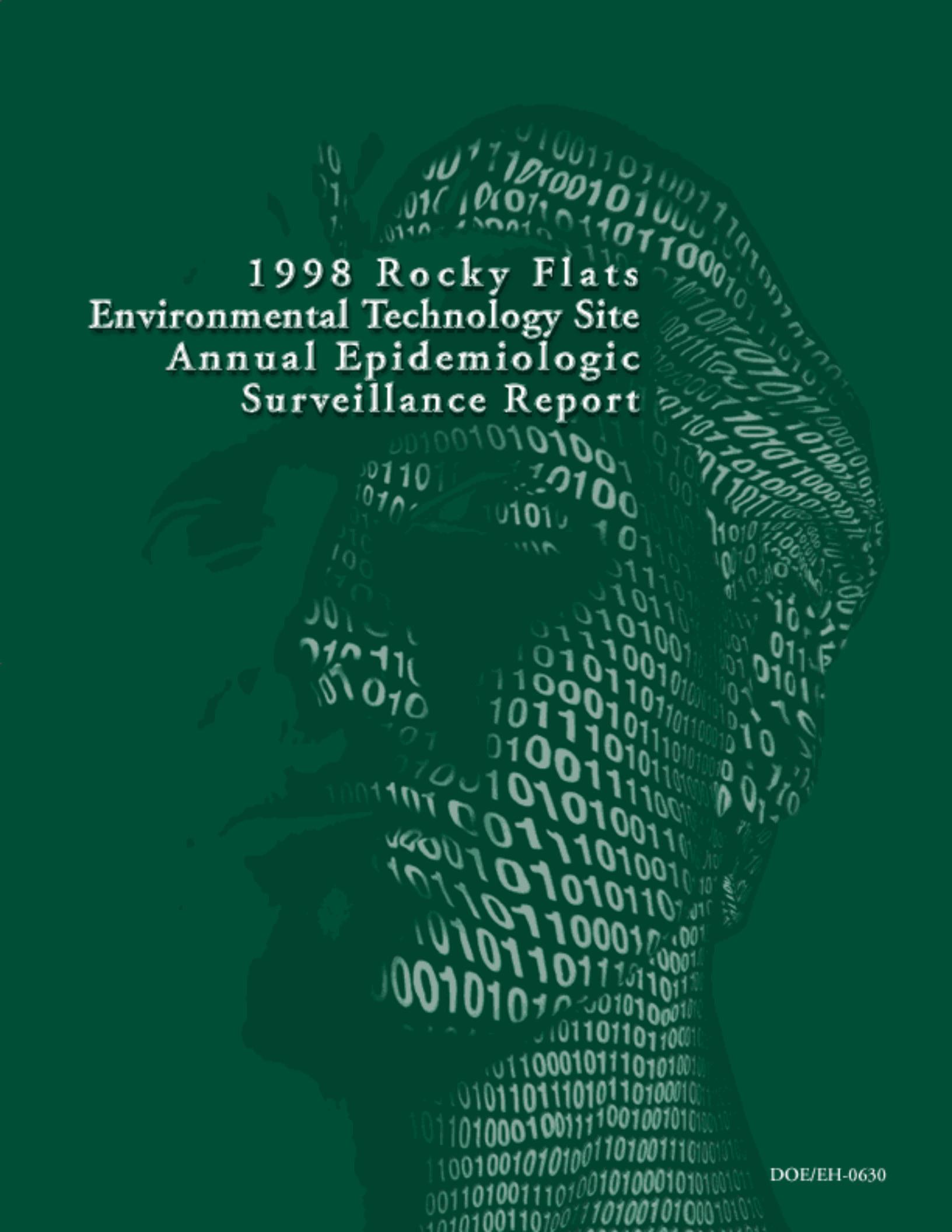
1998 Rocky Flats Environmental Technology Site Annual Epidemiologic Surveillance Report



DOE/EH-0630

ROCKY FLATS
ENVIRONMENTAL TECHNOLOGY SITE

1998 Epidemiologic Surveillance Report

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ROCKY FLATS
ENVIRONMENTAL TECHNOLOGY SITE 1998

At a Glance

The striking decrease in the number of reported absences that we noted from 1996 to 1997 did not continue into 1998. The overall absence rate increased among men from 1997 to 1998 but remained the same among women.

The highest absence rate was noted among the Nuclear workers. Service personnel had the lowest rate of absence.

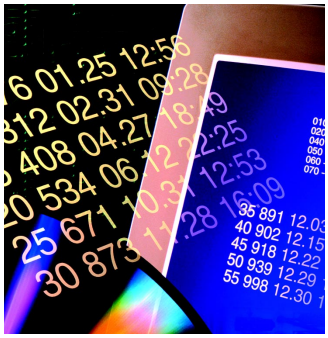
Despite considerable variation from year to year, the overall OSHA-recordable injury rate for women at Rocky Flats has not changed appreciably since 1995. Men showed a decrease in the OSHA-recordable injury rate in 1998.

Security workers accounted for eight percent of the work force but experienced 17 percent of the OSHA-recordable events in 1998. They were at six times greater risk than other workers for sprains and strains other than those involving the back. We noted a relatively steady increase in the rate of OSHA-recordable events among women in the Security job category over the past five years.

As in 1997, most OSHA-recordable events were classified as “other accidents,” 73 percent among women and 87 percent among men. Overexertion and strenuous movements and accidents involving being struck by an object comprised the majority of that category. Falls were also relatively frequent among both women and men.

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 five 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, 1998 through December 31, 1998. 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 data analyses were carried out. 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 Programs' 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 five 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 1998 and OSHA-recordable events from 1994 to 1998.

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

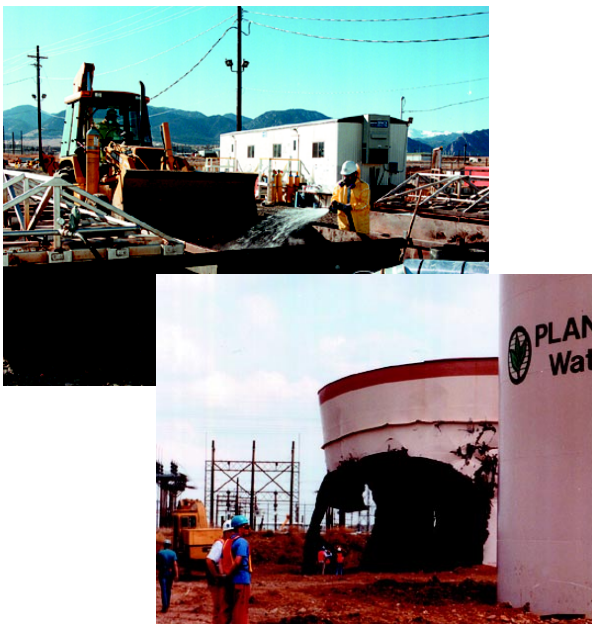
DOE sites vary by mission, function, job classification, and worker exposures. Comparisons of Rocky Flats with other DOE sites should be made with caution. In addition, many factors can affect the completeness and accuracy of health information reported at the sites, thereby affecting the observed patterns 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, a partnership between ICF-Kaiser and CH2M Hill, assumed responsibility as the integrating management contractor for the site on July 1, 1995.

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. Also, in 1998, the site safely drained the last liters of plutonium solution from the final plutonium process tank. Both of these efforts are helping the Department to meet its goal of cleaning up the site and to ultimately close it.

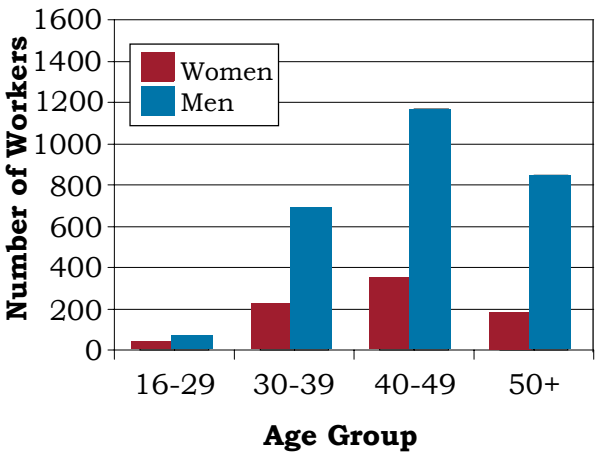


The Rocky Flats Work Force - 1998

A total of 3,520 Rocky Flats employees were included in epidemiologic surveillance in 1998, 634 fewer workers than were present in 1997. Twenty-five workers were excluded from the roster of current workers because no information on gender and age was available for these workers. The gender and age distribution of the work force is shown in Figure 1.

There were 756 (21 percent) women and 2,764 (79 percent) men in the work force. The average age of male Rocky Flats workers was 45 years and 43 years for females. Eighty-three percent of the workers were White. Hispanics comprised 11 percent and African Americans 4 percent of the work force. Asians and Native Americans made up the remaining two percent.

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 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. The majority of female workers (71 percent) were in the Administration Group, while less than half of the men (43 percent) were in this group. The next highest percentage of male workers (15 percent) were crafts and Manual Laborers.

Figure 2. The Work Force by Job Category and Gender

Job Category	Women	Men
Administration	538 71%	1,190 43%
Professional	66 9%	336 12%
Technical	26 3%	132 5%
Service	5 1%	54 2%
Security	36 5%	254 9%
Crafts & Manual Labor	24 3%	425 15%
Nuclear	61 8%	373 14%

Number and Length of Absences

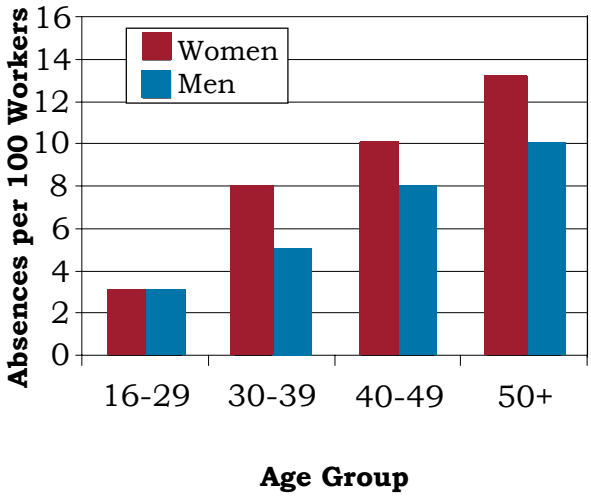
Epidemiologic surveillance examines illness and injury absences of five or more consecutive workdays (also referred to as "five-day absences"). This threshold is based on DOE Order 440.1, which requires contractor management to notify Occupational Medicine when a worker has been absent for five or more 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 five 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 five or more workdays because they were not the result of an injury or illness. In this report, specific absences of five or more consecutive workdays that were excluded include four women with four reported absences due to maternity leave and three men with reported absences due to elective surgical procedures not related to the treatment of an illness or injury. Throughout this report, analyses take gender, age, and occupation into account because the risk of illness and injury varies by these factors.

The striking decrease in the number of reported absences that we noted from 1996 to 1997 did not continue into 1998. The overall absence rate increased among men from 1997 to 1998 but remained the same among women.

The rate of five-day absences due to injury or illness varied by gender and age as shown in Figure 3. There were 76 five-day absences among 58 women resulting in an absence rate of 10 per 100 (76/756). Among the 2,764 men, 215 absences resulted in an absence rate of 8 per 100 (215/2,764). The rate of five-day absences increased with age among both women and men. One percent of the men and women reported more than one absence during 1998.

Figure 3. Absence Rate by Gender and Age



The average length of absence by gender and age is shown in Figure 4. The average length of absence was longer for women (35 days) than for men (27 days). We saw no consistent relationship between gender or age and average duration of absence. The notable difference in the average length of absence between men and women was largely the result of extended absences reported by women 50 years of age and older. Of seven absences lasting three months or more reported by women, five were among women aged 50 or older (23 percent of the female workers at Rocky Flats). Three of the absences were for conditions of the muscles and skeleton.

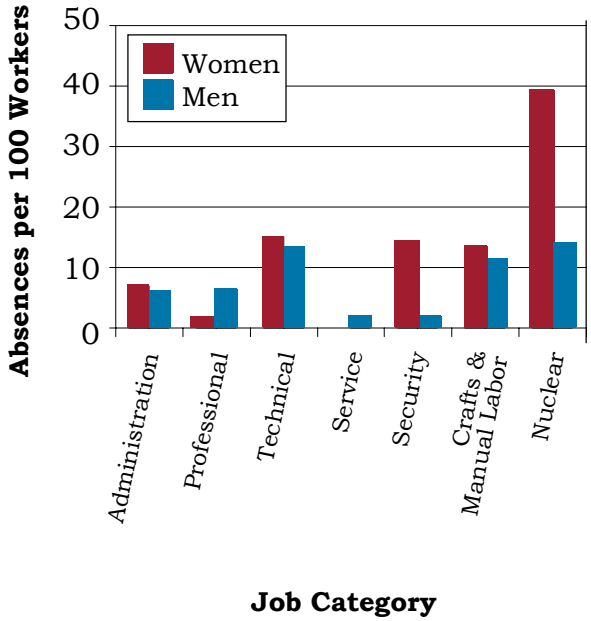
Figure 4. Number of Days Absent by Gender and Age

Gender	Age	Number of Absences	Number of Days Absent	Average Number of Days Absent
Women	16 - 29	1	11	11
	30 - 39	18	632	35
	40 - 49	35	664	19
	50 +	22	1,325	60
	Total	76	2,632	35
Men	16 - 29	2	36	18
	30 - 39	33	889	27
	40 - 49	94	2,615	28
	50 +	86	2,306	27
	Total	215	5,846	27

The rate of five-day absences due to illness or injury varied by job category for men and women as shown in Figure 5. Across similar job categories, we observed no relationship between rate of absence and gender. The highest absence rate was noted among the Nuclear workers for both women (39 per 100) and men (14 per 100). Service personnel had the lowest rate of absence for women (0 per 100) and for men (2 per 100).

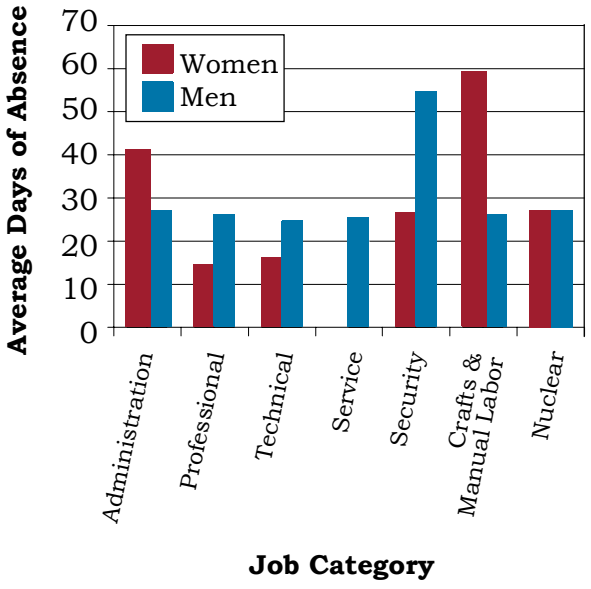
The average duration of absence by job category and gender is shown in Figure 6. Women generally had a shorter average duration of absence than did men within a given job category. Although Nuclear workers had the highest rate of five-day absences, the average duration of their absences was comparable to that of men and women in other job categories.

Figure 5. Absence Rate by Job Category and Gender



Female Crafts and Manual Labor workers had the longest average duration of absence (59 days); one of the three absences reported by women in this job category lasted 148 days. Among men, Security workers had the longest average duration of absence (54 days). These workers reported only six absences, one of which lasted 205 days.

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. Women reported 100 diagnoses and men reported 274 diagnoses in 1998. The most frequently reported diagnoses varied little by gender.

Women lost 2,632 calendar days due to injury and illness. Respiratory conditions (34 percent), muscles and skeleton conditions (21 percent), and genitourinary disorders (12 percent) accounted for 67 percent of their reported diagnoses. Upper respiratory infections made up 41 percent of the respiratory conditions, followed by chronic obstructive pulmonary disease (bronchitis and asthma, 29 percent) and flu and pneumonia (26 percent). The majority of conditions of the muscles and skeleton were disc and back problems (52 percent) with arthritis (24 percent) and acquired bone deformities (24 percent) making up the rest. Disorders of the female breast and reproductive organs accounted for 83 percent of the genitourinary conditions.

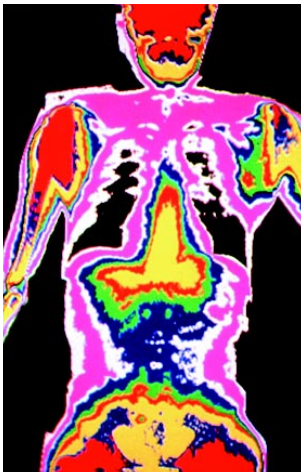
Figure 7. Number of Diagnoses and Lost Calendar Days by Diagnostic Category (Categorized by ICD-9-CM) and Gender

Diagnostic Category	Women		Men	
	Number of Diagnoses	Number of Lost Calendar Days	Number of Diagnoses	Number of Lost Calendar Days
Benign Growths	1	14	0	0
Blood	0	0	0	0
Cancer	0	0	2	42
Digestive	4	15	25	750
Endocrine / Metabolic	0	0	6	90
Existing Birth Condition	0	0	1	15
Genitourinary	12	489	9	167
Heart / Circulatory	2	21	22	579
Infections / Parasites	4	280	5	66
Injury	9	321	58	1,297
Miscarriage	1	26	NA	NA
Muscles & Skeleton	21	1,107	40	2,040
Nervous System	4	47	19	555
Psychological	6	277	14	322
Respiratory	34	399	59	789
Skin	1	42	2	25
Unspecified Symptoms	1	38	12	195

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

Among women, the more frequently reported diagnoses were not as consistent across age groups as they were among men. Women under 30 years old and 50 years old or greater reported only a few diagnoses; all for psychological conditions. Respiratory diseases, genitourinary diagnoses, and conditions of the muscles and skeleton were common among 30-49 year old women.

Men lost 5,846 calendar days due to injury and illness. Over 50 percent of all reported diagnoses among these workers were respiratory conditions (22 percent), injuries (21 percent), and muscles and skeleton conditions (15 percent). Upper respiratory infections accounted for 47 percent of the respiratory conditions, followed by pneumonia and flu (29 percent), and bronchitis and asthma (20 percent). Frequently reported injuries included sprains and strains (36 percent), unspecified injuries (28 percent), and fractures (19 percent). One allergic reaction was reported among the 58 diagnoses categorized as injuries. The diagnoses affecting the muscles and skeleton included arthritis (40 percent), disc and back problems (40 percent), and rheumatism (18 percent).



The above diagnoses did not vary by age. Injuries, respiratory conditions, and diagnoses affecting the muscles and skeleton ranked among the top categories for men of all ages except 16-29 year olds. Workers in this age group reported two five-day absences in 1998. Digestive disorders were common in the 40-49 age group. Among men of all ages, 24 men reported 25 diagnoses involving the digestive system. Over half of these were intestinal conditions (28 percent) and hernias (24 percent).

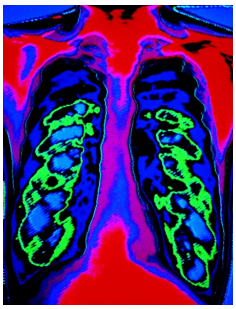


Figure 8 shows the frequency of reported diagnoses by job category for women and men. The ranking of diagnoses should be interpreted cautiously; in many job categories the actual number of diagnoses was very small. Among women, genitourinary disorders, conditions affecting the muscles and skeleton, and respiratory diagnoses were common among the job categories. The women in the Service group reported no absences during 1997 or 1998. Among men, muscles and skeleton conditions, injuries, and respiratory conditions appeared most often in nearly all job categories.

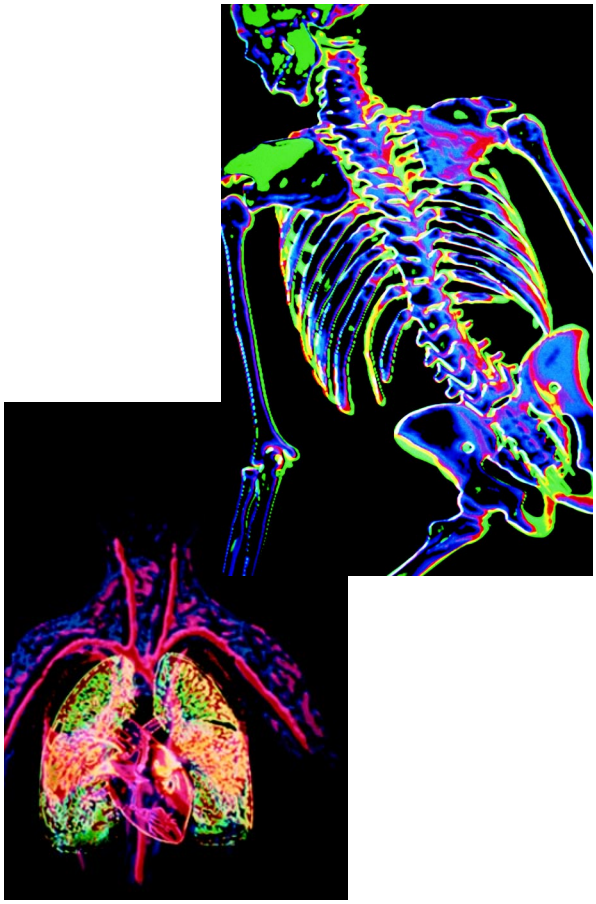


Figure 8. Most Frequently Reported Diagnoses by Job Category and Gender

Job Category	Men	Women
Administration	**Respiratory (19)** **Muscles & Skeleton (14)** **Injury (12)**	**Muscles & Skeleton (14)** **Respiratory (10)** **Genitourinary (7)**
Professional	**Injury (6)** **Respiratory (6)** **Digestive (3)** **Muscles & Skeleton (3)**	**Muscles & Skeleton (1)**
Technical	**Respiratory (5)** **Muscles & Skeleton (4)** **Injury (3)**	**Respiratory (2)** **Genitourinary (1)** **Heart / Circulatory (1)** **Skin (1)**
Service	**Heart / Circulatory (1)**	**None**
Security	**Digestive (3)** **Injury (3)** **Respiratory (2)**	**Respiratory (4)** **Genitourinary (1)** **Infections / Parasites (1)** **Psychological (1)** **Muscles & Skeleton (1)** **Unspecified Symptoms (1)**
Crafts & Manual Labor	**Respiratory (13)** **Injury (12)** **Muscles & Skeleton (10)**	**Respiratory (4)** **Injury (1)**
Nuclear	**Injury (22)** **Respiratory (14)** **Muscles & Skeleton (8)**	**Respiratory (14)** **Muscles & Skeleton (5)** **Genitourinary (3)** **Injury (3)**

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 health conditions among various worker groups. For example, Figure 7 shows that men reported 40 and women reported 21 diagnoses involving muscles and skeleton conditions during 1998. Men, therefore, reported almost twice as many muscles and skeleton diagnoses as women. As there are more than three times as many men than women at Rocky Flats, it seems reasonable to expect more muscles and skeleton diagnoses among men than women. Does this mean that men were at greater risk of muscles and skeleton disorders compared with women in 1998? 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 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. Multiply this number by 1,000 to get the diagnosis rate per 1,000 workers.

For example:

40 muscles and skeleton diagnoses ÷ 2,764 men = .014 x 1,000 = 14 muscles and skeleton diagnoses per 1,000 men

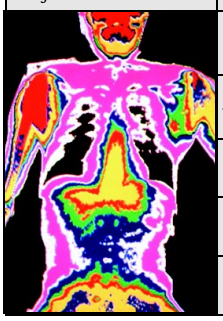
21 muscles and skeleton diagnoses ÷ 756 women = .028 x 1,000 = 28 muscles and skeleton diagnoses per 1,000 women

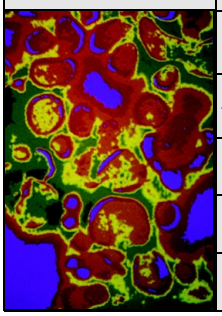
Comparing these rates now correctly suggests that the rate of muscles and skeleton disorders among women is twice the rate for men. They are called **crude rates** because they do not account for possible differences between men and women such as age and other factors that might affect the individual's 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.

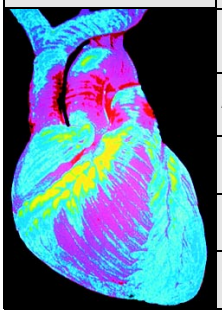
The diagnosis rate, also called the illness and injury rate, is the number of occurrences of a given disease or health condition observed over the course of a year per 1,000 workers at risk of getting that condition (see shaded box). One health condition, arthritis for example, may result in several five-day absences over a year. Conversely, one five-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 seven job categories were combined into five 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 injury. Additional information about eight other diagnosis groups are also analyzed and can be found in the Supplemental Tables.

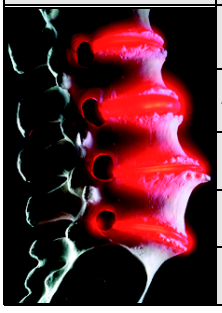
Figure 9. Illness and Injury Rates by Job Category, Gender, and Age

Diagnostic Category	Rate per 1,000			
All Illnesses & Injuries Combined	Job Category	Age	Men	Women
	Administration	<50	68	82
		50+	98	126
	Professional/ Technical	<50	79	53
		50+	129	125
	Service/Security	<50	33	194
		50+	28	400
	Crafts & Manual Labor	<50	108	200
		50+	154	250
	Nuclear	<50	208	500
		50+	165	462

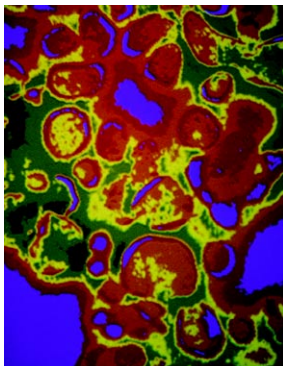
Diagnostic Category	Rate per 1,000			
Cancer	Job Category	Age	Men	Women
	Administration	<50	0	0
		50+	5	0
	Professional/ Technical	<50	0	0
		50+	0	0
	Service/Security	<50	0	0
		50+	0	0
	Crafts & Manual Labor	<50	0	0
		50+	0	0
	Nuclear	<50	0	0
		50+	0	0

Diagnostic Category	Rate per 1,000			
Heart/Circulatory	Job Category	Age	Men	Women
	Administration	<50	2	0
		50+	13	7
	Professional/ Technical	<50	0	13
		50+	22	0
	Service/Security	<50	4	0
		50+	0	0
	Crafts & Manual Labor	<50	12	0
		50+	11	0
	Nuclear	<50	15	0
		50+	18	0

Diagnostic Category	Rate per 1,000			
Respiratory	Job Category	Age	Men	Women
	Administration	<50	16	10
		50+	16	44
	Professional/ Technical	<50	18	26
		50+	36	0
	Service/Security	<50	4	111
		50+	28	0
	Crafts & Manual Labor	<50	16	200
		50+	51	0
	Nuclear	<50	49	208
		50+	9	308

Diagnostic Category	Rate per 1,000			
Injury	Job Category	Age	Men	Women
	Administration	<50	5	12
		50+	21	0
	Professional/ Technical	<50	21	0
		50+	14	0
	Service/Security	<50	11	0
		50+	0	0
	Crafts & Manual Labor	<50	24	0
		50+	34	250
	Nuclear	<50	42	63
		50+	101	0

Women aged 50 years or older had higher rates for all illnesses and injuries combined than did younger women, with the exception of Nuclear workers. Among men, the rates for all illnesses and injuries combined were higher for workers aged 50 or older than for younger males, with the exception of Service/Security and Nuclear workers. For both women and men, Nuclear workers had the highest illness and injury rates. The Nuclear workers also had the highest rates in 1997. Women had higher rates than did men in every job category except the Professional/Technical group.

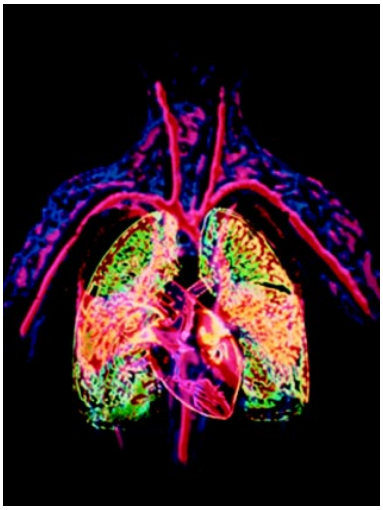


Cancer rates presented in this report are based on reported five-day absences during the year. A worker may experience several absences from one cancer diagnosis due to medical complications or treatment. Each absence results in the report of a cancer diagnosis; however, it does not imply that this is a new cancer. The cancer rates in this report are *not* comparable to the *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 one year.

Only two five-day absences related to cancer were reported during 1998, both reported by the same man. He had not reported cancer between 1994 and 1997.

Among women, only the Administration and Professional/Technical groups reported any heart/circulatory diagnoses. Two women reported two heart/circulatory diagnoses. One woman less than 50 years old reported hemorrhoids; the other woman reported high blood pressure and was in the 50 or older age group. Among men, heart/circulatory problems involving heart attacks, angina (chest pain related to insufficient oxygen reaching the heart muscle), and other ischemic heart disease (restricted blood flow to an artery) were all reported by men aged 50 or older. Other types of heart/circulatory diagnoses did not appear strongly related to age. Overall, 20 men reported 21 absences. Forty-five percent (10/22) of the diagnoses reported by men involved high blood pressure and ischemic heart disease. Men in the Nuclear job category had the highest rate of heart/circulatory disorders.

Women generally had higher rates of respiratory disease than did men among workers under 50 years old. Among older workers, such a relationship was not apparent. Age did not appear related to the rate of respiratory diagnoses for either women or men. Nuclear workers had the highest rates of respiratory diagnoses among women. The Crafts and Manual Labor and Nuclear groups had the highest rates among men. Nuclear workers were three times more likely to report a respiratory diagnosis than were other workers, an increase also noted in 1997. The respiratory disease rate appeared particularly high among women in the Nuclear trades regardless of age, but the



rate is based on 11 absences among eight workers in a job category that contains only 61 women. Even a small number of absences can produce an apparently high rate when based on such a small group of workers.

Women in most job categories reported no injuries in 1998, similar to what we observed in 1997. Older women in the Crafts and Manual Labor job category had a rate of 250 injuries per 1,000

workers. No relationship was seen between age and injury rates for men. Injury rates for men tended to be higher than for women in the same job category regardless of age. Nuclear workers were over three times more likely to report an injury than were other workers. Nuclear workers were 12 percent of the work force but reported 37 percent (25/67) of the injury diagnoses in 1998. A similar increased risk of injuries was reported among the Nuclear workers in 1997.

The risk of illness and injury among workers classified in one job category was compared with workers in the remaining job categories. Workers in the Crafts and Manual Labor group were at almost twice the risk of illness and injury compared with all other groups.

Among Nuclear workers, the risk of illness and injury was twice that of workers in other job categories. Workers in this group also had over four times the risk for psychological conditions and nervous system disorders.

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 selected 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 among women and men over the past 6 years (Figure 10). The overall diagnosis rate for women was much higher than that of men throughout most of the period, but the difference in the rates for men and women has decreased over time. For the past two years women have not reported any cancer diagnoses. The respiratory diagnosis rate for women has declined dramatically. We also noted a modest decrease in injury rates for women. The earlier decline in rates of respiratory diagnoses and injuries among men appears to have stopped; we noted a slight increase in both of these rates for 1998.

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.

The rates for all illnesses and injuries combined were much more variable for women than for men over the six year period (Figure 11). Women in the Nuclear trades had the most variable rates over the period, but their rate in 1998 was only marginally lower than in 1993. We noted modest increases in the overall illness and injury rate among women in the Security, Crafts and Manual Labor, and to a lesser extent the Technical job categories from 1997 to 1998. Among men, Technical, Nuclear, and to a lesser extent, Professional workers displayed increases in the overall rate from 1997 to 1998. Consistent trends were not evident over the six year period.

Figure 10. Age-Adjusted Rates for Selected Diagnostic Categories for Men and Women from 1993 to 1998

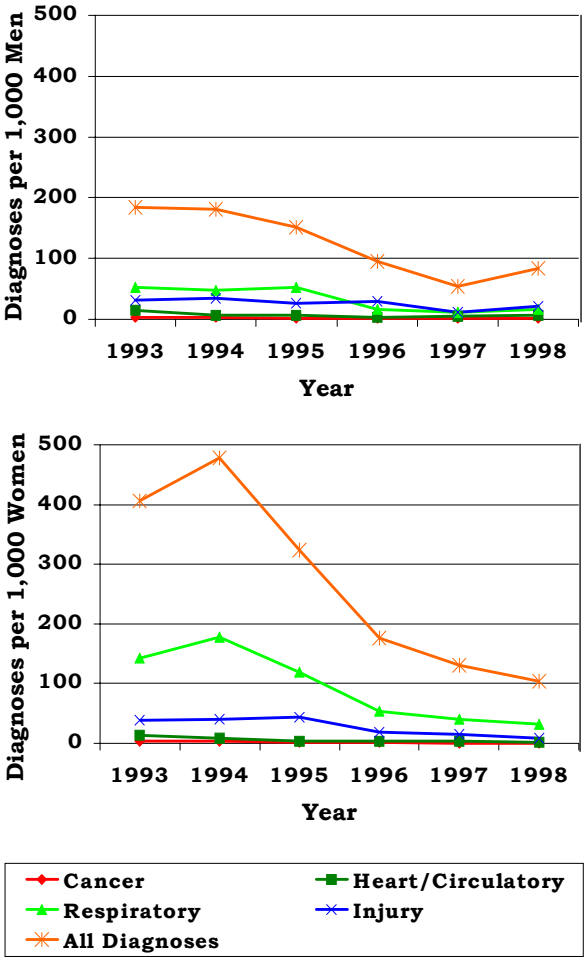
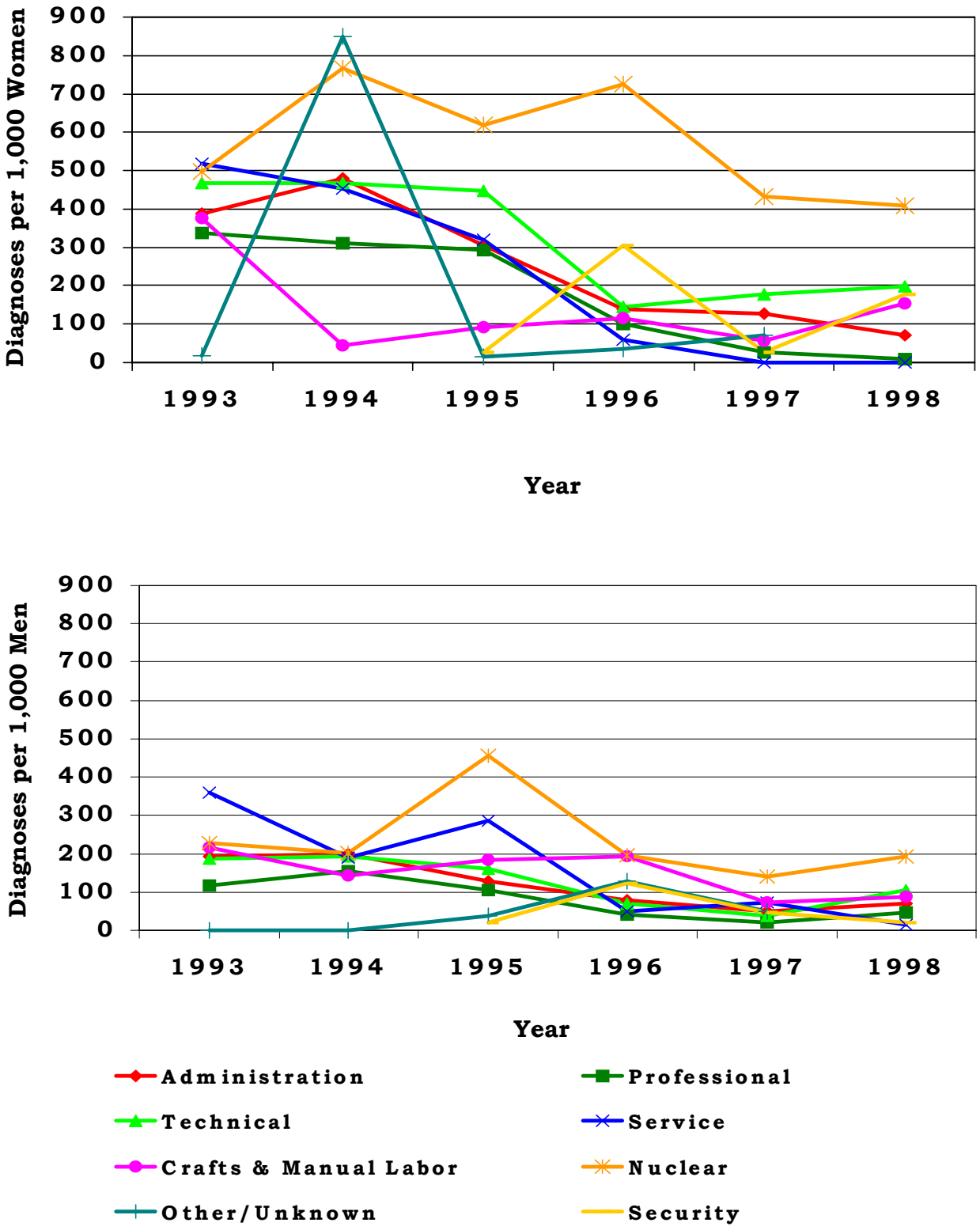


Figure 11. Age-Adjusted Rates for All Diagnoses Combined Among Women and Men by Job Category from 1993 to 1998

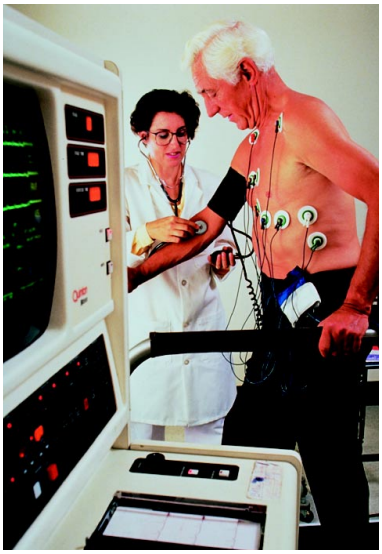


Sentinel Health Events for Occupations

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 work force. Sixty-four medical conditions associated with workplace exposures from studies of many different industries have been identified as sentinel health events. Although sentinel health events may indicate an occupational exposure, many may result from non-occupational exposures. Due to this uncertainty, sentinel health events are assessed in 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 smoking. Carpal tunnel syndrome may result from a job requiring typing or from a hobby such as playing the piano.



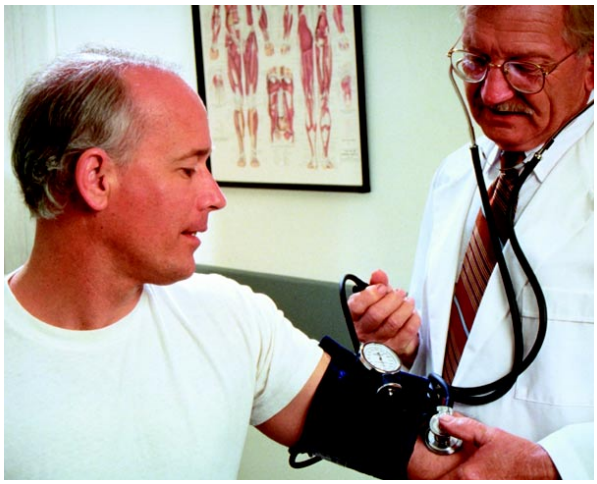
No *definite* sentinel health events were reported in 1998. Two of 374 (1 percent) diagnoses were identified as *possible* sentinel health events (Figure 12). These two sentinel health events (one carpal tunnel syndrome and one liver disorder) were reported by two men and resulted in 57 lost calendar days. The two workers (one Crafts and Manual Laborer and one Security worker) were under 50 years of age.

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	2	0	57	0
Total	2	0	57	0

Disabilities Among Active Workers

No disabilities in the current work force were reported in 1998.



Deaths Among Active Workers

Six deaths were reported in 1998. The causes of death included two heart/circulatory disorders and one each for cancer, infections/parasites, and injuries suffered in an automobile accident. The cause of one death was unspecified. Five of the workers who died were Administration workers and all were aged 40 or older.

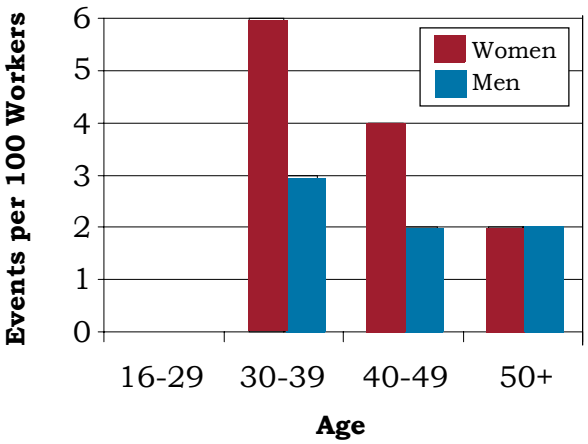
OSHA-Recordable Events

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 rate of OSHA events by gender and age is shown in Figure 13. Twenty-eight women and 62 men had at least one OSHA-recordable event noted. The rate of OSHA events was higher for women (4 per 100 workers) than men (2 per 100 workers).

Figure 13. OSHA-Recordable Events by Gender and Age

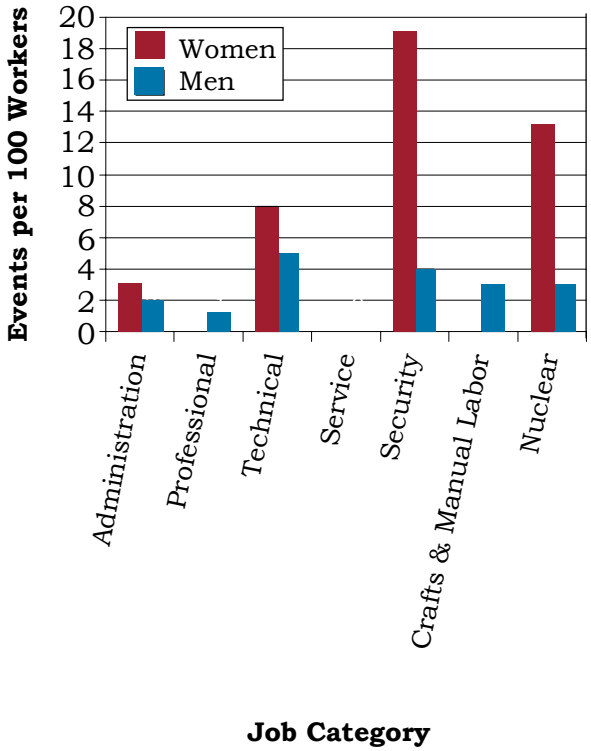


The highest rate of OSHA-recordable events occurred in both men and women aged 30-39. Workers in the 16-29 age group reported no events. The lack of OSHA-recordable events among younger workers may only reflect the very small number of workers aged 16 to 29 on the 1998 roster (Figure 1).

The rate of OSHA-recordable events by job category and gender is shown in Figure 14. Among women, the Security and Nuclear job categories had noticeably higher rates of occupational illness and injury compared with other job categories. Men in the Security, Technical, Crafts and Manual Labor, and Nuclear groups all had higher rates compared with men in other job categories, but the differences between groups were not as marked as those noted among women.

Women had a total of 428 lost or restricted workdays, and 711 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 (11 days). The average number of lost or restricted workdays increased with age among women, but there was no relationship between number of lost or restricted workdays and age among men. The highest average number of lost or restricted workdays was noted among women in Administration (18 days) and men in the Technical category (22 days). We found no consistent relationship between gender and average number of lost or restricted workdays when job categories were compared.

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



Diagnostic and Accident Categories for OSHA-Recordable Events

The 98 OSHA events recorded on the OSHA 200 Logs included 49 diagnoses among women and 79 diagnoses among men (Figure 15). Injuries accounted for 51 percent (25/49) of the diagnoses reported among women. The most common type of OSHA-recordable injury diagnosis was unspecified injuries (40 percent). Fifty-six percent (44/79) of the diagnoses reported among men were injuries, again primarily designated as unspecified injuries (30 percent). Sprains and strains (23 percent) and open wounds (23 percent) were also reported frequently among men. Other than injuries, diagnoses involving the muscles and skeleton were the most common OSHA-recordable diagnoses among both women and men.

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

Diagnostic Category	Gender	
	Women	Men
Digestive	0	1
Muscles & Skeleton	14	24
Nervous System	0	2
Respiratory	3	0
Skin	4	2
Unspecified Symptoms	3	6
Injury	25	44
Fractures-Neck, Trunk	0	1
Fractures-Upper Limb	1	4
Fractures-Lower Limb	0	1
Dislocations	0	2
Back Sprains & Strains	2	3
Other Sprains & Strains	4	7
Open Wounds-Head, Neck, Trunk	1	4
Open Wounds-Upper Limb	1	6
Open Wounds-Lower Limb	1	0
Superficial Injuries	2	0
Bruises	0	1
Foreign Bodies Entering Orifice	2	2
Unspecified Injuries	10	13
Adverse Reactions to External Causes	1	0

Seventy-nine percent (77) of the 98 OSHA events were described as accidents in the OSHA Logs (Figure 16). The majority of events were "other accidents"; 73 percent (16/22) among women and 87 percent (48/55) among men. Overexertion and strenuous movements made up the majority of that category. Accidents involving being struck by an object and falls were also relatively common.

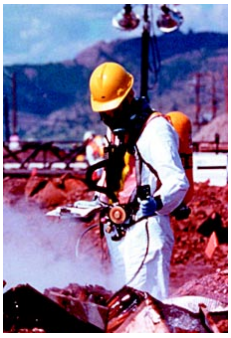


Figure 16. OSHA-Recordable Accidents by Type and Gender

Accident Category	Gender	
	Women	Men
	Number of Accidents	Number of Accidents
Falls	5	5
Submersion/ Suffocation/Foreign Bodies	1	2
Other Accidents	16	48
Caught Between Objects	0	5
Cutting/Piercing Instrument/Object	2	4
Hot, Corrosive, or Caustic Material/ Steam	1	0
Overexertion & Strenuous Movements	10	26
Repetitive Trauma	2	2
Struck by an Object	1	11
Total	22	55

Rates of OSHA-Recordable Events

The rates of all OSHA-recordable events by age category, gender, and job category are shown in Figures 17 and 18. The OSHA-recordable rates among women were highest among Service/ Security and Nuclear workers. Rates among women were higher among workers under age 50 than among older workers. Among men, OSHA-recordable

rates varied with age among the job categories, but not consistently. Overall, rates among men varied less across the job categories than the rates among women. Among men, the Crafts and Manual Labor and Nuclear groups had the highest rates. Most of the OSHA-recordable diagnoses involved injuries. When injuries were considered separately, the same job categories had the highest rates for both men and women. Security workers accounted for 8 percent of the work force but 17 percent of the OSHA-recordable events.

Technical workers were four times more likely than other workers to suffer complications and unspecified injuries or disorders of the muscles and skeleton. Security workers were at six times greater risk than other workers for sprains and strains other than those involving the back.

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

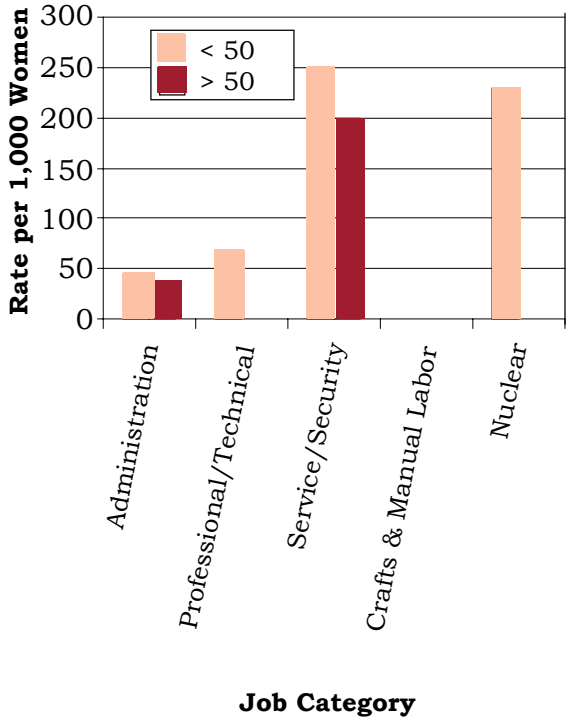
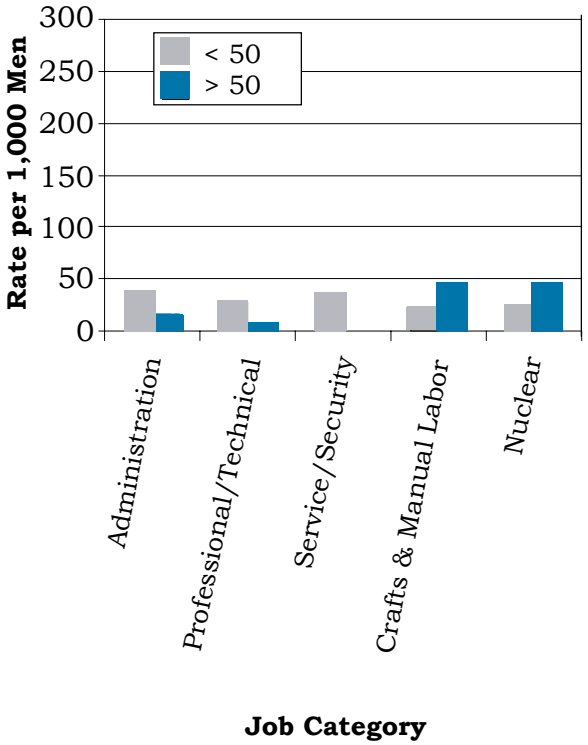


Figure 18. OSHA-Recordable Rates by Age and Job Category Among Men, All Diagnoses Combined



Time Trends for OSHA-Recordable Events

OSHA-recordable data for Rocky Flats became available for epidemiologic surveillance analysis beginning in 1994. The age-adjusted rates from 1994 to 1998 by job category and gender are shown in Figures 19 and 20. We observed considerable variability in the rates for both women and men over the 5-year period. Among women, the rate dropped dramatically among Technical workers through 1997, followed by an

increase in 1998 (Figure 19). The most consistent trend was a relatively steady increase in the rate of OSHA-recordable events among women in the Security category. The erratic behavior of rates for most job categories over the five-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 somewhat more stable than were those of women over the five-year period (Figure 20). We noted a steady decline in rates among Security and Nuclear workers. Crafts and Manual Labor and Service workers experienced a significant decline in 1998. Despite considerable variation from year to year, the overall injury rates for women at Rocky Flats have not changed appreciably since 1995. Men showed a decrease in the injury rate in 1998.

The changes occurring among women, and to a lesser extent men, during the five years are difficult to interpret, but dramatic changes in OSHA-recordable rates over a short period of time are not typical of the patterns observed at other Epidemiologic Surveillance sites. Although 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 more likely that administrative changes in the way workers are classified by job category and the impact of integrated contracting on the reporting of health and safety data by lower tier subcontractor workers may be reflected in injury and illness rates over time. Continued surveillance will help to clarify the impact of administrative changes on our ability to monitor the health and safety of Rocky Flats workers.

Figure 19. Age-Adjusted Rates for All OSHA-Recordable Diagnoses Combined Among Women by Job Category from 1994 to 1998

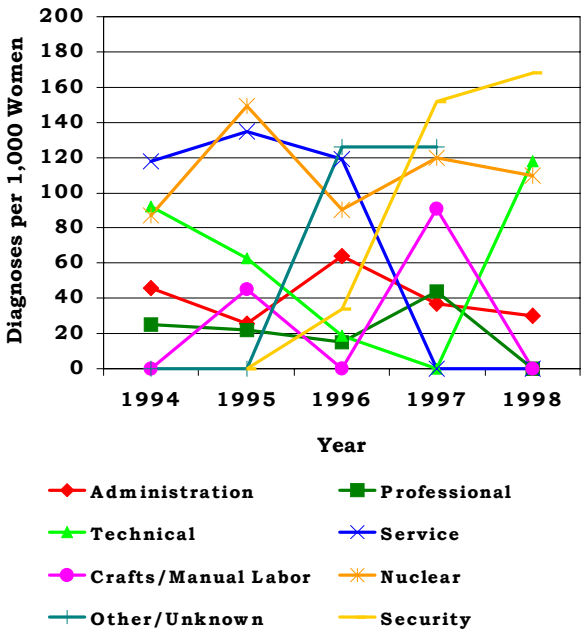
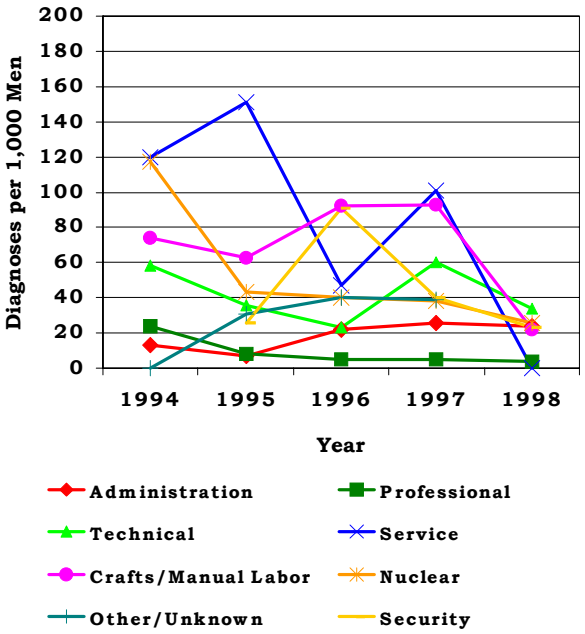


Figure 20. Age-Adjusted Rates for All OSHA-Recordable Diagnoses Combined Among Men by Job Category from 1994 to 1998



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 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 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

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