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Rocky Flats Plant Annual Epidemiologic Surveillance Report

Rocky Flats Environmental Technology Site
2000 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

FAREWELL

This report is the last in a series of annual epidemiologic surveillance reports from Rocky Flats. The site began participation in Epidemiologic Surveillance when the program was still being piloted at a limited number of sites in the late 1980s. The initiation of integrated contracting at Rocky Flats in 1995 had a profound impact on the site's ability to collect health information on its subcontractor workers. Many of the workers doing the more hazardous tasks became lower tier subcontractor workers, and these workers became increasingly difficult to track. They were no longer required to use the site's medical clinic, nor was any contract requirement implemented to require collection of information about their health events. Similarly, the creation of rosters became less and less complete without requirements to roll up basic data about lower tier subcontractor workers. By the late 1990s it became clear that integrated contracting was in many ways not conducive to the conduct of epidemiologic surveillance as it had been practiced for nearly a decade at Rocky Flats. Given the rapidly diminishing ability to evaluate the health of the site's work force and the need to make best use of the program's limited resources, the decision was made to end epidemiologic surveillance at Rocky Flats.

Rocky Flats Environmental Technology Site 2000

At A Glance

The age-adjusted rates for all illness and injury categories combined have decreased over the past 8 years at Rocky Flats. The rapid overall decline for both women and men is without precedent at other epidemiologic surveillance sites and suggests a change in the reporting of diagnoses based on absences rather than a true decline in illnesses and injuries in the work force. The introduction of an integrated contract at Rocky Flats Environmental Technology Site in 1995 coincided with a reduction in the use of on-site occupational medicine services from which Epidemiologic Surveillance health data are collected. The number of lower tier subcontractors using off-site occupational medicine services increased, and data from these off-site services are not routinely reported to Epidemiologic Surveillance program staff. The reduced reporting may account for much of the apparent decrease in illness and injury rates. Trends in the reporting of OSHA-recordable diagnoses do not show the same sharp decline, but the collection of OSHA data does not depend on worker use of the medical clinic.

Among both men and women, we found no relationship between age and the number of lost or restricted workdays. The highest average number of lost or restricted workdays was noted among women in the Security category (22 days) and men in the Service category (22 days).

The OSHA-recordable rates among women were highest among Nuclear workers. Men in the Other/Unknown category had the highest rates of OSHA events, followed by the Crafts and Manual Labor and Nuclear groups.

Crafts and Manual Laborers were responsible for one-third of the occupational accidents reported by men.

Nuclear workers accounted for 15 percent of the work force but 27 percent of the OSHA-recordable events. Nuclear workers were 3 times more likely than other workers to report an injury. They were at higher risk of sprains and strains of the back (5 times) and complications and unspecified injuries (4 times).

Security workers were at over 5 times greater risk of sprains and strains other than back strains.

No disabilities in the work force were reported in 2000.

Women in the Service group have reported no absences since 1997.

Regardless of age, men in the Nuclear group had the highest illness and injury rates; among women, this was true only for workers younger than 50 years of age. The Nuclear group has generally had the highest rates since 1997.

Of the 12 diagnoses for asthma and bronchitis reported among all women at Rocky Flats, 10 (83 percent) were reported by women in the Nuclear group, which made up 11 percent of the female work force at Rocky Flats.

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 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 Rocky Flats Environmental Technology Site from January 1, 2000 through December 31, 2000. The data were collected by a coordinator at Rocky Flats and submitted to DOE's Epidemiologic Surveillance Data Center, located at Oak Ridge Institute for Science and Education, where quality control procedures and initial data analyses were carried out. The analyses were interpreted and the final report prepared by the DOE Office of Health Programs. Epidemiologic surveillance has been ongoing at Rocky Flats since 1992.

The information presented in this report provides highlights of the data analyses conducted. Earlier surveillance reports and additional supporting tables for this report 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 lasting 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. This report includes sections on time trends that provide comparative information on the health of the work force, including health-related absences from 1993 to 2000 and OSHA-recordable events from 1994 to 2000.

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. Comparisons of Rocky Flats with other DOE sites should be made with caution. Many factors can affect the completeness and accuracy of health information reported at the sites, thereby affecting the observed patterns of illness and injury.

Site Overview

The Rocky Flats Environmental Technology Site is situated on the western slopes of the Rocky Mountains near Golden, Colorado, 16 miles northwest of Denver. The site encompasses about 400 acres located on a 6,500-acre reserve that includes over 400 separate buildings and structures. The site was established in 1952 by the Atomic Energy Commission to serve as one of seven production plants in the national nuclear weapons complex. The site's operations involved the development of new technology needed for the manufacture and assembly of nuclear weapons. During the Cold War, Rocky Flats was responsible for the fabrication of the hollow plutonium sphere, or "pit," that serves as the trigger device for nuclear warheads. With the end of the Cold War, the plant's mission changed from weapons production to environmental cleanup.

In 1989, Rocky Flats was added to the National Priorities List for Superfund, the national environmental cleanup program. The site has areas in which buried chemicals and nuclear materials have contaminated both the soil and groundwater. The buried chemicals and materials include thousands of cubic yards of wastes left over from the production era that must be removed for disposal. The cleanup of contaminated areas in both the natural environment and the buildings will also contribute to the already large waste volume. In July 1994, the name "Rocky Flats Plant" was changed to "Rocky

Flats Environmental Technology Site" to more accurately reflect the current environmental restoration and cleanup mission. Kaiser-Hill Company operates the Rocky Flats Site through a performance-based Integrating Management contract. On January 24, 2000, a new contract was signed between DOE and Kaiser-Hill to safely close the site as early as December 15, 2006.

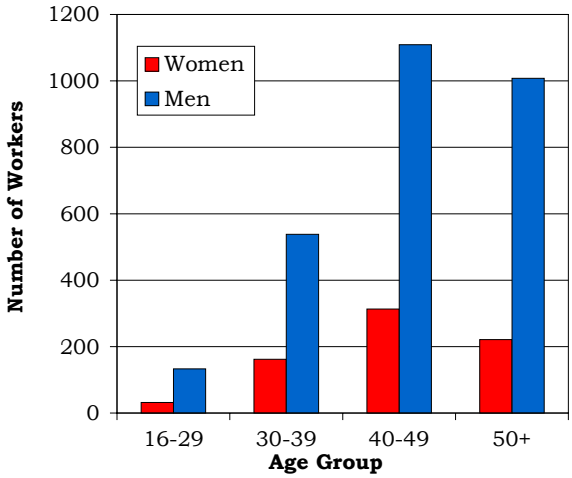
The site's current mission is to safely manage its existing nuclear wastes and materials until national repositories are established to accept them, clean up the areas of environmental contamination, and decontaminate and decommission the site. In August 1997, the last of the entire inventory of "saltcrete" was removed from the site. In 1998, the site safely drained the last liters of plutonium solution from the final plutonium process tank.

The Rocky Flats Work Force - 2000

A total of 3,516 Rocky Flats employees were included in epidemiologic surveillance in 2000, 148 fewer workers than were present in 1999. The gender and age distribution of the work force is shown in Figure 1.

There were 728 (21 percent) women and 2,788 (79 percent) men in the work force. The average age of male Rocky Flats workers was 46 years and 45 years for females. Eighty-one percent of the workers were White. Hispanics comprised 12 percent and African Americans 4 percent of the work force. Asians and Native Americans made up 2 percent. Race was unknown for 1 percent of the work force.

Figure 1. The Work Force by Gender and Age



The distribution of workers by job category and gender is shown in Figure 2. Individual job titles reported by Rocky Flats were grouped together into eight job categories. This is because there were either too few workers or too few health events among workers with a particular job title, thereby limiting the types of analyses that could be conducted. Men and women were not distributed equally among the various job categories. Sixty-nine percent of women were Administration workers, while only 39 percent of the men were in this job category. Twenty percent of men and 5 percent of the women were Crafts and Manual Laborers.

Figure 2. The Work Force by Job Category and Gender

Job Category	Women	Men
Administration	507 69%	1,103 39%
Professional	44 6%	249 9%
Technical	21 3%	121 4%
Service	8 1%	50 2%
Security	31 4%	246 9%
Crafts & Manual Labor	37 5%	569 20%
Nuclear	78 11%	445 16%
Other/Unknown	2 <1%	5 <1%

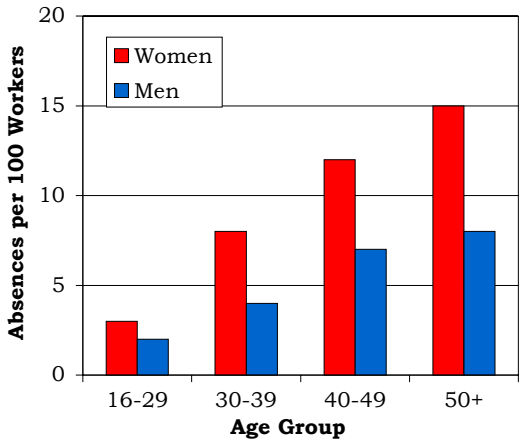
Number and Length of Absences

Epidemiologic surveillance examines illness and injury absences of 5 or more consecutive workdays (also referred to as "5-day absences"). This threshold is based on DOE Order 440.1, which 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. All injuries and illnesses due to a work-related incident must be reported. Non-occupational illnesses and injuries that involve absences of fewer than 5 days do not routinely require a medical clearance for return to work and are therefore excluded from these analyses.

Unlike Epidemiologic Surveillance annual reports issued prior to 1996, we excluded some types of absences of 5 or more workdays because they were not the result of an injury or illness. In 2000, specific absences of 5 or more consecutive workdays reported that were excluded include three absences due to maternity leave reported by three women and one absence not related to a specific illness or injury reported by a male worker. Throughout this report, analyses take gender, age, and occupation into account because the risk of illness and injury varies by these factors.

The number of reported absences increased in 2000, reversing a downward trend that began in 1996. As shown in Figure 3, the rate of 5-day absences due to injury or illness varied by gender and age. Eighty-six 5-day absences among 68 women resulted in an absence rate of 12 per 100 (86/728). Among the 2,788 men, 188 absences resulted in an absence rate of 7 per 100 (188/2,788). The overall absence rate increased with age among men and women. Two percent of the women and 1 percent of the men reported more than one absence during 2000.

Figure 3. Absence Rate by Gender and Age



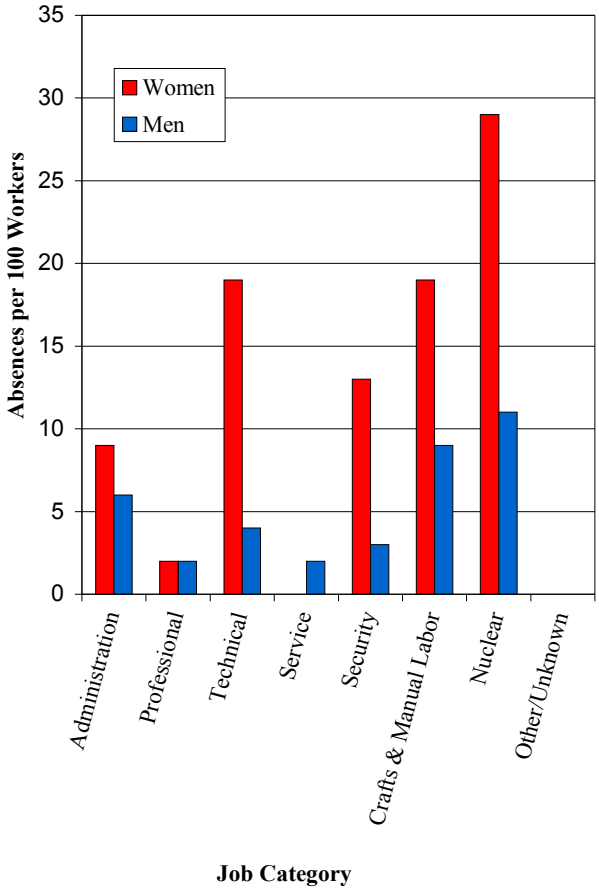
The average length of absence (Figure 4) was almost the same for women (32 days) and for men (31 days). We saw no consistent relationship between gender or age and average duration of absence. The long absence duration among women younger than 30 years of age is based on only one absence that lasted 74 days.

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	1	74	74
	30-39	13	304	23
	40-49	39	1,196	31
	50+	33	1,184	36
	Total	86	2,758	32
Men	16-29	2	18	9
	30-39	24	764	32
	40-49	77	2,288	30
	50+	85	2,726	32
	Total	188	5,796	31

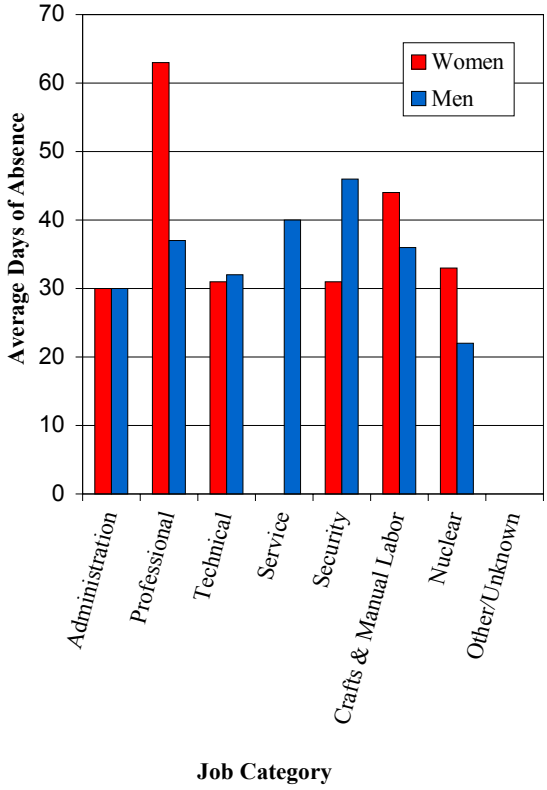
The rate of 5-day absences due to illness or injury varied by job category for men and women (Figure 5). Across similar job categories, women tended to have a higher absence rate than did men. The highest absence rate among women and men was among the Nuclear workers (29 per 100 for women and 11 per 100 for men). Women in the Service group and both women and men in the Other/Unknown group reported no absences in 2000.

Figure 5. Absence Rate by Job Category and Gender



We saw no consistent relationship between gender or job category and average duration of absence (Figure 6). Women in the Professional group and men in the Security group had the highest average absence durations compared with women and men in other job categories. The long average absence duration among Professional women is based on one absence that lasted 63 days. Although Nuclear workers had the highest absence rate among men, the average duration of their absences was the shortest compared with that of men in other job categories.

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 which health effects are due to occupational exposures and which ones 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 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 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 the number of lost calendar days are presented in Figure 7. Please note that the number of lost calendar days for each absence is counted more than once when multiple diagnoses occur in different diagnostic categories for the same absence. Women reported 110 diagnoses and men reported 240 diagnoses in 2000, an increase in reported diagnoses of 39 percent for women and 10 percent for men from the number of diagnoses reported in 1999. The increase occurred despite a 5 percent decrease in the male work force and a 2 percent reduction in the female work force at Rocky Flats from 1999 to 2000. The most frequently reported diagnoses varied little by gender.

Figure 7. Number of Diagnoses and Lost Calendar Days by Diagnostic Category (Characterized 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	2	45	3	65
Blood	0	0	0	0
Cancer	2	281	3	172
Digestive	14	398	31	883
Endocrine/ Metabolic	0	0	3	340
Existing Birth Condition	0	0	0	0
Genitourinary	10	314	7	81
Heart/ Circulatory	2	52	13	370
Infections/ Parasites	2	52	7	115
Injury	15	410	36	1,119
Miscarriage	1	13	NA	NA
Muscles & Skeleton	17	558	50	1,776
Nervous System	6	129	10	339
Psychological	7	232	7	160
Respiratory	27	403	57	706
Skin	1	8	5	323
Unspecified Symptoms	4	81	8	260

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

Women lost 2,758 calendar days due to injury and illness, a 62 percent increase from 1999. This is the opposite of the change between 1998 and 1999, when there was a 35 percent decrease in the number of calendar days absent in 1999 compared to 1998. Respiratory conditions (25 percent), muscles and skeleton conditions (15 percent), and injuries (14 percent) accounted for 54 percent of their reported diagnoses. Bronchitis and asthma made up 44 percent of the respiratory conditions, followed by upper respiratory infections (30 percent). The majority of conditions of the muscles and skeleton were disk and back problems (53 percent) and

joint disorders (29 percent). Bruises (20 percent) and complications and unspecified injuries (20 percent) accounted for 40 percent of the injuries.

Among women, the more frequently reported diagnoses were not as consistent across age groups as they were among men. Women under 30 years old reported only three diagnoses. Digestive, psychological, and respiratory diagnoses were common among 30-39 year old women. Among women 40 years of age or older, the more commonly reported diagnoses included respiratory conditions, muscles and skeleton disorders, and injuries.

Men lost 5,796 calendar days due to injury and illness, a 21 percent increase from the number of calendar days absent in 1999. The increase was the opposite of what was seen from 1998 to 1999, when there was an 18 percent decrease in the number of calendar days absent. Respiratory conditions (24 percent), muscles and skeleton conditions (21 percent), and injuries (15 percent) comprised 60 percent of all reported diagnoses among these workers. Pneumonia and flu accounted for 39 percent of the respiratory conditions, followed by upper respiratory infections (26 percent) and bronchitis and asthma (26 percent). One diagnosis for chronic beryllium disease was reported. The diagnoses affecting the muscles and

skeleton included joint disorders (52 percent) and disk and back problems (32 percent). Frequently reported injuries included sprains and strains (47 percent) and fractures (25 percent). One spider bite and three diagnoses for complications of surgical/medical care were reported among the 36 diagnoses categorized as injuries.

The previously mentioned diagnoses did not vary by age. Injuries, respiratory conditions, digestive disorders, and diagnoses affecting the muscles and skeleton ranked among the more common diagnoses for men of all ages except 16-29 year olds. Workers in the youngest age group reported only 2 diagnoses in 2000. Twenty-eight men reported 31 diagnoses for digestive disorders. Hernias accounted for 13 of these diagnoses (42 percent).

Figure 8 shows the frequency of reported diagnoses by job category for women and men. The ranking of diagnoses should be interpreted cautiously; in many job categories the actual number of diagnoses was very small. Among women and men, conditions affecting the muscles and skeleton, respiratory system, and digestive system, as well as injuries were common among the job categories. Women in the Service group have reported no absences since 1997.

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

Job Category	Men	Women
Administration	Respiratory (21) Muscles & Skeleton (20) Digestive (8) Injury (7)	Digestive (10) Muscles & Skeleton (9) Injury (7) Respiratory (7)
Professional	Respiratory (6) Injury (2) Cancer (1) Genitourinary (1) Muscles & Skeleton (1)	Digestive (2)
Technical	Digestive (2) Injury (2) Heart/Circulatory (1) Psychological (1) Respiratory (1) Skin (1)	Genitourinary (1) Injury (1) Muscles & Skeleton (1) Psychological (1)
Service	Injury (1)	None
Security	Injury (3) Muscles & Skeleton (2) Digestive (1) Respiratory (1) Unspecified Symptoms (1)	Respiratory (2) Heart/Circulatory (1) Injury (1) Nervous System (1)
Crafts & Manual Labor	Digestive (14) Muscles & Skeleton (14) Respiratory (11) Injury (10)	Respiratory (3) Digestive (2) Muscles & Skeleton (2)
Nuclear	Respiratory (17) Muscles & Skeleton (13) Injury (11)	Respiratory (15) Injury (6) Muscles & Skeleton (5)
Other/Unknown	None	None

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 36 and women reported 15 diagnoses involving injuries during 2000. Men, therefore, reported almost two and a half times more injuries as women. As there were almost 4 times as many men than women at Rocky Flats, 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 2000? To correctly answer the question, the total number of men and women in the work force must be considered. To compare risk between men and women, it is necessary to calculate the injury diagnosis 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:

36 injuries ÷ 2,788 men = .013 x 1,000
= 13 injuries per 1,000 men

15 injuries ÷ 728 women = .021 x 1,000
= 21 injuries per 1,000 women

Comparing these rates now correctly suggests that the rate of injuries among women is over 60 percent greater 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 using 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 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 analyses, the four age groups used previously were combined into two groups, workers younger than 50 years of age and those 50 years or older. These groups were combined to ensure that the number of diagnoses in each group was large enough to analyze. In addition, the eight job categories were combined into six larger groups. Five groups of diagnoses of particular interest to workers are presented in Figure 9: all illnesses and injuries combined, cancer, heart/circulatory system, respiratory system, and injuries. Additional information about seven other diagnosis groups are also analyzed and can be found in the Supplemental Tables.

Women had higher rates of all illnesses and injuries combined than men regardless of age or job category. Within a given job category, age was not related to rates for all illnesses and injuries combined for men or women. Regardless of age, men in the Nuclear group had the highest illness and injury rates; among women, this was true only for workers younger than 50 years of age. The Nuclear group has generally had the highest rates since 1997.

Cancer rates presented in this report are based on reported 5-day absences during the year. A worker may experience several absences from one cancer diagnosis due to medical complications or treatment. 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 *incident* 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 1 year.

Five workers reported five 5-day absences related to cancer during 2000. Four of the workers were 50 years old or older. Two men reported two absences for prostate cancer, and one man reported one absence for kidney cancer. Two women reported

two absences for breast cancer and leukemia. None of these workers reported a cancer diagnosis between 1994 and 1999.

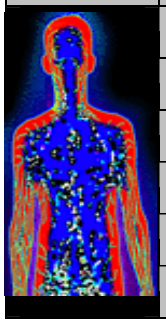
Among women, only two workers, both under age 50 years old, reported heart/circulatory diagnoses. One worker reported a diagnosis for high blood pressure. Among men, 13 men reported 13 heart/circulatory diagnoses; 4 of the men were younger than 50 years old. Nine diagnoses were for high blood pressure or ischemic heart disease (restricted blood flow to an artery). Other forms of heart disease accounted for the remaining diagnoses.

Women generally had higher rates of respiratory disease than did men among workers 50 years and older. For both men and women, younger workers tended to have higher respiratory disease rates compared to older workers. Nuclear workers had the highest rates of respiratory diagnoses among women and men. The respiratory disease rate appeared particularly high among women in the Nuclear job category, regardless of age. Ten women reported 13 absences with 15 diagnoses for respiratory disorders. Eight of the 10 women reported a diagnosis for bronchitis or asthma. Of the 12 diagnoses for asthma and bronchitis reported among all women at Rocky Flats, 10 (83 percent) were reported by women in the Nuclear group, which made up 11 percent of the female work force at Rocky Flats. Workers in the Nuclear group were at over 4 times the risk of reporting a respiratory condition compared to workers in other job categories.

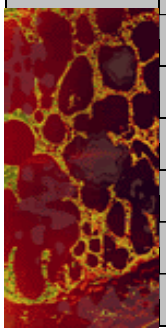
Women in two job categories reported no injuries in 2000, similar to what we have observed since 1996. No relationship was seen between injury rates and age or between injury rates and job category for men or women. Contrary to what we observed in previous years, we noted no increased risk of injuries among Nuclear workers compared with other workers in 1999 or 2000.

The risk of illness and injury among workers classified in one job category was compared with workers in the remaining job categories. Compared with other workers, those in the Nuclear group were at almost twice the risk of reporting a diagnosis for all injuries and illnesses combined, at 7 times the risk of reporting unspecified symptoms, and at twice the risk of a condition of the

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
	Administration	<50	64	88
		50+	92	164
	Professional/ Technical	<50	63	98
		50+	30	71
	Service/Security	<50	32	94
		50+	21	286
	Crafts & Manual Labor	<50	106	267
		50+	131	286
	Nuclear	<50	110	500
		50+	207	231
	Other/Unknown	<50	0	0
		50+	0	0

Diagnostic Category	Rate per 1,000			
Respiratory	Job Category	Age	Men	Women
	Administration	<50	26	6
		50+	7	30
	Professional/ Technical	<50	29	0
		50+	0	0
	Service/Security	<50	4	63
		50+	0	0
	Crafts & Manual Labor	<50	7	100
		50+	34	0
	Nuclear	<50	20	212
		50+	76	154
	Other/Unknown	<50	0	0
		50+	0	0

Diagnostic Category	Rate per 1,000			
Cancer	Job Category	Age	Men	Women
	Administration	<50	1	0
		50+	2	12
	Professional/ Technical	<50	0	0
		50+	8	0
	Service/Security	<50	0	0
		50+	0	0
	Crafts & Manual Labor	<50	0	0
		50+	0	0
	Nuclear	<50	0	0
		50+	0	0
	Other/Unknown	<50	0	0
		50+	0	0

Diagnostic Category	Rate per 1,000			
Injury	Job Category	Age	Men	Women
	Administration	<50	4	9
		50+	10	24
	Professional/ Technical	<50	8	20
		50+	15	0
	Service/Security	<50	12	0
		50+	21	143
	Crafts & Manual Labor	<50	20	0
		50+	15	0
	Nuclear	<50	33	115
		50+	7	0
	Other/Unknown	<50	0	0
		50+	0	0

Diagnostic Category	Rate per 1,000			
Heart/ Circulatory	Job Category	Age	Men	Women
	Administration	<50	1	3
		50+	12	0
	Professional/ Technical	<50	4	0
		50+	0	0
	Service/Security	<50	0	31
		50+	0	0
	Crafts & Manual Labor	<50	0	0
		50+	7	0
	Nuclear	<50	7	0
		50+	14	0
	Other/Unknown	<50	0	0
		50+	0	0

muscles and skeleton compared to other workers. Crafts and Manual Labor workers were over twice as likely to report a digestive disorder compared to workers in other job categories. Six (43 percent) of the 14 diagnoses for hernias reported in 2000 were among Crafts and Manual Labor workers, who accounted for 17 percent of the Rocky Flats work force. Technical workers were over 6 times as likely to report a psychological disorder 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 one rate is calculated for an entire group. This allows us to make comparisons between groups with different age compositions. Age-adjusted rates are calculated using the age distribution of the 1970 U.S. population as a reference.

Age-adjusted rates for all illness and injury categories are presented in Figure 10. It is important to note that the age-adjusted rates for the years 1993 and 1994 presented in this report differ from those reported in the *1993 and 1994 Annual Epidemiologic Surveillance Reports* due to the exclusion of health conditions resulting from maternity leave.

The age-adjusted rates for all illness and injury categories combined have decreased over the past 8 years (Figure 10). The overall diagnosis rate for women was much higher than that of men throughout the period, but the difference in the rates for men and women has tended to decline over time. The rate of psychological disorders increased in 2000 among women. This increase was not the result of an increase in any particular diagnosis. The dramatic decline in the rates of respiratory disease for women that began in 1995 showed a reversal in 2000. Chronic respiratory disease followed the same trend as all respiratory disease. The rate of disorders of the muscles and skeleton increased slightly in 2000, ending a 2-year decline in the rate for women. The rates for injuries rose in 2000 for men and women. Among men, the rates of psychological disorders, chronic respiratory disease, and conditions of the muscles and skeleton have been stable over the last 2 years (Figure 11).

The rapid overall decline for both women and men is without precedent at other epidemiologic surveillance sites and suggests a change in the reporting of absence-based diagnoses rather than a true decline in illnesses and injuries in the work force. The introduction of an integrated contract at Rocky Flats Environmental Technology Site in 1995 coincided with a reduction in the use of on-site occupational medicine services from which Epidemiologic Surveillance health data are collected. The number of lower tier subcontractors using off-site occupational medicine services increased, and data from these off-site services are not routinely reported to Epidemiologic Surveillance program staff. The reduced reporting may account for much of the apparent decrease in illness and injury rates for the site's work force. Trends in the reporting of OSHA-recordable diagnoses, to be discussed later in this report, do not show the same sharp decline. The collection of OSHA data does not depend on worker use of the medical clinic.

The rates for all diagnoses combined were much more variable for women than for men over the 8-year period. The overall trend was a decline in rates from 1993 to 2000 for most job categories among men and women, with some job categories showing considerable variability over time (Figure 12). Women in the Administration group showed a continued increase in rates from 1998 to 2000, after steadily decreasing rates since 1995. The decrease in rates noted in 1999 reversed in 2000 among women in the Technical, Security, Crafts and Manual Labor, and Nuclear groups.

Figure 10. Age-Adjusted Rates for All Diagnoses Combined Among Women and Men from 1993 to 2000

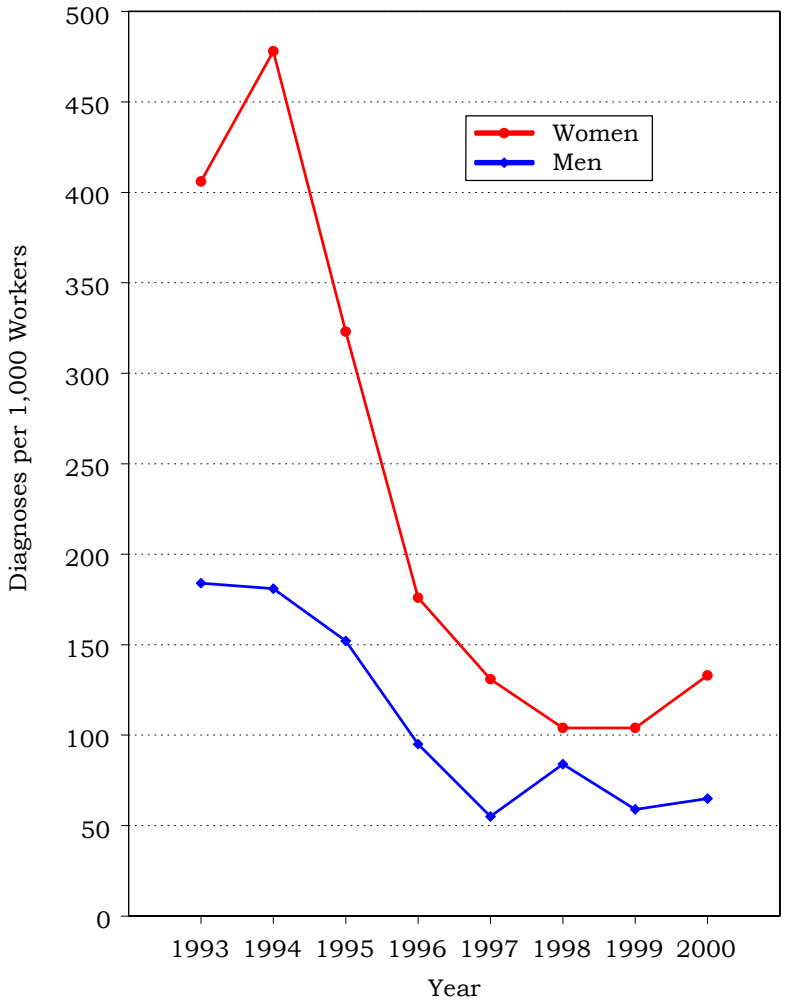
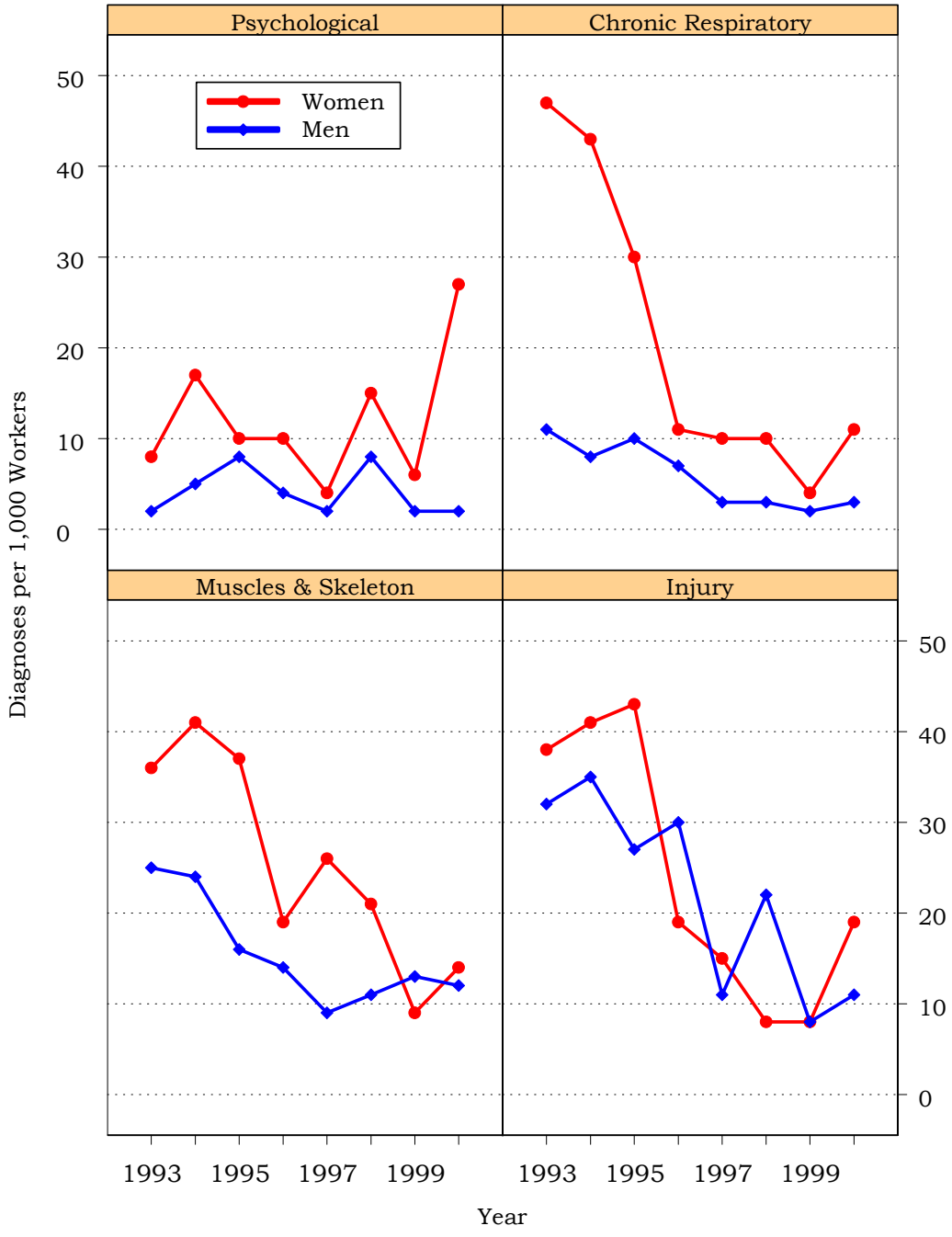
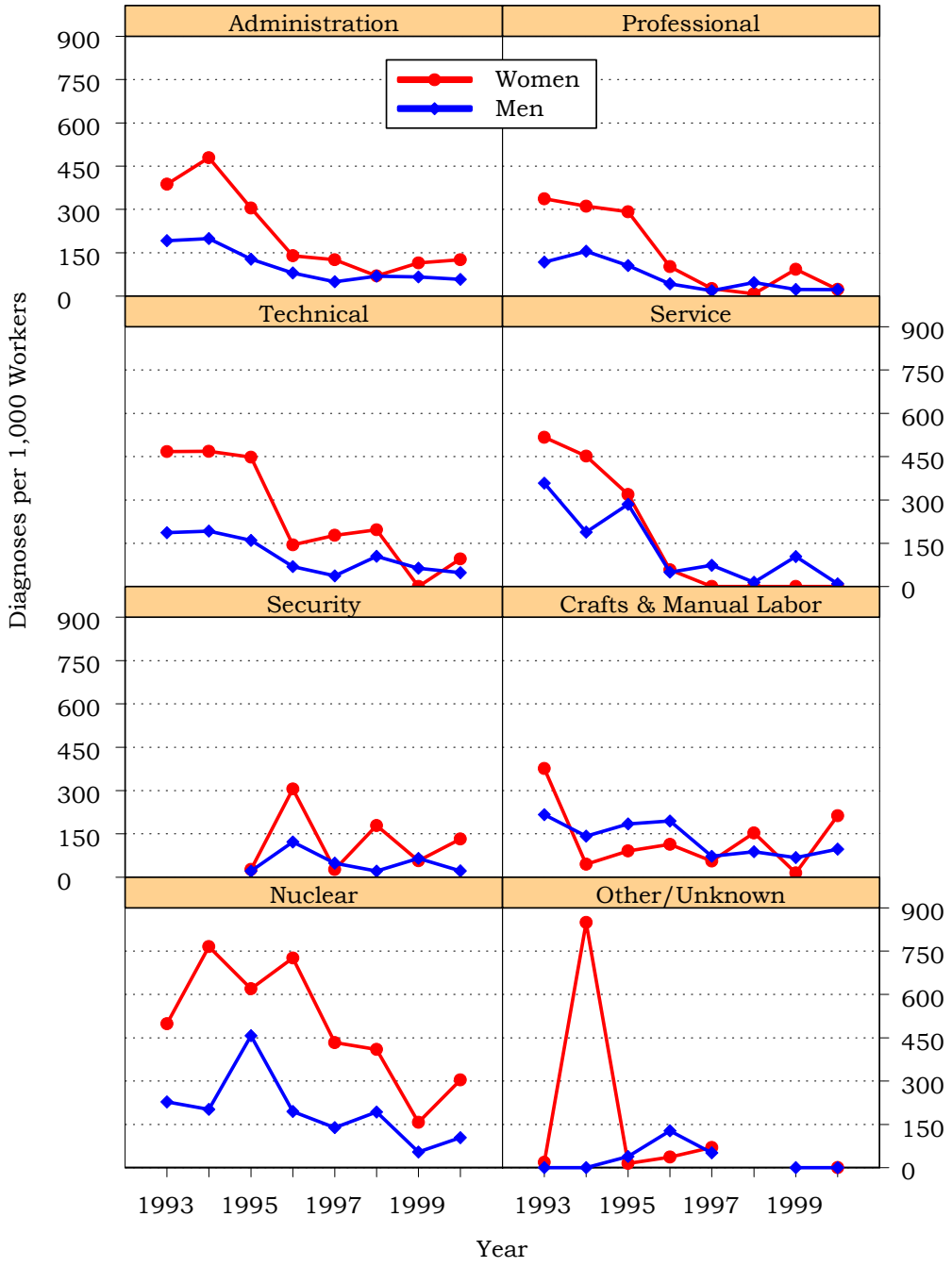


Figure 11. Age-Adjusted Rates for Selected Diagnostic Categories Among Women and Men from 1993 to 2000



Note: For 1993, the rate was based on external causes of injury data; for 1994 through 2000, the rate was based on injury and poisoning data.

Figure 12. Age-Adjusted Rates for All Diagnoses Combined Among Women and Men by Job Category from 1993 to 2000



Note: Security workers were included in the Service job category in 1993 and 1994. The Other/Unknown job category had no workers for men in 1998 or for women in 1998 and 1999.

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 injury or illness in the workplace. 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 also 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.

One definite sentinel health event was reported in 2000 (Figure 13). A male Professional worker aged 40-49, reported respiratory conditions related to chronic beryllium disease and was absent 74 days. Seven of 350 (2 percent) diagnoses were identified as possible sentinel health events. These seven sentinel health events (four carpal tunnel syndrome, two allergic reactions, and one kidney cancer) were reported by five men and two women and resulted in 164 lost calendar days. Three of these workers were aged 50 or older and two workers were younger than 40 years of age.

The four carpal tunnel diagnoses were reported by one woman (50+ age group) and three men (aged 30-49). One hundred nine calendar days were lost due to carpal tunnel syndrome.

Figure 13. Characteristics of SHEOs by Gender

	Total Number of SHEO Diagnoses		Total Number of Days Absent	
	Men	Women	Men	Women
Definite	1	0	74	0
Possible	5	2	132	32
Total	6	2	206	32

Disabilities Among Active Workers

No disabilities in the work force were reported in 2000.

Deaths Among Active Workers

Eight deaths were reported in 2000. The causes of these deaths included one blood clot in the lung and one lung cancer. The causes of six deaths were not reported. Six of the workers who died were aged 50 or 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 two 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 distribution of OSHA events by gender and age is shown in Figure 14. Twenty-two women and 71 men had at least one OSHA-recordable event noted. The rate of OSHA events was the same for women and men (3 per 100 workers). The highest rate of OSHA-recordable events among men was in workers aged 16-29 (5 per 100 workers); among women, workers in the 40-49 and 50+ age groups had the highest rates of OSHA events (4 per 100 workers).

The rates of OSHA-recordable events by job category and gender are shown in Figure 15. Among women, the Security and Nuclear job categories had noticeably higher rates of occupational illness and injury compared with workers in other job categories. Men in the Other/Unknown group had a higher rate than did men in other job categories. Women in the Professional, Technical, Service, Crafts and Manual Labor, and Other/Unknown groups reported no OSHA events in 2000.

Figure 14. OSHA-Recordable Events by Gender and Age

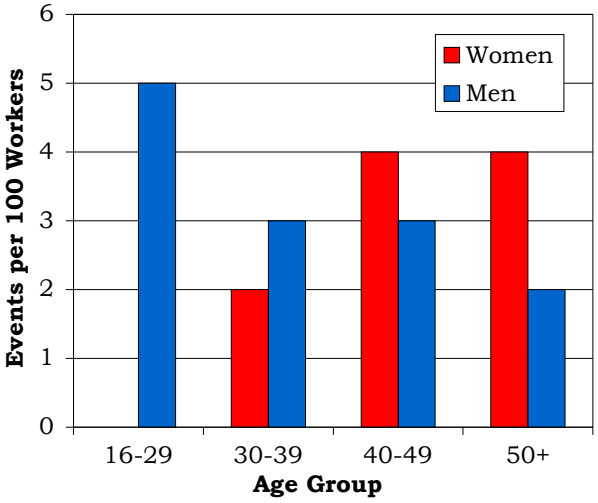
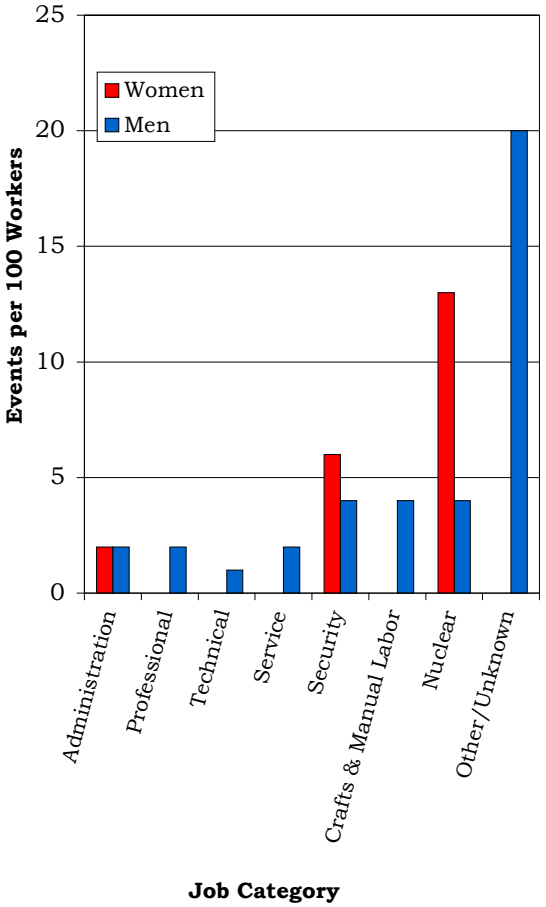


Figure 15. OSHA-Recordable Events by Job Category and Gender



Women had a total of 312 lost or restricted workdays; 719 lost or restricted workdays were recorded for men. Overall, the average number of workdays lost or with restricted activity due to an OSHA-recordable event was higher among women (13 days) than among men (10 days). Among both men and women, we found no relationship between age and the number of lost or restricted workdays. The highest average number of lost or restricted workdays was noted among women in the Security category (22 days) and men in the Service category (22 days). We found no consistent relationship between gender and average number of lost or restricted workdays when job categories were compared.

Diagnostic and Accident Categories for OSHA-Recordable Events

The 99 OSHA events recorded on the OSHA 200 Logs included 37 diagnoses among women and 86 diagnoses among men (Figure 16). Injuries accounted for 35 percent (13/37) of the diagnoses reported among women. The injuries were primarily sprains and strains (38 percent) and bruises (31 percent). Muscles and skeleton disorders accounted for 43 percent of the diagnoses among women, and 88 percent were reported by workers aged 40-49. Administration workers reported 50 percent and Nuclear workers reported 44 percent of the muscles and skeleton conditions.

Seventy-one percent (61/86) of the diagnoses reported among men were injuries, primarily designated as sprains and strains (31 percent) and unspecified injuries (25 percent). Other than injuries, diagnoses involving the muscles and skeleton were the most common OSHA-recordable diagnoses among men.

Figure 16. OSHA-Recordable Diagnoses by Diagnostic Category and Gender

Diagnostic Category	Gender	
	Women	Men
Digestive	0	2
Muscles & Skeleton	16	17
Nervous System	0	2
Skin	5	1
Unspecified Symptoms	3	3
Injury	13	61
Fractures – Upper Limb	0	3
Fractures – Lower Limb	1	3
Dislocations	0	1
Back Sprains & Strains	1	10
Other Sprains & Strains	4	9
Open Wounds – Head, Neck, Trunk	1	1
Open Wounds – Upper Limb	1	5
Open Wounds – Lower Limb	0	2
Superficial Injuries	0	3
Bruises	4	3
Crushing Injuries	1	1
Foreign Bodies Entering Orifice	0	2
Burns	0	1
Injuries to Nerves & Spinal Cord	0	1
Unspecified Injuries	0	15
Adverse Reactions to Non-Medical Substances	0	1

Eighty-one percent (80) of the 99 OSHA events were described as accidents in the OSHA Logs (Figure 17). The majority of these events were "other accidents"; 70 percent (14/20) among women and 82 percent (49/60) among men. Overexertion and strenuous movements made up the majority of that category. Accidents involving being struck by an object were also relatively common among men. Falls were the second most common type of accident reported. Crafts and Manual Laborers were responsible for one-third of the accidents reported by men.

Figure 17. OSHA-Recordable Accidents by Type and Gender

Accident Category	Gender	
	Women	Men
	Number of Accidents	Number of Accidents
Falls	5	8
Natural/Environmental Factors	1	1
Submersion/Suffocation/Foreign Bodies	0	2
Other Accidents	14	49
Struck by an Object	2	6
Caught Between Objects	1	4
Cutting/Piercing Instrument/Object	0	4
Firearm	0	1
Electric Current	0	1
Overexertion/Strenuous Movements	11	31
Repetitive Trauma	0	2
Total	20	60

Rates of OSHA-Recordable Events

The rates of all OSHA-recordable events by age and job categories and gender are shown in Figures 18 and 19. Rates among women and men were generally higher among workers under age 50 than among older workers. The OSHA-recordable rates among women were highest among Nuclear workers. Men in the Other/Unknown category had the highest rates of events, followed by the Crafts and Manual Labor and Nuclear groups. There were only five men in the Other/Unknown category in 2000. The high rate of OSHA-recordable events for men in this group is based on one event. A worker, aged 50+, reported a foreign body in his eye. No lost or restricted workdays resulted from this event.

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

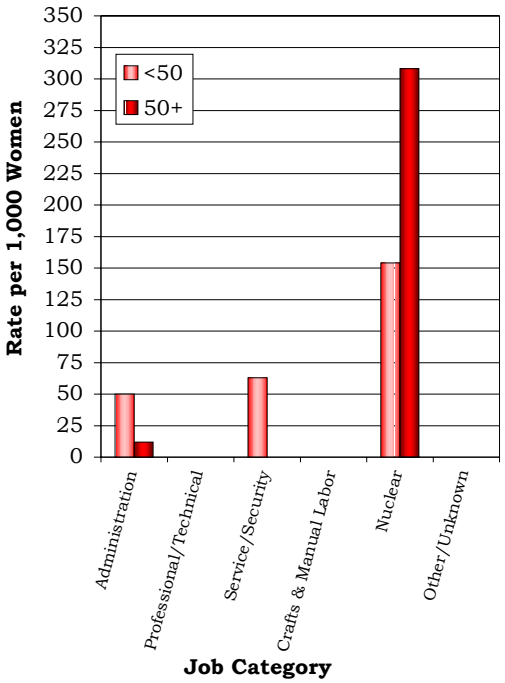
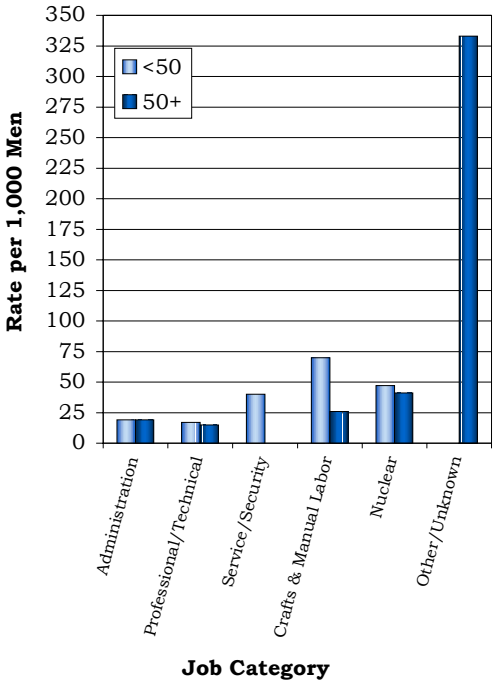


Figure 19. OSHA-Recordable Rates by Age and Job Categories Among Men, All Diagnoses Combined



Most of the OSHA-recordable diagnoses among men involved injury; among women, most of the diagnoses were muscles and skeleton conditions. When injuries were considered separately, the same job categories with the highest rates for all diagnoses combined had the highest injury rates for both men and women. Nuclear workers accounted for 15 percent of the work force but 27 percent of the OSHA-recordable events.

Nuclear workers were 3 times more likely than other workers to report an injury. They were at higher risk of sprains and strains of the back (5 times) and complications and unspecified injuries (4 times). In addition, Security workers were at over 5 times greater risk of sprains and strains other than back strains.

Time Trends for OSHA-Recordable Events

OSHA-recordable data for Rocky Flats became available for epidemiologic surveillance analysis beginning in 1994. The age-adjusted rates from 1994 to 2000 by job category and gender are shown in Figure 20. We observed considerable variability in the rates for both women and men over the 7-year period. Among women, the rate dropped dramatically among Technical workers through 1997, followed by an increase in rates for 1998 and 1999 and no OSHA events recorded in 2000. An apparent increase in rates was observed among Security workers from 1996 to 1998, followed by a decrease beginning in 1999 and continuing into 2000. The erratic behavior of rates for most job categories over the 7-year period may reflect the effects of reclassifying workers from one job category to another and the uncertainty of reporting by lower tier subcontractors since 1995.

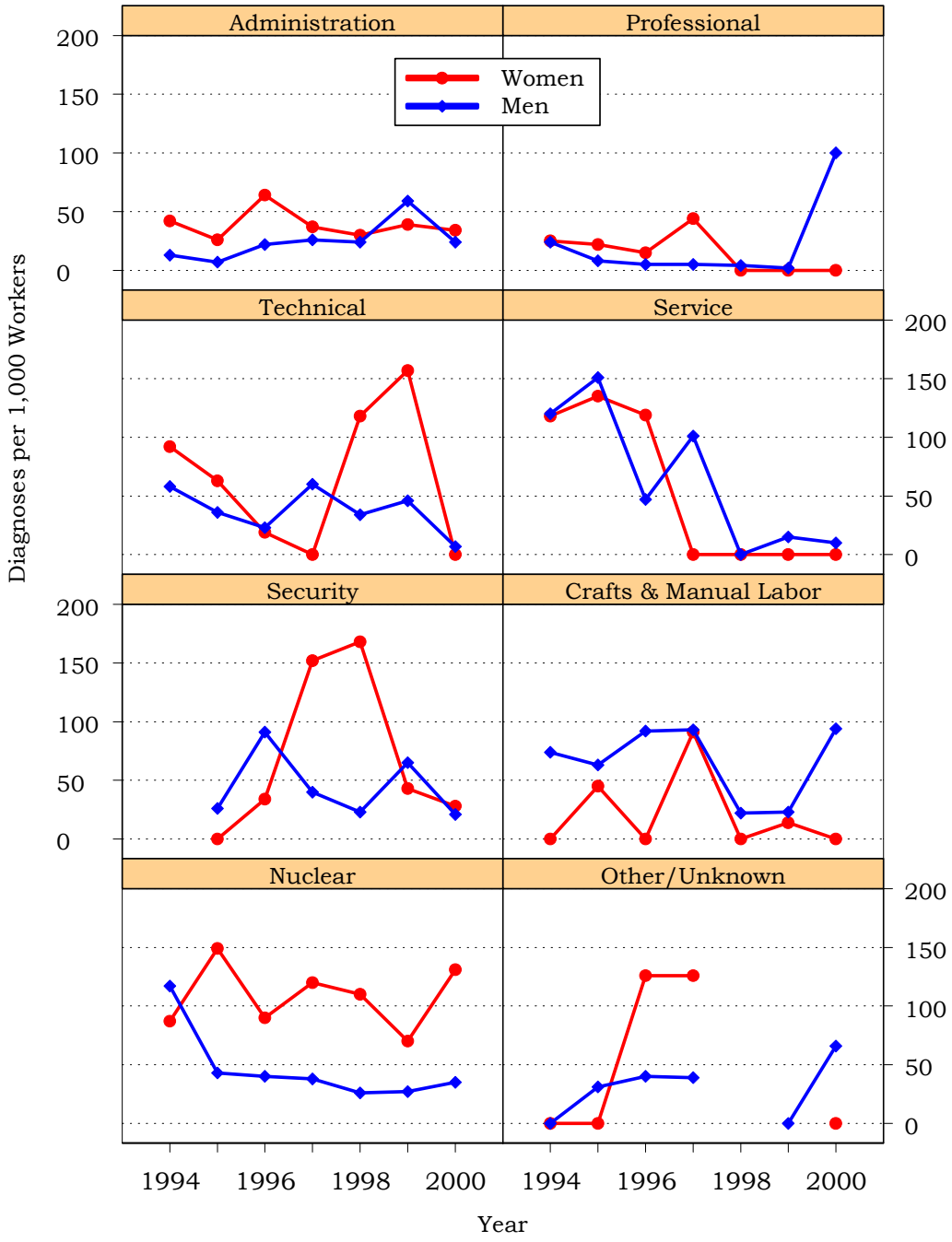
The rates among men were more stable than those of women over the 7-year period. We noted a modest but steady decline in rates among male Professional workers through 1999 and a sharp increase in rates in 2000. A more consistent decline was noted among Nuclear workers. Crafts and Manual Labor workers experienced a significant decline in 1998 and little change for 1999, followed by a significant rate increase in 2000. Male Crafts and Manual Laborers had an increase in injury diagnoses from 1999

to 2000. We noted a significant increase in rates for men in the Administration group in 1996 and then again in 1999.

Despite considerable variation from year to year, the overall injury rates for women at Rocky Flats have not changed appreciably since 1996. Men showed a decrease in the injury rate in 1998, followed by an increase in 1999. No significant changes in the injury rates were noted from 1999 to 2000.

The changing illness and injury rates at Rocky Flats could indicate rapid changes in the types of work being conducted as site remediation goes forward. It is equally possible that administrative changes in the way workers are classified by job category created many of the fluctuations in rates observed in both the return-to-work and OSHA-recordable rates presented in this report. Interpretation is made even more uncertain by changes in reporting following the introduction of integrated contracting at the site in 1995. The work force has been fragmented into a number of lower tier subcontractors, not all of whom utilize the site's occupational medical clinic with equal consistency. Thus, it is unlikely that the work force reflected in more recent statistics is like the work force reflected in earlier reports. Concerns about the completeness of return-to-work health and safety data are of special urgency. These data depend on contractors' and subcontractors' willingness to utilize the site medical clinic, the source of most non-OSHA health data collected by the Epidemiologic Surveillance Program. These many factors, coupled with the integrating contractor's concerns about meeting the record-keeping requirements of Epidemiologic Surveillance, persuade us that continued conduct of the program at Rocky Flats is no longer feasible. Faced with the inability to ensure that the health data represented by these reports is a reasonable representation of the health experience of current workers, the year 2000 Epidemiologic Surveillance report is therefore the last such report for Rocky Flats Environmental Technology Site.

Figure 20. Age-Adjusted Rates for All OSHA-Recordable Diagnoses Combined Among Women and Men by Job Category from 1994 to 2000



Note: Security workers were included in the Service job category in 1994. The Other/Unknown job category had no workers for men in 1998 or for women in 1998 and 1999.

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 1 person followed for 1 year. For example, 5 people followed for 1 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 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