1996 Fernald Annual Epidemiologic Surveillance Report

DOE/EH-0613

FERNALD
1996 Epidemiologic Surveillance Report

Questions or comments about this report or the Epidemiologic Surveillance Program may be directed to:

Dr. Cliff Strader at **cliff.strader@eh.doe.gov**
or Dr. Bonnie Richter at **bonnie.richter@eh.doe.gov**
United States Department of Energy
Office of Epidemiologic Studies
Mail Stop: 270CC/EH-62
19901 Germantown Road
Germantown, MD 20874-1290

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

http://www.eh.doe.gov/epi/surv

FERNALD 1996

At a Glance

Sixty percent of the diagnoses that resulted in an absence of 5 or more days among men at Fernald in 1996 were due to injuries, muscles and skeleton disorders, and respiratory diseases.

About half of the most frequently reported diagnoses among women at Fernald were due to respiratory diseases; psychological disorders related to anxiety, stress, and depression; and muscles and skeleton problems.

The rates for all diagnoses combined have been steadily increasing over time (1993 to 1996) for both men and women. The overall increase is primarily due to an increase in the number of injury diagnoses among men and psychological and respiratory diagnoses among women.

About 1.5 percent of all Fernald workers experienced an occupational injury that was OSHA-recordable. Men and women in Nuclear Specialties had the highest rates of OSHA-recordables compared with those in other job categories.

There were 349 lost or restricted workdays resulting from 35 occupational incidents (OSHA-recordable events) among the Fernald work force.

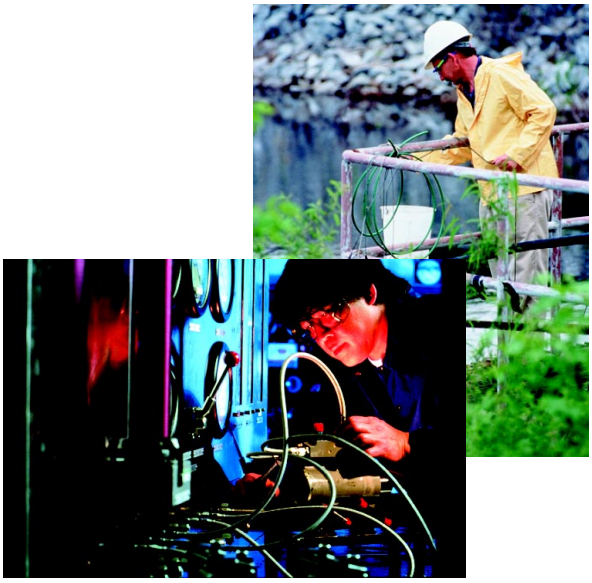
Introduction

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 to detect health problems among workers. The Epidemiologic Surveillance Program monitors illnesses and health conditions that result in an absence of 5 or more consecutive workdays, 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, 1996 through December 31, 1996. The data were collected by a coordinator at FEMP and submitted to the Epidemiologic Surveillance Data Center, located at Oak Ridge Institute for Science and Education, where quality control procedures and data analyses were carried out. Epidemiologic surveillance has been ongoing at FEMP since 1993.

The Epidemiologic Surveillance report for FEMP has been redesigned for 1996. The information presented in this report provides highlights of the data analyses conducted. Surveillance reports and additional supporting tables are posted on the Office of Epidemiologic Studies' Web Site **(http://www.eh.doe.gov/epi/surv)**, or are available by request. The main sections of the report include: work force characteristics; absences due to injury or illness of 5 or more consecutive workdays; 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. The report also includes time trend analyses, providing comparative data from 1993 to 1996. Also note that in the figures and tables that follow, percentages and other calculated numbers 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, 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 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 from 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.

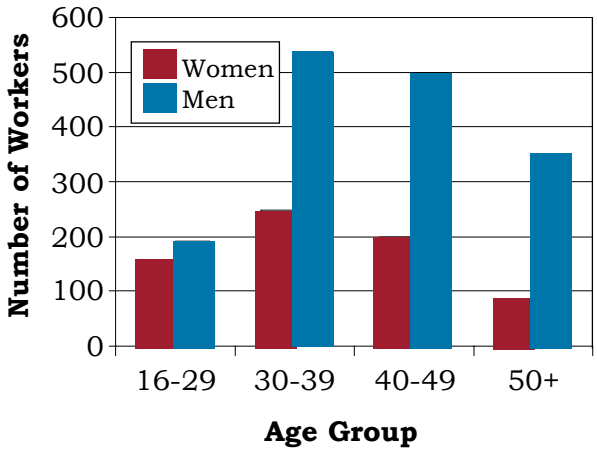
Fernald is now engaged in an environmental cleanup program to address concerns associated with the former production mission.

The Fernald Work Force - 1996

A total of 2,265 employees were included in the Epidemiologic Surveillance Program in 1996. There has been a 14 percent decline in the number of workers from a peak work force of 2,646 in 1994. The gender and age distribution of the 1996 work force is shown in Figure 1. There were 1,578 men (70 percent) and

687 women (30 percent) in the FEMP work force.The average age was 41 years for male workers and 38 years for females. The majority (89 percent) of the work force was White, 9 percent were African American; and the remaining 2 percent were Hispanic, Asian, Native American, and others.

Figure 1. The Work Force by Gender and Age



Individual job titles reported by Fernald were grouped together into job categories. This is because there were either too few workers or health events within a particular job title, thereby limiting the types of analyses that could be conducted. The distribution of workers by gender and job category is shown in Figure 2. Men and women were not distributed equally among the various job categories. Forty percent of the women were clerical workers compared with 2 percent of the men. More than half (63 percent) of the men were categorized as white collar workers compared with 41 percent of the female work force. A more detailed distribution of the work force by gender, age, and job category is available on the Web site in the Supplemental Tables.

Figure 2. The Work Force by Job Category and Gender

Job Category	Women	Men
Management	9 1%	80 5%
Administration	21 3%	137 9%
Professional	129 19%	334 21%
Engineering, Scientific, & Health Care	82 12%	330 21%
Technical Support	44 6%	111 7%
Clerical	277 40%	39 2%
Service	76 11%	150 10%
Security	3 < 1%	17 1%
Craft & Repair	4 1%	201 13%
Nuclear Specialties	42 6%	179 11%

Number and Length of Absences

Epidemiologic surveillance examines illness and injury absences of 5 or more consecutive workdays (also referred to as "5-day absences"). 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 work-

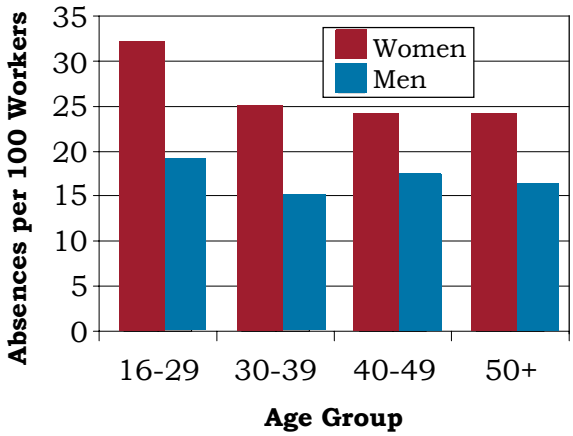
days. If an absence on a Friday continues through Monday, the length of that absence includes the weekend. All injuries and illnesses due to a work-related incident must be reported regardless of the length of absence. Non-occupational illnesses and injuries that involve absences less than 5 days do not routinely require a medical clearance for return to work and are excluded from these analyses.

One change from earlier surveillance reports is the exclusion of some absences of 5 or more consecutive workdays. These include absences due to maternity leave and absences due to elective surgical procedures not related to the treatment of an illness or injury. Excluded from the 1996 report were 27 women with 29 absences due to maternity leave and 4 workers absent for elective surgery that was not related to the treatment of an illness or injury.

Throughout this report, analyses take gender, age, and occupation into account because the risk of illness and injury varies by these factors. This is done either by stratification into distinct categories or by statistical methods of adjustment.

The number of 5-day absences due to injury or illness varied by gender and age as shown in Figure 3. Female employees had a higher rate of absence compared with men for each age group. There were 180 absences of 5 or more workdays among 687 female employees resulting in an absence rate of 26 per 100 workers. Among the 1,578 men, there were 261 reported absences of 5 or more workdays resulting in an absence rate of 17 per 100 workers. The rate of reported absences of 5 or more days did not vary much by age category for either women or men, with the exception of a slightly higher rate among employees aged 16-29.

Figure 3. Absence Rate by Gender and Age



The average duration of absence by gender and age category is shown in Figure 4. Overall, men were absent for more days than women, 35 days versus 32 days. This is particularly true in the oldest age group. Among those 50 years or older, men were absent about 40 days compared with 33 days for women. Among those younger than age 50, men were absent about 33 days compared with 32 days for women.

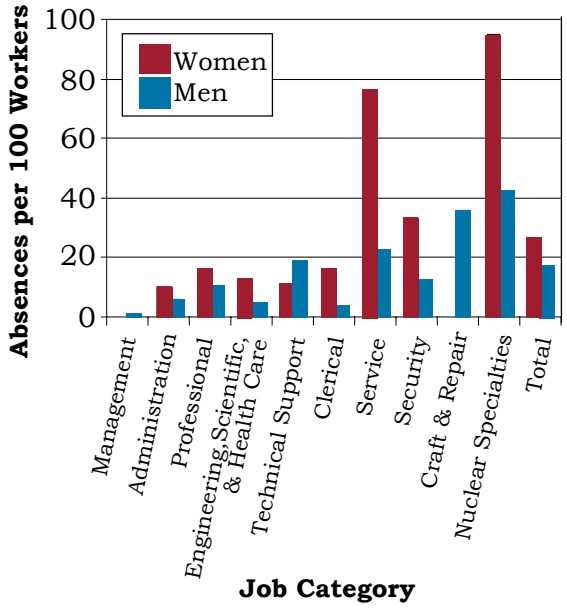
Figure 4. Number of Days Absent by Gender and Age

Gender	Age	Number of Absences	Number of Days Absent	Average Number of Days Absent
Women	16 - 29	50	1,380	28
	30 - 39	63	1,970	31
	40 - 49	47	1,798	38
	50 +	20	669	33
	Total	180	5,817	32
Men	16 - 29	36	1,048	29
	30 - 39	82	2,721	33
	40 - 49	87	3,091	36
	50 +	56	2,237	40
	Total	261	9,097	35

The rate of 5-day absences due to illness or injury varied by job category as shown in Figure 5. Generally, female workers had higher rates of absence for any given job category compared with male workers. Among women, those categorized as Nuclear Specialties had the highest absence rate, 95 per 100 workers, followed by female Service workers, 76 absences per 100 workers. These rates were two to three times higher than the comparable rates for men. Nuclear Specialties had the highest absence rates among male workers, 43 per 100 workers, followed by those categorized as Craft and Repair workers, 36 absences per 100 workers. Among men and women, the lowest absence rates were among white collar workers.

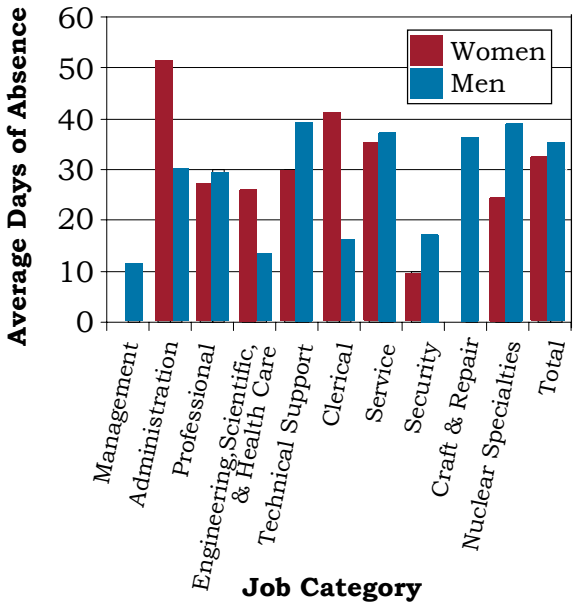
The average duration of absence by job category and gender is shown in Figure 6. Among men, the occupational groups that had the highest rates of absence, Nuclear Specialties and Craft and Repair workers, tended to have the longest duration of absence. Among women, those categorized in Administration were absent the longest, but it was based on only two absences. Clerical

Figure 5. Absence Rate by Job Category and Gender



workers averaged longer absences than females in Nuclear Specialties or Service. Additional information about the number and length of absences for men and women in different age and job categories are in the Supplemental Tables (on the Web or available by request).

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



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 are reported to the occupational medicine clinic by workers who require return-to-work clearances. An absence due to illness or injury may involve more than one 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 Disease, 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 (that may include weekends and holidays) are presented in Figure 7. Lost calendar days for each diagnosis are counted more than once when multiple diagnoses occur in different diagnostic categories for the same absence. There were 317 diagnoses reported by female and 437 diagnoses among male FEMP workers in 1996. Women accrued 8,606 lost calendar days (may include weekends and holidays) due to injury and illness. About half of the most frequently reported diagnoses among women were due to three disease categories: 1) respiratory diseases (21 percent), 2) psychological disorders related to anxiety, stress, and depression (15 percent), and muscles and skeleton problems (14 percent).

Rheumatism accounted for 37 percent of the diagnoses involving the muscles and skeleton, followed by back problems, 30 percent, and arthritis, 21 percent.

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

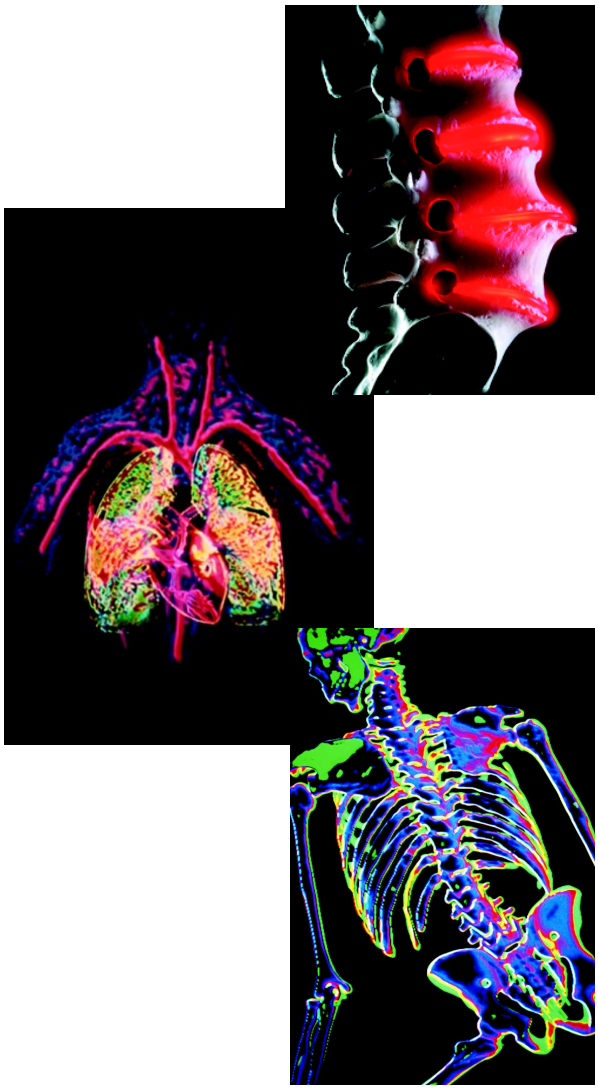
Diagnostic Category	Women		Men	
	Number of Diagnoses	Number of Lost Calendar Days	Number of Diagnoses	Number of Lost Calendar Days
Benign Growths	10	297	5	184
Cancer	6	324	3	39
Digestive	28	674	41	1,029
Endocrine / Metabolic	1	20	4	107
Existing Birth Condition	1	44	1	70
Genitourinary	23	450	11	261
Heart / Circulatory	6	394	29	942
Infections / Parasites	11	155	4	62
Injury	31	1,252	121	4,034
Miscarraige	1	21	NA	NA
Muscles and Skeleton	43	1,441	80	2,718
Nervous System	20	522	20	582
Psychological	46	1,052	22	445
Respiratory	66	882	60	707
Skin	1	9	6	189
Unspecified Symptoms	23	1,069	30	575

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

Men accrued 11,944 lost calendar days due to injury and illness. Sixty percent of the diagnoses among men were due to injuries (28 percent), muscles and skeleton disorders (18 percent), and respiratory problems (14 percent). Back problems accounted for 38 percent of the diagnoses involving muscles and skeleton conditions, 31 percent were due to rheumatism, and 22 percent were due to arthritis. Among men, infections (colds, sinusitis, etc) accounted for 43 percent of the respiratory conditions; pneumonia and flu accounted for 30 percent, and chronic obstructive disease accounted for 23 percent. Frequently reported injuries among men were sprains and strains (44 percent), fractures (15 percent), open wounds (9 percent), and dislocations (7 percent).

Figure 8 shows the frequency of reported diagnoses by job category for men and women. Respiratory disorders were frequently reported among women in half of the job categories, especially among Clerical, Service, and Nuclear Specialties workers. Psychological disorders such as anxiety, stress, and depression were frequently reported among women in the Professional, Clerical, Service, and Nuclear specialties job categories. This condition was notably absent among men. Muscles and skeleton conditions were reported by women in the Engineering, Scientific & Health Care job category, and by those in Clerical, Service, and Nuclear Specialties.

Among men, respiratory conditions, injuries, and muscles and skeleton conditions appeared often in nearly every job category.



Injuries were reported most frequently by men in the Service, Craft and Repair, and Nuclear Specialties categories. Muscles and skeleton conditions were frequently reported by Technical Support, Service, Craft and Repair, and Nuclear Specialties workers. Respiratory conditions were frequently reported by men in all job categories except Management, Security, and Nuclear Specialties.

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

Job Category	Men	Women
Management	Nervous System (2)	None
Administration	Respiratory (4) Digestive (2) Injury (2) Muscles and Skeleton (2)	Digestive (1) Injury (1)
Professional	Digestive (10) Heart / Circulatory (10) Injury (7) Respiratory (7)	Psychological (6) Benign Growths (4) Digestive (4) Genitourinary (4) Respiratory (4)
Engineering, Scientific, & Health Care	Respiratory (4) Genitourinary (3) Injury (3) Muscles and Skeleton (3)	Muscles and Skeleton (6) Digestive (5) Unspecified Symptoms (3)
Technical Support	Respiratory (8) Muscles and Skeleton (8) Injury (7) Digestive (5) Unspecified Symptoms (5)	Nervous System (2)
Clerical	Heart/ Circulatory (2) Respiratory (2) Injury (1) Unspecified Symptoms (1)	Respiratory (18) Muscles and Skeleton (15) Psychological (10)
Service	Injury (16) Muscles and Skeleton (9) Respiratory (8)	Respiratory (23) Psychological (16) Muscles and Skeleton (11)
Security	Injury (2)	Respiratory (1) Nervous System (1) Unspecified Symptoms (1)
Craft & Repair	Injury (34) Muscles and Skeleton (26) Respiratory (21)	None
Nuclear Specialties	Injury (49) Muscles and Skeleton (31) Digestive (12)	Respiratory (18) Psychological (13) Injuries (10) Muscles and Skeleton (10)

Note: Numbers in parentheses are number of diagnoses reported.

Rates of Disease Occurrence

A Word about Rates: The previous section considered the **number** of absences and diagnoses among various worker groups. For example, Figure 7 shows that men reported 80 and women reported 43 diagnoses involving muscles and skeleton conditions during 1996. Men, therefore, reported almost twice as many muscles and skeleton health conditions as women. As there are more than twice as many men than women at Fernald, it seems reasonable to expect more muscles and skeleton conditions among men than women. Does this mean that men were at greater risk of muscles and skeleton conditions compared with women in 1996? To correctly answer the question, the total number of men and women in the work force must be considered. A more accurate way to compare risk among men and women is to calculate the muscles and skeleton diagnosis rate for each gender. Rates are calculated by dividing the number of muscles and skeleton diagnoses in a given gender by the total number of employees of that gender. This number is then multiplied by 1,000 to give a rate per 1,000 workers.

For example:

80 muscles and skeleton diagnoses ÷ 1,578 men = .051 x 1,000 = 51 muscles and skeleton diagnoses per 1,000 men

43 muscles and skeleton diagnoses ÷ 687 women = .063 x 1,000 = 63 muscles and skeleton diagnoses per 1,000 women

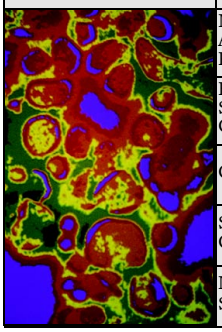
Comparing these rates now correctly suggests that muscles and skeleton diagnoses among women are higher than among men. They are called **crude rates** because they do not account for possible differences between men and women such as age and other factors that might affect the individual's risk of having a muscles and skeleton diagnosis. 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.

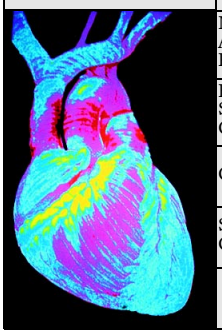
The diagnosis rate, also called the illness and injury rate, is the number of occurrences of a given disease or health condition observed over the course of a year per 1,000 workers at risk of getting that condition (see shaded box). One health condition, arthritis for example, could result in several 5-day absences over a year. Conversely, one 5-day absence may be associated with multiple diagnoses (e.g., the flu *and* a sprained wrist) recorded for epidemiologic surveillance.

In the following set of analyses (Figure 9), the four age groups were collapsed into two groups, workers less than 50 years of age and those 50 and 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. Five groups of diagnoses of particular interest to workers are presented: all illness and injuries combined; cancer; heart/circulatory system; respiratory system; and injury. Additional information about 11 other disease groups are also analyzed and can be found in the Supplemental Tables.

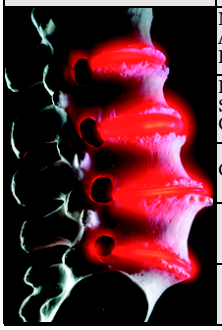
Figure 9. Illness and Injury Rates by Job Category, Gender, and Age

Diagnostic Category	Rate per 1,000			
All Illnesses & Injuries Combined	Job Category	Age	Men	Women
	Management / Administration / Professional	<50	112	210
		50+	171	125
	Engineering, Scientific & Health Care/Technical	<50	134	259
		50+	80	200
	Clerical	<50	167	275
		50+	0	243
	Service/Security/ Craft & Repair	<50	517	1,225
		50+	364	1,167
	Nuclear Specialties	<50	738	1,941
		50+	706	1,375

Diagnostic Category	Rate per 1,000			
Cancer	Job Category	Age	Men	Women
	Management / Administration / Professional	<50	0	0
		50+	0	0
	Engineering, Scientific & Health Care/Technical	<50	0	0
		50+	0	0
	Clerical	<50	0	0
		50+	0	27
	Service/Security/ Craft & repair	<50	11	28
		50+	0	0
	Nuclear Specialties	<50	0	59
		50+	0	125

Diagnostic Category	Rate per 1,000			
Heart/Circulatory	Job Category	Age	Men	Women
	Management / Administration / Professional	<50	10	0
		50+	43	0
	Engineering, Scientific & Health Care/Technical	<50	5	9
		50+	0	0
	Clerical	<50	56	8
		50+	0	0
	Service/Security/ Craft & Repair	<50	22	0
		50+	10	83
	Nuclear Specialties	<50	48	59
		50+	29	0

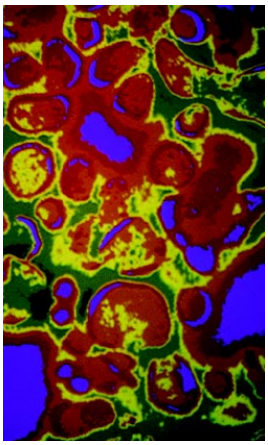
Diagnostic Category	Rate per 1,000			
Respiratory	Job Category	Age	Men	Women
	Management / Administration / Professional	<50	19	28
		50+	21	0
	Engineering, Scientific & Health Care/Technical	<50	30	9
		50+	13	100
	Clerical	<50	56	58
		50+	0	108
	Service/Security/ Craft & Repair	<50	63	254
		50+	121	500
	Nuclear Specialties	<50	41	382
		50+	0	625

Diagnostic Category	Rate per 1,000			
Injury	Job Category	Age	Men	Women
	Management / Administration / Professional	<50	19	14
		50+	7	63
	Engineering, Scientific & Health Care/Technical	<50	25	9
		50+	13	0
	Clerical	<50	28	21
		50+	0	54
	Service/Security/ Craft & Repair	<50	167	127
		50+	71	83
	Nuclear Specialties	<50	303	294
		50+	147	0

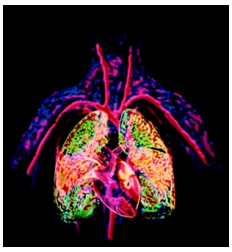
In general, the rates for all illnesses and injuries combined were generally 2 to 3 times greater for women compared with men across all occupational groups. Among female and male workers, employees aged less than 50 years had higher rates of disease compared with employees aged 50 and older. The highest illness and injury rates were for both male and female FEMP workers categorized as Nuclear Specialties.

Cancer rates presented in this report are based on reported 5-day absences during the year. A worker may experience several periods of absence from one cancer diagnosis due to medical complications or treatment regimens. Each absence results in the report of a cancer diagnosis. However, it does not imply that this is a new cancer. The cancer rates in this report are *not* comparable to the *incidence rates* frequently published in many articles on cancer with which you may be familiar. *Incident* cancer rates are based on the number of new cancer cases diagnosed within a given time, usually a year.

There were a total of nine cancer diagnoses reported among six workers during 1996, including three diagnoses for one man and six diagnoses among five women. The women reported three colon, one cervical, and two skin cancers. The highest cancer rate, 125 per 1,000 workers, was noted for women aged 50 and over in the Nuclear Specialties job category. This rate is based on one diagnosis of colon cancer. In 1995, five men reported cancer and five cancer diagnoses were reported among four women. One woman who reported cancer in 1995 reported the same cancer in 1996.



There were 29 diagnoses among men involving the heart/circulatory system; 8 occurred in workers aged 50 and older. Eleven diagnoses involved high blood pressure (hypertension) or restricted blood flow through an artery (ischemic heart disease). Seven diagnoses were for hemorrhoids. Men in the Nuclear Specialties group showed the highest rate of disease affecting the heart/circulatory system. Rates for the heart/circulatory system among women tended lower than for men. Women reported 6 diagnoses, 3 were for hemorrhoids.



Women 50 years or older generally had higher rates of respiratory disease than women aged less than 50 years. Those categorized as Nuclear Specialties showed the highest rate of respiratory diagnoses among women. The rates for respiratory problems among men did not vary as greatly by age or occupation compared with women. Men in the Service/Security/Craft and Repair job category had higher rates than most other occupational groups. Also, it appears that workers younger than age 50 were at slightly increased risk of respiratory disease.

Injury rates were higher among male workers aged less than 50; in women this was true in three of the job categories. Rates were higher for men than women across most job categories. Those in the Nuclear Specialties were at increased risk of injury among men and women.

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 between groups of workers are taken into consideration, and one rate is calculated for an entire group. This allows us to make comparisons between groups of different age distributions. Age-adjusted rates are calculated using the age distribution of the 1970 U.S. population as a reference.

There are now 4 years of data, 1993 to 1996, in which to examine trends in age-adjusted diagnostic rates at FEMP. A major change from previous years is the elimination of pregnancy and childbirth-related conditions (with the exception of an ectopic pregnancy or miscarriage, conditions that may be associated with work conditions) as a diagnostic category in the 1996 report. In order to compare 1996 rates with data from past years, pregnancy and childbirth events were eliminated from data that had been previously published. Age-adjusted rates were then recalculated for the years 1993 to 1995.

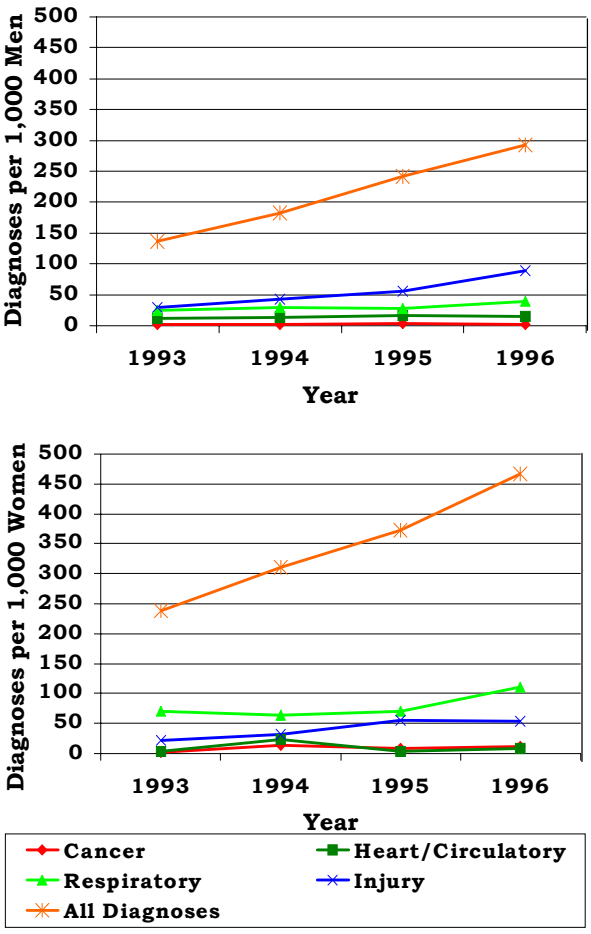
In 1995, Fernald reported job categories that were unavailable in previous years. In order to study time trends from 1993 to 1996, some job categories used in the 1995 and 1996 surveillance reports were combined to reflect those used in earlier years.

1993 & 1994 Occupational Groups Equal	1995 & 1996 Occupational Group
Office Management and Administration	Management
Office Management and Administration	Administration
Other Management and Administration	Professional
Engineering, Scientific, and Health Care	Engineering, Scientific, and Health Care
Technical Support	Technical Support
Office Management and Administration	Clerical
Service	Service
Service	Security
Craft and Repair	Craft and Repair
Nuclear Specialties	Nuclear Specialties

The percentage of women decreased somewhat more than the number of men. In previous years women were about 33 percent of the work force, but in 1996 women made up only 30 percent of the total. Over the 4-year period, the predominant types of jobs shifted. No dramatic changes occurred in the distribution of occupational groups between 1995 and 1996. The percentage of both men and women in the Service category has steadily increased each year since 1993. Women in the Office Management and Administration category have steadily decreased. A small steady increase was seen for women in the Nuclear Specialties group. These changes may indicate real shifts in the types of work being done at Fernald or reflect administrative changes in the way contractors classify their workers.

Age-adjusted rates for selected diagnostic categories are shown in Figure 10. The age-adjusted rates for all diagnoses combined have been steadily increasing over time for both men and women. The overall increase is primarily due to an increase in injury diagnoses among men and an increase in respiratory and psychological conditions (anxiety, stress, and depression) among women. Rates are consistently higher among women for all injuries and illnesses, combined, cancer, and respiratory diagnoses. Injury diagnosis rates are generally slightly higher in men compared with women. Men, not unexpectedly, have higher rates of heart/circulatory diagnoses.

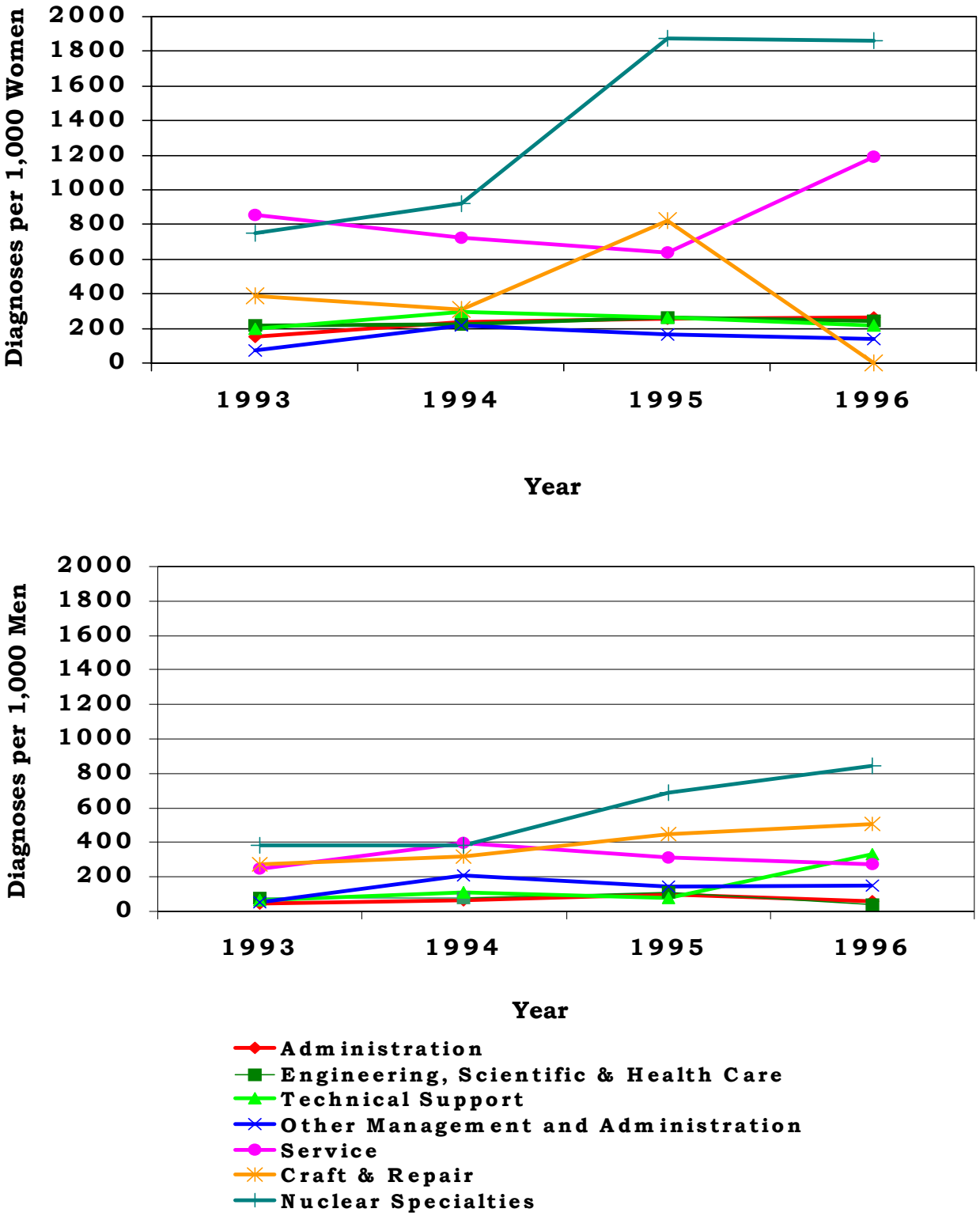
Figure 10. Age-Adjusted Rates for Selected Diagnostic Categories for Men and Women from 1993 to 1996



Age-adjusted rates for all diagnostic categories combined by job category are shown in Figure 11. Rate increases over time were noted for men in Technical Support, Craft and Repair, and Nuclear Specialties. Most of the increase was the result of more frequently reported diagnoses related to muscle and skeletal conditions and/or fractures among men in the Technical Support and Craft and Repair job categories. Increasing rates over the past four years were also noted for women categorized in Service, Craft and Repair (although no injuries or illnesses were reported in 1996), and Nuclear Specialties.

The rising rate trends among certain occupations may reflect true increases in illness, changes in absence reporting requirements, administration of sick leave, or heightened awareness of existing reporting requirements. Generally 5 years of data are needed to determine the direction of a trend, therefore we will continue to monitor these data annually to determine if they level off or continue to increase.

Figure 11. Age-Adjusted Rates for all Diagnoses Combined Among Women and Men by Job Category from 1993 to 1996

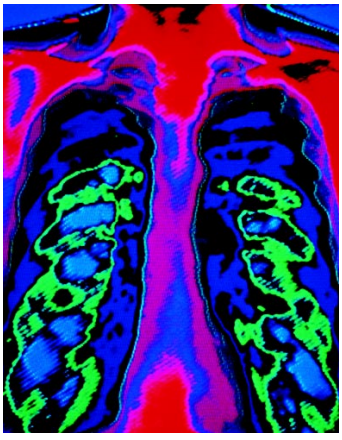


Sentinel Health Events for Occupations

An occupational sentinel health event (SHEO) is a "disease, disability, or death which is occupationally related and whose occurrence may serve as a warning signal that materials substitution, engineering control, personal protection, or medical care may be required." Sixty-four medical conditions associated with workplace exposures from studies of many different industries have been identified as sentinel health events (refer to the Supporting Tables). 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 two 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 from cigarette smoking. Carpal tunnel syndrome may result from a job requiring typing or from a hobby such as playing the piano.



No *definite* sentinel health events were identified. Two percent (14/754) of the diagnoses reported by FEMP workers in 1996 were identified as *possible* sentinel health events (Figure 12). Of the possible sentinel health events, 11 were carpal tunnel syndrome. The diagnoses were almost equally split among men (55%) and women (45%). All of the diagnoses of carpal tunnel syndrome occurred among workers aged 30 to 49. FEMP workers were absent a total of 486 days due to this diagnosis.

Figure 12. Characteristics of SHEOs by Gender

	Total Number of SHEO Diagnoses		Total Number of Days Absent	
	Men	Women	Men	Women
Definite	0	0	0	0
Possible	9	5	268	231
Total	9	5	268	231

Disabilities Among Active Workers

Disability data were first available for epidemiologic surveillance in 1994. Five workers were placed on long-term disability in 1994, and four workers were placed on long-term disability in 1995. One FEMP worker was placed on long-term disability during 1996 due to a heart condition. This individual is excluded from the statistical analyses in this report because he was not actively working during the course of the entire year.

Deaths Among Active Workers

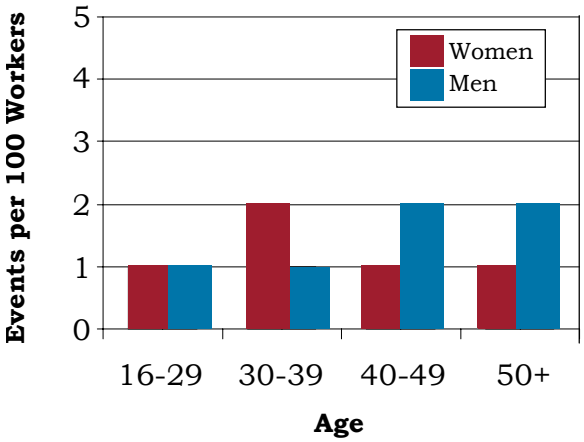
During 1996, one female and four male FEMP employees died. The cause of death was respiratory failure for the woman and multiple myeoloma, lung cancer, myocardial infarction, and drowning for the men.

OSHA-Recordable Events

The Occupational Safety and Health Administration (OSHA) requires employers to keep a written record on all occupational injuries and illnesses that have occurred among employees and to make that information available to OSHA opon request. Employers maintain the information on a standardized form, the OSHA 200 Log. OSHA-recordable events differ from health events captured through return-to-work clearances in at least two important respects: 1) they do not necessarily result in absences from work, and 2) they are usually accompanied by basic descriptive data related to these events.

The distribution of OSHA events by age and gender is shown in Figure 13.

Figure 13. OSHA-Recordable Events by Gender and Age

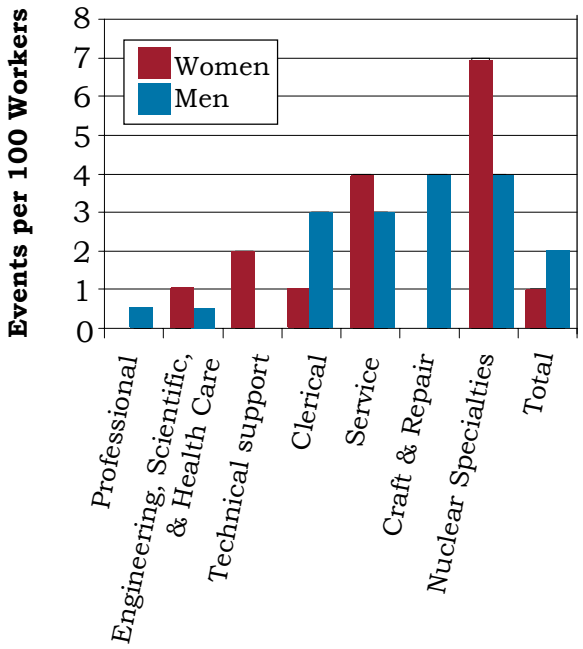


About 1.5 percent of all Fernald workers experienced an occupational injury or illness that was OSHA-recordable. Although there were more than twice the number of OSHA events for men than women, the rates were nearly identical for both. The rates did not appear to vary by age. There were no lost workdays reported in 1996. On average, women had 16 workdays with restricted activity compared with 7.7 workdays for men.

The rates of OSHA-recordable events by job category are shown in Figure 14. Only those job categories with one or more OSHA events are shown. Nuclear Specialties had the highest rate of occupational injuries based on OSHA-recordables for both women and men. Female Clerical workers had the highest

average number of days of restricted activity, 39 days. Male service workers averaged the highest number of days of restricted activity, 13 days. Additional information about OSHA-recordable events is available in the Supplemental Tables.

Figure 14. OSHA-Recordable Events by Job Category and Gender



Diagnostic and Accident Categories for OSHA-Recordable Events

There were 35 OSHA events recorded on the OSHA 200 Logs; resulting in 13 diagnoses among women and 27 diagnoses among men. The diagnoses are shown in Figure 15.

Figure 15. OSHA-Recordable Diagnoses by Diagnostic Category and Gender

Diagnostic Category	Gender	
	Women	Men
Muscles and Skeleton	2	1
Injury	11	26
Fractures-Upper Limb	1	2
Back Sprains and Strains	2	6
Other Sprains and Strains	3	6
Open Wounds-Head, Neck, Trunk	0	2
Open Wounds-Upper Limb	0	3
Open Wounds-Lower Limb	0	1
Bruises	2	3
Burns	0	3
Unspecified Injuries	2	0
Adverse Reactions to Non-Medical Substances	1	0

More than 93 percent of the OSHA-recordable conditions were for various types of injuries. Sprains and strains were the most common injuries (46 percent) among men and women. Open wounds were also frequently reported (23 percent) by men (Figure 15).

All 35 of the recorded OSHA events were the result of a variety of accidents, including being struck by an object, cut or pierced by an object, being caught between objects or machinery, overexertion and strenuous movements, and contact with hot or corrosive materials (Figure 16). Two accidents involved contact with caustic or corrosive substances that resulted in second-degree burns to two men. One was caused by contact with nitric acid, and the other was due to bodily contact with a freezer pack.

The type of accident and injury did not appear systematically related to age or occupation.

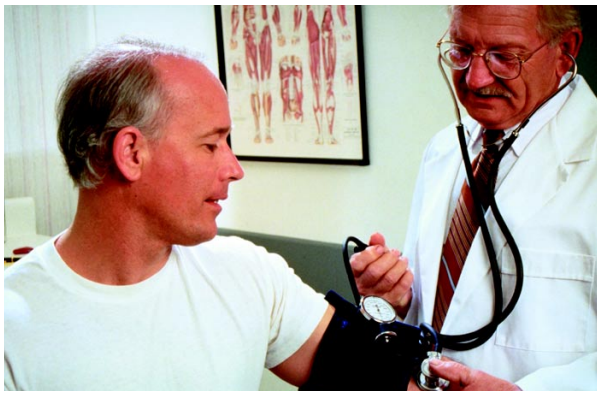
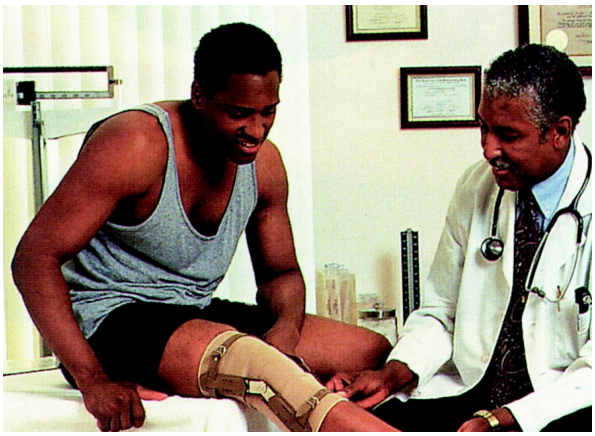


Figure 16. OSHA-Recordable Accidents by Type and Gender

Accident Category	Gender	
	Women	Men
	Number of Accidents	Number of Accidents
Non-Motor Vehicle	0	1
Poisoning-Non-Medicinal	1	0
Falls	4	4
Other Accidents	5	20
Accident Caused by Machinery	0	1
Caught Between Objects	1	3
Cutting/Piercing Instrument/Object	0	2
Hot, Corrosive, or Caustic Material/ Steam	0	2
Overexertion and Strenuous Movements	4	9
Struck by an Object	0	3

Rates of OSHA-Recordable Events

The rates for all diagnoses combined for OSHA-recordable events by job category are shown in Figures 17 and 18. Among women younger than age 50, Nuclear Specialties had the highest rates.



Among women 50 and older, workers in the Clerical job category had the highest OSHA-recordable rates. Males in the Nuclear Specialties job category had the highest rates for OSHA-recordables regardless of age. Service/Security/ Craft and Repair workers had the second highest rates of occupational illness and injuries.

Figure 17. OSHA-Recordable Rates by Age and Job Category Among Women, All Diagnoses Combined

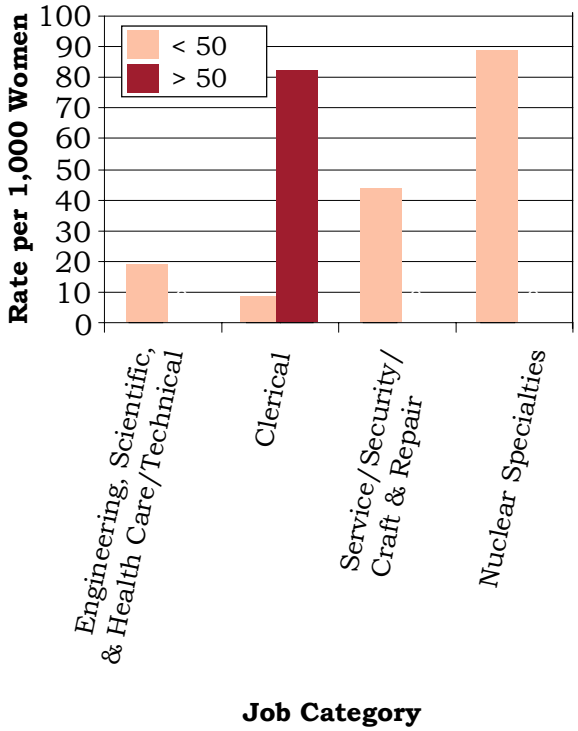
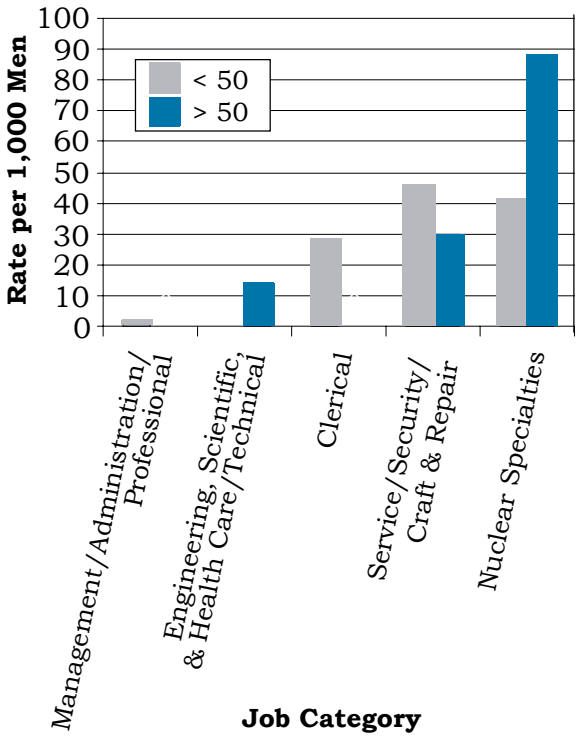


Figure 18. OSHA-Recordable Rates by Age and Job Category Among Men, All Diagnoses Combined



Time Trends for OSHA-Recordable Events

The age-adjusted rates for OSHA-recordable diagnoses combined by year and job category are shown in Figures 19 and 20. From 1993 through 1996, overall rates for OSHA-recordable diagnoses among men did not appear to increase within each occupational group. The rates tended to be higher for women than men in all occupations except Nuclear Specialties. The rates for women fluctuated more than the rates for men due to the smaller number of OSHA events reported among women. Workers in the Service, Craft and Repair, and Nuclear Specialties groups tended to have rates that were greater than the rates for workers in the other occupational groups.

Figure 19. Age-Adjusted Rates for All OSHA-Recordable Diagnoses Combined Among Women by Occupation from 1993 to 1996

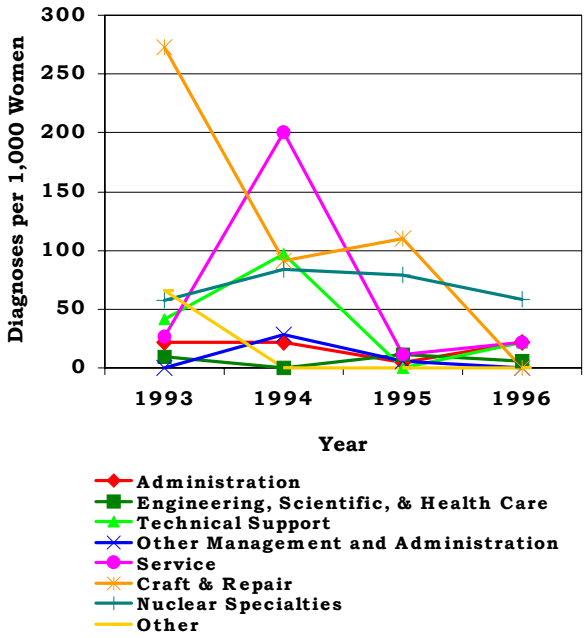
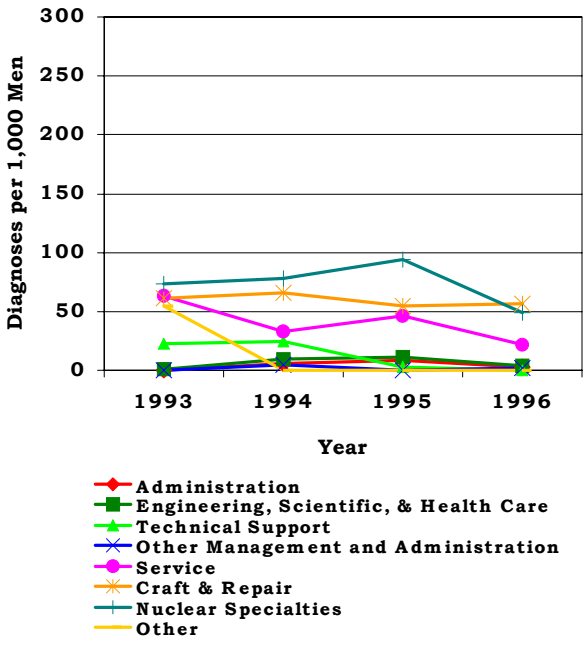


Figure 20. Age-Adjusted Rates for All OSHA-Recordable Diagnoses Combined Among Men by Occupation from 1993 to 1996



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 two 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 one person followed for one year. For example, 5 persons followed for one year contribute five 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 one group compared to 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 Condition	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 nonarthropod 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, 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 disc ("slipped disc"), 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 disc; 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

NOTES