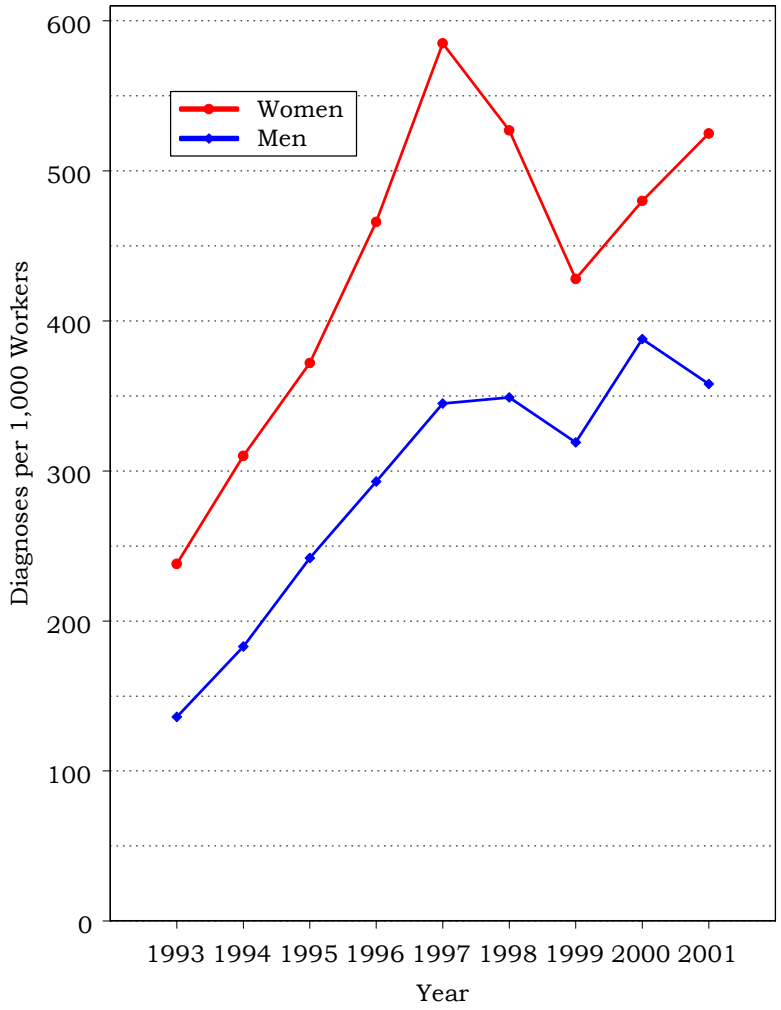


Figure 12. Age-Adjusted Rates for Selected Diagnostic Categories Among Women and Men from 1993 to 2001

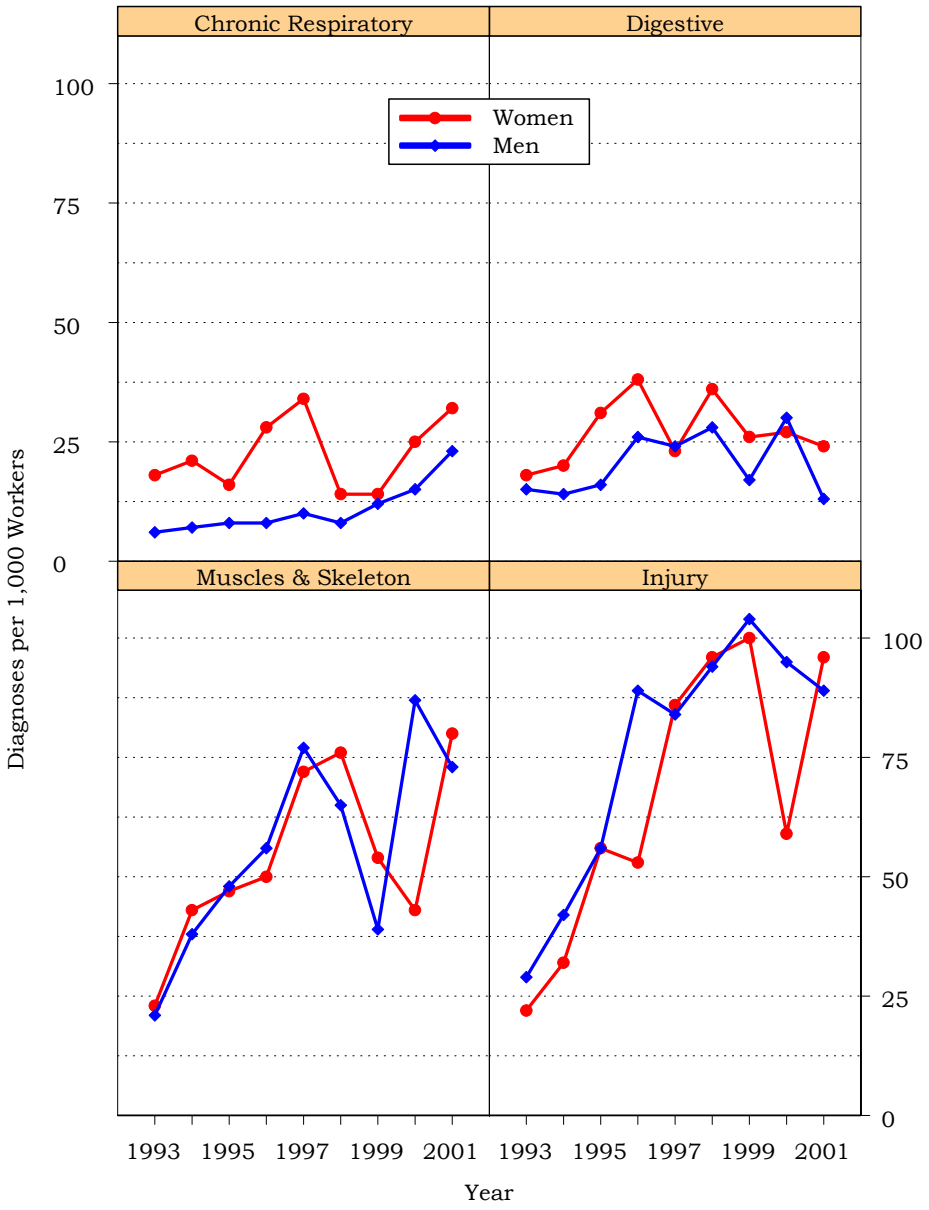
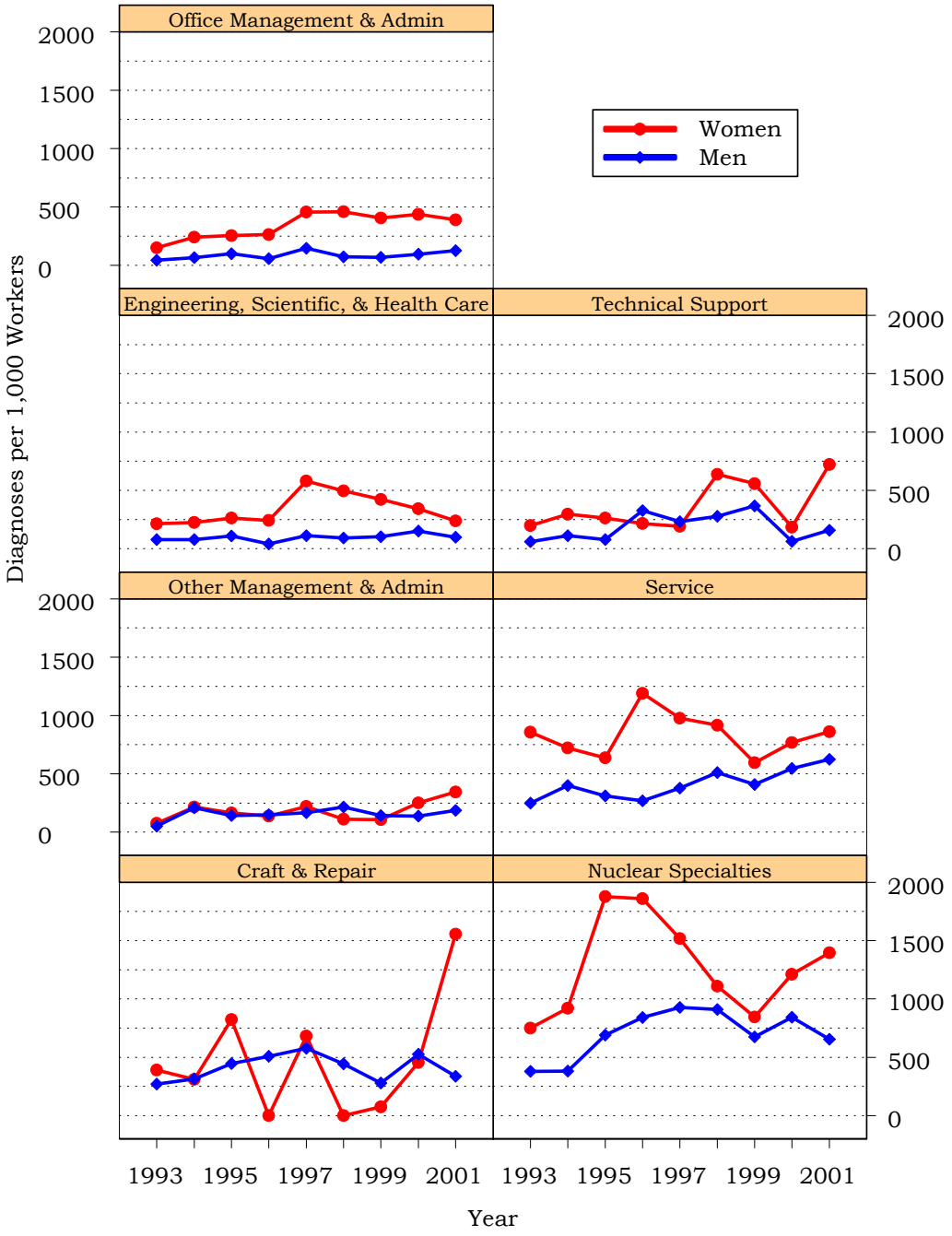


Figure 13. Age-Adjusted Rates for All Diagnoses Combined Among Women and Men by Job Category from 1993 to 2001



Note: A job category for "Other" workers appeared in 1993 only; the 36 employees in this job category were excluded from this figure.

Sentinel Health Events for Occupations

A sentinel health event for occupation (SHEO) is a disease, disability, or death that is likely to be occupationally related. Its occurrence may serve as a warning signal that material substitution, engineering control, personal protection, or medical care may be required to reduce the risk of illness or injury among the work force. Sixty-four medical conditions associated with workplace exposures from studies of many different industries have been identified as sentinel health events. Although sentinel health events may indicate an occupational exposure, many may result from non-occupational exposures. Due to this uncertainty, sentinel health events are assessed in 2 categories:

Definite Sentinel Health Events: Diseases that are unlikely to occur in the absence of an occupational exposure. Asbestosis, a lung disease resulting from exposure to asbestos, is an example.

Possible Sentinel Health Events: Conditions such as lung cancer or carpal tunnel syndrome may or may not be related to occupation. Detailed occupational and non-occupational information is required to determine the work-relatedness of the illness. For example, lung cancer may result from asbestos exposure or smoking. Carpal tunnel syndrome may result from a job requiring typing or from a hobby such as playing the piano.

One definite and 7 possible sentinel health event diagnoses were identified among the 763 reported diagnoses (Figure 14). The 1 definite sentinel health event, reported by a Security worker, was a fracture of the left arm due to a bicycle accident during police training. This event accounted for 76 days absent. The 7 possible sentinel health events were due to carpal tunnel syndrome and accounted for 460 days absent. Two of these events occurred among women, both of whom were aged 30-39. The remaining 5 events occurred among males; 3 were among workers aged 30-39.

Figure 14. Characteristics of SHEOs by Gender

	Total Number of SHEO Diagnoses		Total Number of Days Absent	
	Men	Women	Men	Women
Definite	1	0	76	0
Possible	5	2	253	207
Total	6	2	329	207

Disabilities Among Active Workers

Two disabilities were reported by FEMP in 2001. One was due to a muscles and skeleton condition; the other was due to cancer. Both were male Craft and Repair workers over 50 years old.

Deaths Among Active Workers

Four deaths occurred among FEMP workers in 2001. All 4 deaths were attributed to cancer: 1 bone sarcoma, 1 lung cancer, 1 leukemia, and 1 pancreatic cancer. All of the deaths occurred in male workers aged 50 and older.

OSHA-Recordable Events

The Occupational Safety and Health Administration (OSHA) requires employers to maintain a record of occupational injuries and illnesses that have occurred among employees and to make that information available to OSHA upon request. Employers maintain the information from these OSHA-recordable events in the OSHA 200 Log. OSHA-recordable events differ from health events captured through return-to-work clearances in at least 2 important respects: 1) they do not necessarily result in days lost from work, and 2) they are usually accompanied by a specific determination that they are work-related.

The rates of OSHA events by gender and age are shown in Figure 15. The rates of OSHA-recordable events by job category and gender are shown in Figure 16. Three women and 5 men reported 8 OSHA-recordable events. Figure 18 shows that 7 of the 8 events resulted from accidents: 3 falls and 1 each for struck by an object, caught between objects, fire, and overexertion and strenuous movements. These 7 events resulted in 8 diagnoses: 2 contusions, 2 sprains of the lower limb, and 1 diagnosis each for a second degree burn of the finger, a fractured finger, a lacerated eyeball, and bursitis of the elbow. The 1 event not recorded as an accident had a diagnosis of allergic rhinitis due to pollen (Figure 17).

Figure 15. OSHA-Recordable Events by Gender and Age

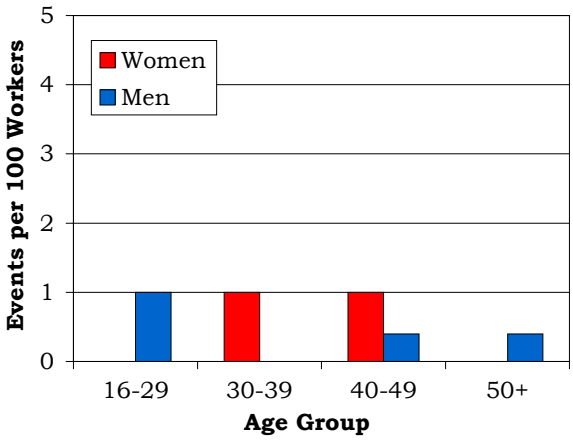


Figure 16. OSHA-Recordable Events by Job Category and Gender

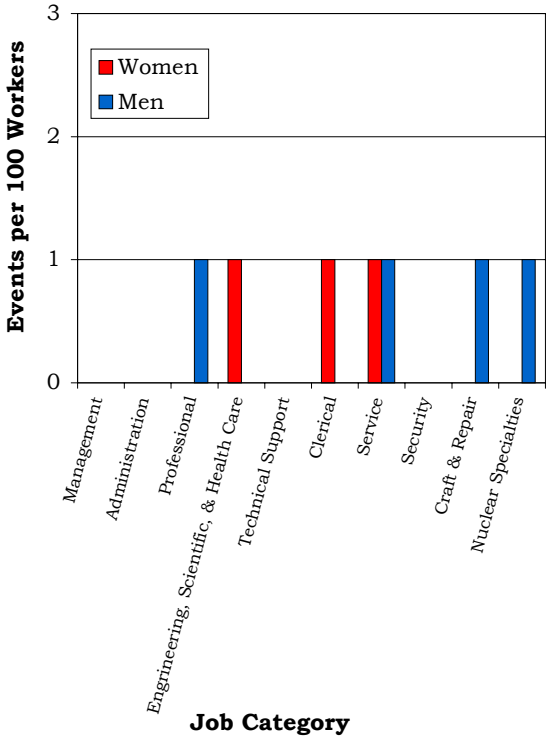


Figure 17. OSHA-Recordable Diagnoses by Diagnostic Category and Gender

Diagnostic Category	Gender	
	Women	Men
Muscles & Skeleton	0	1
Respiratory	0	1
Injury	4	3
Fractures – Upper Limb	1	0
Other Sprains & Strains	0	2
Open Wounds – Head, Neck, Trunk	1	0
Bruises	2	0
Burns	0	1

A total of 100 days were restricted due to OSHA events in 2001; no lost workdays were recorded. These restricted days resulted from a man who fell and sprained his ankle and a woman whose finger was fractured when caught between 2 objects.

There were no OSHA events reported by men aged 30-39 years old or by women aged 16-29 or 50 years or older. Among men and women, no OSHA events were reported by Management, Administration, Technical Support, or Security workers. These same occupational groups had no OSHA events in 2000.

Figure 18. OSHA-Recordable Accidents by Type and Gender

Accident Category	Gender	
	Women	Men
	Number of Accidents	Number of Accidents
Falls	1	2
Fire	0	1
Other Accidents	2	1
Struck by an Object	1	0
Caught Between Objects	1	0
Overexertion/Strenuous Movements	0	1
Total	3	4

Rates of OSHA-Recordable Events

The rates of all OSHA-recordable events by age and job categories and gender are shown in Figures 19 and 20.

Figure 19. OSHA-Recordable Rates by Age and Job Categories Among Women, All Diagnoses Combined

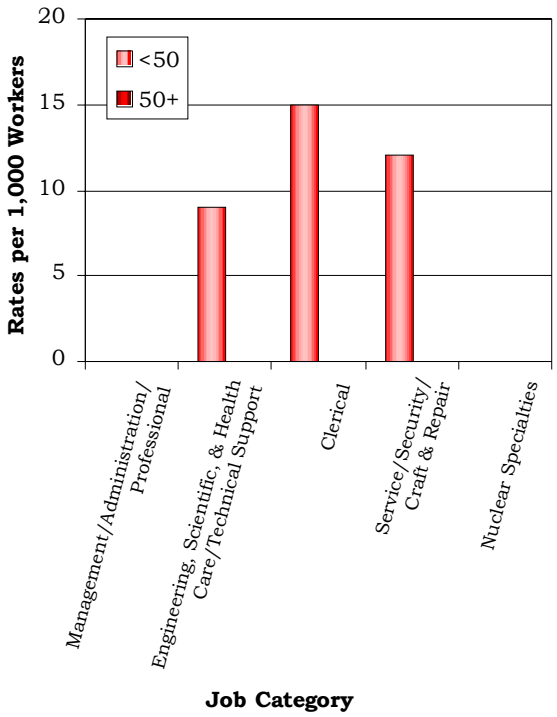
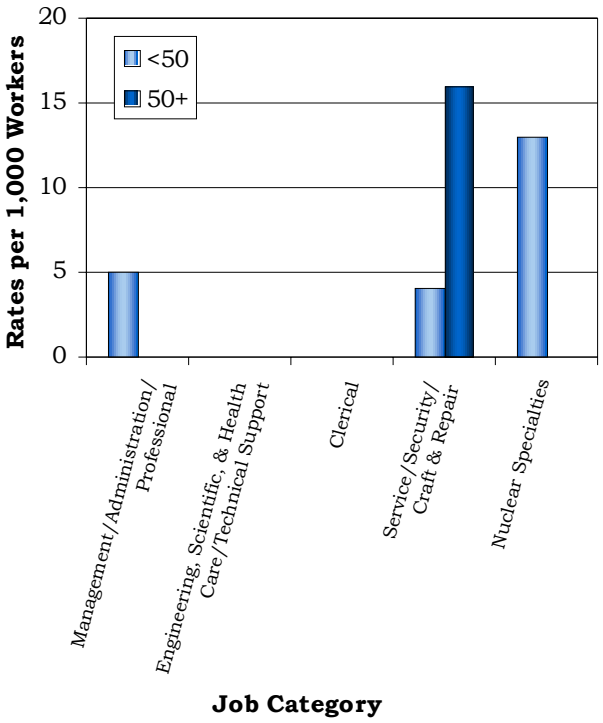


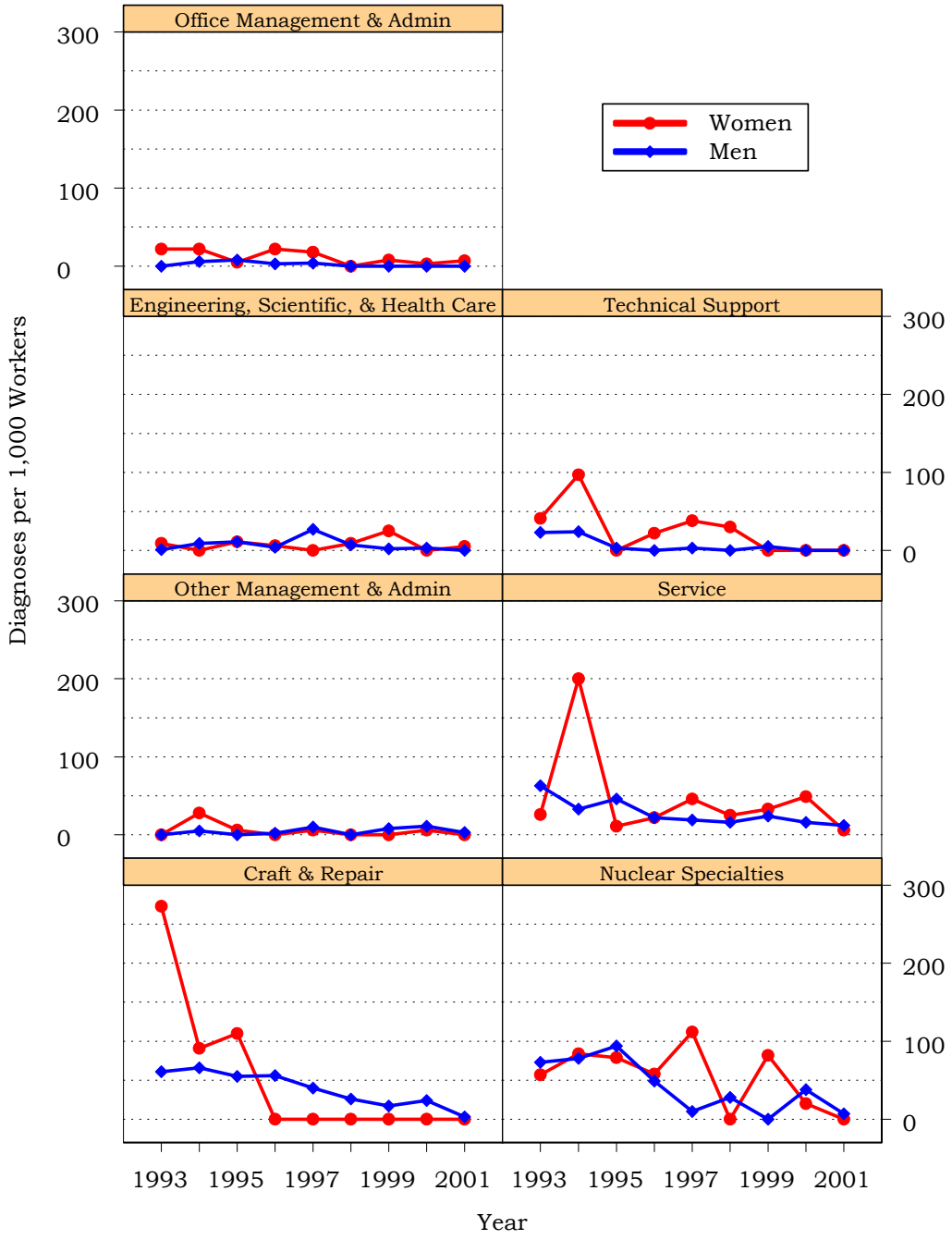
Figure 20. OSHA-Recordable Rates by Age and Job Categories Among Men, All Diagnoses Combined



Time Trends for OSHA-Recordable Events

The age-adjusted rates for all OSHA-recordable diagnoses combined from 1993 to 2001 by job category and gender are shown in Figure 21. During the 9-year period, the overall rates for OSHA-recordable events did not change greatly for most of the job categories among men and women. There were no significant changes noted in the injury rates among OSHA-recordable events from 1993 to 2001.

Figure 21. Age-Adjusted Rates for All OSHA-Recordable Diagnoses Combined Among Women and Men by Job Category from 1993 to 2001



Note: A job category for "Other" workers appeared in 1993 only; the 36 employees in this job category were excluded from this figure.

Glossary

Adjustment: A mathematical procedure for rates in which the effects of differences of a characteristic (such as age or gender) between groups have been removed. The purpose of adjustment is to allow comparisons between 2 or more groups with the effect of the differences for the characteristic removed.

Age-Adjusted Rate: A rate that has been mathematically adjusted to account for the effects of differences in the age composition between groups.

Age-Specific Rate: A rate that is calculated for a specific age group (e.g., 16 to 29 years old). Only people in the specific age group are included in the calculation of the rate.

Confidence Interval: A range of values determined by the degree of random variability in the data. The width of the confidence interval is affected by the size of the group being studied and how often the event whose true value is sought occurs. Generally, as the size of the group or the frequency of the event increases, the width of the confidence interval decreases. The level of confidence, for example a 95 percent confidence level, indicates the percentage (e.g., 95 percent) of time that the true value is expected to fall within the confidence interval if the mathematical procedure is repeated 100 times.

Demographics: Characteristics of human populations related to their size, density, age distribution, and vital status.

Diagnosis (diagnoses): Identification of a disease or health condition from signs and symptoms.

Diagnosis Rate: The number of occurrences of a given disease or health condition observed during a given time period per the number of workers at risk of getting that disease during that time period. It is usually multiplied by 100 or 1,000 to produce a rate expressed as a convenient number.

Diagnostic Category: A particular type of disease, a group of related health conditions, or diseases that all affect the same organ system.

Epidemiologic Surveillance: The ongoing evaluation of the health of a human population which is based on the collection and interpretation of demographic and health information for that population.

Epidemiology: The study of the distribution and determinants of diseases and health conditions in human populations.

ICD-9-CM Code: An abbreviation for the *International Classification of Diseases, 9th Revision, Clinical Modification*. An internationally accepted standardized system for the classification of disease and health data collected from medical records.

OSHA: An acronym for the Occupational Safety and Health Administration.

OSHA Event: An abbreviation used throughout this report for an OSHA-Recordable Event.

OSHA-Recordable Event: An accident that occurs on the job and involves fatalities (regardless of time between injury and death), time lost from work, transfer of employment, medical treatment other than first aid, loss of consciousness, or restriction of work or motion. Also included is any diagnosed occupational health event reported to the employer that is neither fatal nor results in workdays lost. By law, these events are recordable in the OSHA 200 Log.

Person-Year: A unit of measurement combining the number of people being studied with the time that each was observed equivalent to 1 person followed for 1 year. For example, 5 people followed for 1 year contribute 5 person-years, as do 10 people each followed for half a year.

Relative Risk: The ratio of the occurrence of a disease or health condition in 1 group compared with the rate of occurrence of that same disease or health condition in another group.

Explanation of Diagnostic Categories

Throughout this report, health conditions have been grouped into a number of diagnostic categories which come from the *International Classification of Diseases, 9th Revision, Clinical Modification* (ICD-9-CM). For the text of this report the categories are abbreviated to make the report easier to read. The following table lists the abbreviated categories used throughout the annual report and the corresponding ICD-9-CM codes found in the supporting tables.

Abbreviated Categories Used in the Annual Report	ICD-9-CM Codes
Benign Growths	210-229 235-239
Blood	280-289
Cancer	140-208 230-234
Digestive	520-579
Endocrine / Metabolic	240-279
Existing Birth Conditions	740-759
Genitourinary	580-629
Heart / Circulatory	390-459
Infections / Parasites	001-139
Injury	800-999
Miscarriage	630-676
Muscles and Skeleton	710-739
Nervous System	320-389
Psychological	290-319
Respiratory	460-519
Skin	680-709
Unspecified Symptoms	780-799

ICD-9-CM Codes

All conditions	001-V82	All reported health events
Infectious and parasitic diseases	001-139	Diseases caused by bacteria, viruses, and parasites
• Intestinal infections	001-009	Infections of the bowel or gut
• Tuberculosis	010-018	TB in the lungs and other organs
• Zoonotic bacterial diseases	020-027	Bacterial diseases that animals transmit to humans
• Other bacterial diseases	030-041	Whooping cough, diphtheria, strep throat, and gangrene
• Human Immunodeficiency Virus (HIV) infection	042	AIDS
• Poliomyelitis and other non-arthropod diseases of the central nervous system	045-049	Viral meningitis (swelling of the layers covering the brain and spinal cord); viral encephalitis (swelling of the brain); and polio
• Viral diseases accompanied by exanthem	050-057	Diseases accompanied by rashes or blisters like chickenpox, measles, shingles, and herpes
• Arthropod-borne viral diseases	060-066	Encephalitis (swelling of the brain) caused by bites from virus-carrying ticks or mosquitoes
• Other diseases caused by viruses and chlamydiae	070-079	Viral hepatitis, mumps, rabies, and mononucleosis
• Rickettsioses and other arthropod-borne diseases	080-088	Rocky Mountain spotted fever, malaria, and lyme disease
• Other spirochetal diseases	100-104	Trench mouth and Weil's disease (jaundice caused by coil-shaped bacteria)
• Mycoses	110-118	Athlete's foot; fungal infections of fingernails and toenails; and thrush
• Helminthiases	120-129	Pinworms, tapeworms, roundworms, and whipworms

• Other infectious and parasitic diseases	130-136	Lice, chiggers, scabies, and mites
• Late effects of infectious or parasitic diseases	137-139	Side effects of TB, chickenpox, or polio even though the disease is no longer active
Malignant neoplasms	140-208, 230-234	All cancers, regardless of the part of the body affected
• Lip, oral cavity, and pharynx	140-149	Lip, mouth, throat, and tongue
• Digestive organs and peritoneum	150-159	Stomach, esophagus (tube that transports food to the stomach), intestines, colon, rectum, anus, liver, pancreas, and gallbladder
• Respiratory system and intrathoracic organs	160-165	Sinuses, throat, voice box, lungs, and heart
• Bone, connective tissue, skin, and breast	170-176	Bone, muscle, ligament, tendon, blood vessels, fat, skin, and breast
• Genitourinary organs	179-189	Kidney, bladder, and cervix, ovary, uterus, and prostate
• Other and unspecified sites	190-199	Eye, brain, and thyroid
• Lymphatic and hematopoietic tissue	200-208	Leukemia, lymphoma, Hodgkin's disease, multiple myeloma, lymphosarcoma, and reticulum cell sarcoma
• Carcinoma in situ	230-234	A cancer that is confined to the site of origin (has not spread to neighboring tissue)
Benign neoplasms and neoplasms of uncertain behavior and unspecified nature	210-229 235-239	Tumors that are not cancerous or do not exhibit cancerous behavior, regardless of the part of the body affected
Endocrine, nutritional, and metabolic diseases and disorders of the immune system	240-279	Diseases affecting the hormone secreting glands and organs. Overactive thyroid; underactive thyroid; vitamin deficiency; diabetes; gout; and problems affecting the antibody producing system

Disorders of the blood and blood forming organs	280-289	Anemia and hemophilia (excludes leukemia)
Mental disorders	290-319	Psychiatric diagnoses - Non-psychotic disorders: depression; anxiety, fear, and stress disorders; alcoholism; drug dependence; and eating disorders, such as anorexia; Psychotic disorders: dementia, schizophrenia, and manic depression
Diseases of the nervous system and sense organs	320-389	Huntington's chorea; Alzheimer's and Parkinson's disease; epilepsy; multiple sclerosis; migraine; diseases of the eye, such as cataract and glaucoma
• Inflammatory diseases of the central nervous system	320-326	Bacterial meningitis (swelling of the layers covering the brain and spine); bacterial encephalitis (swelling of the brain); and brain and spinal abscesses
• Hereditary and degenerative diseases of the central nervous system	330-337	Alzheimer's and Parkinson's disease, tremors, and Huntington's chorea
• Other disorders of the central nervous system	340-349	Multiple sclerosis (MS), cerebral palsy, epilepsy, and migraine
• Disorders of the peripheral nervous system	350-359	Nerve disorders of the face, carpal tunnel syndrome, muscular dystrophy
• Disorders of the eye	360-379	Inflammation and ulcers of the eye and eyelid; detached retina; pink eye; problems with tear ducts; glaucoma; and cataracts
• Diseases of the ear and mastoid process	380-389	Infections of the outer, middle, or inner ear; ringing of the ears; hearing loss

Diseases of the circulatory system	390-459	Rheumatic fever, heart murmurs, heart attacks, angina, hardening of the arteries, varicose veins, hemorrhoids, and phlebitis
• Acute rheumatic fever	390-392	High fever and joint pain with possible heart damage
• Chronic rheumatic heart disease	393-398	Long lasting swelling and damage to the heart which results from rheumatic fever
• Hypertensive disease	401-405	High blood pressure
• Ischemic heart disease (Restricted blood flow to the heart)	410-414	Heart attack and angina
• Diseases of pulmonary circulation	415-417	Blood clots in the lung and pulmonary aneurysm (bulge that develops in the wall of the pulmonary artery, which is the artery that carries blood to the lungs)
• Other forms of heart disease	420-429	Swelling of the inner lining, middle lining, or sac enclosing the heart; heart failure; and irregular heartbeat
• Cerebrovascular disease	430-438	Stroke, bleeding in the brain, and blockage or low blood flow in blood vessels of the brain
• Diseases of the arteries and capillaries	440-448	Hardening of the arteries; aneurysm (bulge that develops in the walls of arteries); and blood clots
• Diseases of the veins, lymphatics, and other circulatory system diseases	451-459	Phlebitis (swelling of a vein), thrombophlebitis (swelling of a vein which has a blood clot), varicose veins, and hemorrhoids

Diseases of the respiratory system	460-519	Colds, sinusitis, laryngitis, pneumonia, influenza, chronic bronchitis, asthma, and emphysema
• Acute respiratory infections	460-466	Colds, sore throat, sinus infections, swollen tonsils, and bronchitis
• Other diseases of the upper respiratory tract	470-478	Allergies, hay fever, sinus infections, bronchitis, and sore throat that continue for a long time
• Pneumonia and influenza	480-487	"The flu" and pneumonia caused by a bacteria or virus
• Chronic obstructive pulmonary diseases and allied conditions	490-496	Emphysema and asthma
• Pneumoconiosis and other lung diseases caused by external agents	500-508	Black lung; miners' asthma; asbestosis; silicosis; berylliosis; and conditions caused by chemical fumes and vapors
• Other diseases of the respiratory system	510-519	Pleurisy (swelling of the lining of the lungs), collapsed lung, and respiratory failure
Diseases of the digestive system	520-579	Diseases affecting the teeth and mouth, salivary glands, digestive tract, and the abdominal cavity. Examples include dental abscess, ulcers, appendicitis, hepatitis (excluding viral hepatitis), cirrhosis of the liver, gallstones, pancreatitis, abdominal hernia, and intestinal polyps
• Diseases of the oral cavity, salivary glands, and jaw	520-529	Tooth problems (too many, too few, abnormal shape or size, cavities, bleeding gums, toothaches), and infections and swelling of the mouth, jaw, and tongue
• Diseases of the esophagus, stomach, and duodenum	530-537	Ulcers of the esophagus (tube that transports food to the stomach), stomach, and small intestine; indigestion; and uncontrollable vomiting

• Appendicitis	540-543	Swelling of the appendix (rupture, surgery, or both may result)
• Hernia of the abdominal cavity	550-553	Ruptures of the groin and diaphragm (muscle which separates the chest area from the lower part of the trunk)
• Non-infectious enteritis and colitis	555-558	Crohn's disease and swelling of the intestine and colon
• Other diseases of the intestines and peritoneum	560-569	Irritable bowel syndrome, blockage of the intestine, constipation, and diarrhea
• Other diseases of the digestive system	570-579	Diseases of the liver, gallbladder, and pancreas; hepatitis; blood in stool; and bleeding in the stomach and intestine
Diseases of the genitourinary system	580-629	Diseases affecting the kidneys, the prostate, and testes; benign breast diseases; infertility (male and female); diseases of the ovary; pelvic inflammatory disease; and menstrual disorders
• Nephritis, nephrotic syndrome, and nephrosis	580-589	Swelling of the kidney; swelling of the small blood vessels in the kidney; and kidney failure
• Other diseases of the urinary system	590-599	Swelling and infection of the kidney and bladder; kidney stones; and difficulty urinating
• Diseases of the male genital organs	600-608	Enlarged prostate; swelling of the scrotum and prostate; and abscess of the prostate
• Disorders of the breast	610-611	Benign tumors, cysts, and infections of the breast
• Inflammatory disease of the female pelvic organs	614-616	Swelling of the uterus, ovary, fallopian tubes, or cervix
• Other diseases of the female genital tract	617-629	Conditions associated with menopause and postmenopause; PMS; infertility; and cramps

Complications of pregnancy, childbirth, and the puerperium	630-676	Miscarriage; complications of pregnancy, such as hemorrhage; pregnancy-related high blood pressure; preeclampsia; and premature labor or other complications of labor
• Ectopic and molar pregnancy	630-633	Development of fetus outside the uterus and growth of cysts
• Other pregnancy with abortive outcome	634-639	Miscarriage and complications associated with miscarriage
• Complications mainly related to pregnancy	640-648	Abnormal bleeding and possible miscarriage; infections; high blood pressure caused by pregnancy; and premature labor
• Normal delivery, and other indications for care in pregnancy, labor, and delivery	650-659	Delivery requiring little or no assistance; multiple births; breech birth; and problems of the fetus or placenta which affect care of mother
• Complications occurring mainly in the course of labor and delivery	660-669	Long labor; unusually fast delivery; and abnormal bleeding after delivery
• Complications of the puerperium	670-676	Infections of the breast; blood clot in lung; and varicose veins
Diseases of the skin and subcutaneous tissue	680-709	Acne, cellulitis, sunburn, psoriasis, and seborrhea
• Infections of the skin and subcutaneous tissue	680-686	Abscesses, boils, hair-containing cysts, and pus-filled blisters
• Other inflammatory conditions of skin and subcutaneous tissue	690-698	Skin rashes caused by detergents, oils, greases, solvents, sun, food, drugs, or medicine
• Other diseases of the skin and subcutaneous tissue	700-709	Corns, calluses, heat rash, swollen hair follicles, acne, and ingrown fingernails and toenails

Diseases of the musculoskeletal system and connective tissue	710-739	Arthritis, systemic lupus erythematosus, ankylosing spondylitis, herniated intervertebral disk ("slipped disk"), lumbago, sciatica, rheumatism, tendonitis, and osteoporosis
• Arthropathies and related disorders	710-719	Arthritis; joint pain and stiffness; and other diseases of the connective tissue which supports and connects internal organs, forms bones and blood vessel walls, and attaches to bones
• Dorsopathies	720-724	Swelling of the spine; herniated, slipped, and ruptured disk; rheumatoid arthritis of the spine; lumbago; and sciatica
• Rheumatism, excluding the back	725-729	Swelling and degeneration of joints, muscles, tendons; tennis elbow; and bursitis
• Osteopathies, chondropathies, and acquired musculoskeletal deformities	730-739	Fracture caused by bone disease; osteoporosis; curvature of the spine; flat foot; hammer toe; and development of deformities of the nose, toes, feet, legs, arms, and hands
Congenital anomalies	740-759	Spina bifida; cleft palate; harelip; and various chromosomal anomalies, such as Klinefelter's syndrome
Certain conditions originating in the perinatal period	760-779	Maternal high blood pressure; maternal malnutrition; ectopic pregnancy; breech birth; fetal malnutrition or slow growth; injuries related to birth trauma; and perinatal jaundice
Symptoms, signs, and ill-defined conditions	780-799	Blackout, chills, dizziness, fatigue, pallor, abnormal weight loss, undiagnosed chest pain, and heartburn

• Symptoms	780-789	Hallucinations, fainting, convulsions, dizziness, fatigue, fever, sleep disturbance, rash, headache, sore throat, chest pain, nausea, vomiting, and heartburn
• Non-specific abnormal findings	790-796	Abnormal x-ray, blood, stool, and urine test results
• Ill-defined and unknown causes of morbidity and mortality	797-799	Senility; asphyxia; respiratory arrest; nervousness; and unexplained death within 24 hours of onset of symptoms
Injury and poisoning	800-999	Dislocation of joints; sprains and strains of associated muscles; concussions; bruises; cuts; internal injuries from crushing, puncture, tearing, or blunt impact; burns; blisters; poisoning; frostbite; heatstroke; and complications of medical or surgical care
• Fractures, all sites	800-829	Cracks or breaks of any bone
• Dislocations	830-839	Separation of a bone from its normal socket or joint
• Sprains and strains of joints and adjacent muscles	840-848	Strains are injuries to muscle from overuse or stretching the muscle beyond its normal limit; sprains are injuries involving tearing or overextending the ligaments of a joint
• Intracranial injuries excluding those with skull fractures	850-854	Concussions; internal bruises; and bleeding within the head without a fracture of the bones of the skull
• Internal injuries of the thorax, abdomen, and pelvis	860-869	Bruising, crushing, tearing, or rupturing the chest, abdomen, and pelvis and the organs within these areas of the body
• Open wounds	870-897	Animal bites; cuts; lacerations; punctures; and amputations, excluding the arteries and veins

• Other injuries and late effects of external causes	900-999	Miscellaneous injuries, including injuries to the arteries and veins; problems that occur an extended period of time after the injury has taken place (”late effects”); superficial bruises and abrasions; burns; post-injury shock; poisoning; toxic side effects of chemicals; heatstroke; electrocution; and altitude sickness
Supplementary classifications related to personal or family history of disease	V10-V19	Covers situations in which the person is not ill or injured but has a personal or family history of problems, such as cancer, mental illness, allergies, or arthritis that may affect his or her risk of illness
Supplementary classifications related to health care for reproduction and child development	V20-V28	Problems related to pregnancy, postpartum care, contraception, outcome of delivery, and physical development of child
Contact with health services for reasons other than illness or injury	V50-V59	Care for workers who have been treated previously for an illness or injury that is no longer present but who receive care to complete treatment or prevent recurrence

NOTES