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Hanford Site Annual Epidemiologic Surveillance Report

Hanford 1999
Epidemiologic Surveillance Report

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Additional information about the Department of Energy's Office of Health Programs, 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

Hanford Site 1999

At A Glance

Male employees at Hanford lost 24,276 workdays in 1999 due to illness and injury. The most frequently reported adverse health conditions among men were injuries, muscles and skeleton conditions, and digestive disorders.

Female employees at Hanford lost 17,972 workdays due to illness and injury in 1999. Women most frequently reported muscles and skeleton conditions, injuries, and respiratory system problems.

There was no evidence of excess cancer of any type among men or women by job category.

The rates of illness and injury were highest among men classified as Service, Crafts and Manual Labor, and Nuclear workers. Among women, the highest rates were among those classified as Service workers and Nuclear workers.

Occupational injuries (OSHA-recordables) resulted in a total of 2,651 lost or restricted workdays at Hanford in 1999. Forty-eight percent of the OSHA events were due to injuries, primarily sprains and strains.

Introduction

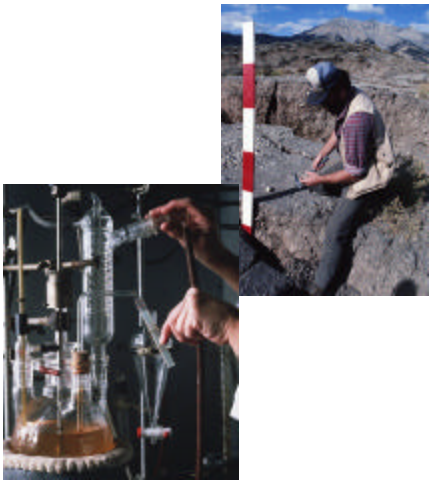
The U.S. Department of Energy's (DOE) commitment to assuring the health and safety of its workers includes the conduct of epidemiologic surveillance activities that provide an early warning system for health problems among workers. The Epidemiologic Surveillance Program monitors illnesses and health conditions that result in an absence of 5 or more consecutive workdays, occupational injuries and illnesses, and disabilities and deaths among current workers. Epidemiologic surveillance has been ongoing at Hanford since 1992.

This report provides a summary of epidemiologic surveillance data collected from Hanford during the period January 1, 1999 through December 31, 1999. The data were collected by a coordinator at Hanford and submitted to the Epidemiologic Surveillance Data Center, located at Oak Ridge Institute for Science and Education, where quality control procedures and data analyses were carried out. The analyses were interpreted and the final report prepared by the DOE Office of Health Programs.

The information in this report provides highlights of the data analyses conducted on the 1999 data collected from Hanford. Surveillance reports and additional Supporting Tables are posted on the Office of Health Programs' 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 1999 report includes sections on time trends that provide comparative information on the health of the work force from 1993 through 1999.

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 Hanford 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 Hanford Site covers 560 square miles in the southeastern portion of Washington State, near the city of Richland. Construction of the site began in March 1943. Hanford's original mission was to produce

plutonium for the first atomic bombs. Construction of the first large-scale nuclear reactor, the B Reactor, began in 1943 and was completed in 1944. Plutonium from the B Reactor was used in the Trinity test bomb in New Mexico and in the "Fat Man" bomb that was dropped on Nagasaki, Japan in 1945.

After World War II, a gigantic nuclear arms race began between the United States and the former Soviet Union resulting in the Cold War. Increased tensions between the two countries eventually led to the addition of eight reactors to the Hanford Site. Defense production at the site peaked during the years 1956 to 1963. In 1964, as a result of a decreased need for special nuclear materials, all of the defense reactors at Hanford were shut down with the exception of the N Reactor, the newest reactor at Hanford that also produced electricity.

During the 1970s, the mission of the Hanford site began to diversify with the addition of energy research and development and technology development. The Hanford site was selected as the location for the Fast Flux Breeder Reactor prototype in January 1967. Construction of the facility began in December 1970 and initial startup occurred in February 1980 for the purpose of testing oxide fuels and addressing other fuel performance issues.

From 1980 to 1989, defense production was increased at Hanford's N Reactor to bolster the nation's military power. Waste management was added to the site mission during this time, but remained secondary to the defense production. By the 1990s, changing world conditions eventually halted defense production at Hanford. Hanford's current mission includes the safe cleanup and management of the site's legacy wastes and the development and deployment of science and technology. In 1998, Hanford's last plutonium production reactor, N Reactor, was deactivated.

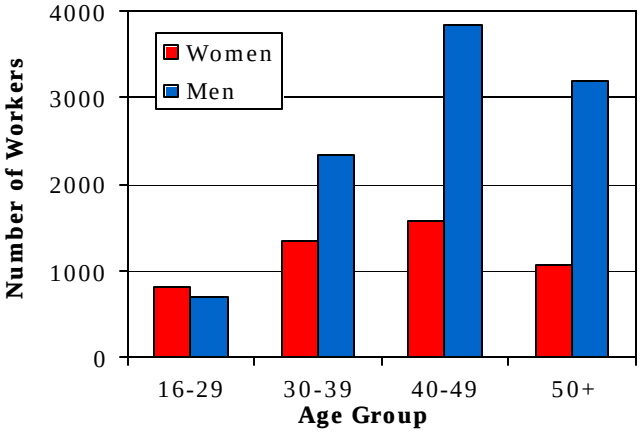
Congress created the Office of River Protection in 1998 to manage Hanford's tank waste retrieval, treatment, and disposal, DOE's largest, most complex environmental cleanup project. Sixty percent by volume of the nation's high-level radioactive waste is stored at Hanford in aging and deteriorating tanks. Included in the site's 1999 accomplishments are the completion of 16 waste remediations and submission of over 300,000 cubic meters of contaminated soil and debris to the Environmental Restoration Disposal Facility.

The Hanford Site is operated through a management and integration contract with Fluor Daniel Hanford, Inc. which became effective on October 1, 1996. Fluor Daniel and the Project Hanford are the management contractor team.

The Hanford Work Force - 1999

A total of 14,901 Hanford employees were included in epidemiologic surveillance in 1999, 27 more workers than were present in 1998. The gender and age distribution of the 1999 work force is shown in Figure 1. There were 4,820 (32 percent) women and 10,081 (68 percent) men in the work force. The average age of male workers at Hanford was 44 years and 41 years for women. There was no information on the distribution of workers by race.

Figure 1. The Work Force by Gender and Age



The Hanford work force decreased 24 percent from a high of 19,655 employees in 1994 to a low of 14,847 in 1997. Women have consistently made up about a third of the work force. There has been a gradual shift in the age of the work force; the percentage of workers under age 30 has decreased and the percentage of workers aged 40 or more has increased.

Individual job titles as reported by Hanford were grouped together into nine job categories. This is because there were either too few workers or health events within a particular job title, thereby limiting the type of analyses that could be conducted. Hanford reported Service and Security as two separate job categories starting in 1995. The distribution of workers by job category and gender is shown in Figure 2. Men and women were not distributed equally among the various job categories. Almost half (45 percent) of women were Administration workers; an additional 24 percent of the female work force were in the Other / Unknown job category. The largest percentage of men (31 percent) were Professional employees. The next largest group of men (21 percent) was the Administration category.

Figure 2. The Work Force by Job Category and Gender

Job Category	Women	Men
Administration	2,154 45%	2,135 21%
Professional	607 12%	3,133 31%
Technical	386 8%	787 8%
Other/Unknown Salaried	205 4%	544 5%
Service	102 2%	256 3%
Security	9 <1%	189 2%
Crafts & Manual Labor	40 1%	850 8%
Nuclear	155 3%	666 7%
Other/Unknown	1,162 24%	1,521 15%

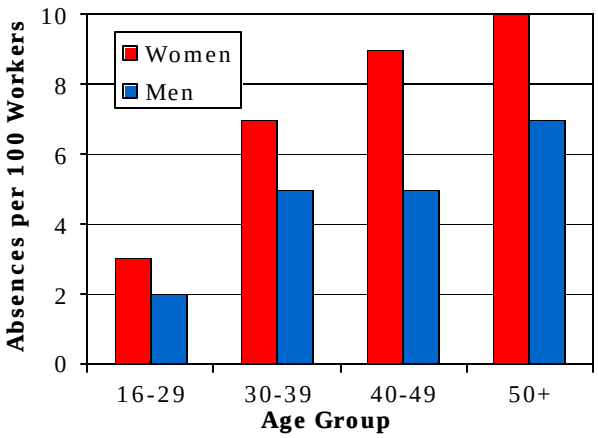
Number and Length of Absences

Epidemiologic surveillance examines absences of 5 or more consecutive workdays (also referred to as "5-day absences"). It is based on DOE Order 440.1 that requires contractor management to notify Occupational Medicine when a worker has been absent for 5 or more consecutive 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 regardless of the length of absence. Non-occupational illnesses and injuries that involve absences less than 5 days do not routinely require a medical clearance for return to work and are therefore excluded from these analyses. One change from earlier surveillance reports is the exclusion of specific health events that lasted 5 or more consecutive workdays but did not result from injury or illness. These include 71 absences among 70 women due to maternity leave and 3 absences among 2 individuals that were due to elective surgery or procedures not related to the treatment of an illness or injury.

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

The rate of absences among male and female workers is shown in Figure 3. There were 356 5-day absences among women, resulting in an absence rate of 7 per 100 workers (356 / 4,820). The 5-day absence rate among men was about 5 per 100 workers (542 / 10,081). The distribution of 5 or more consecutive workday absences due to injury or illness varied by age and gender. Women had a greater rate of 5-day absences than men in all age groups. The rates of absence increased with age among men and women.

Figure 3. Absence Rate by Gender and Age



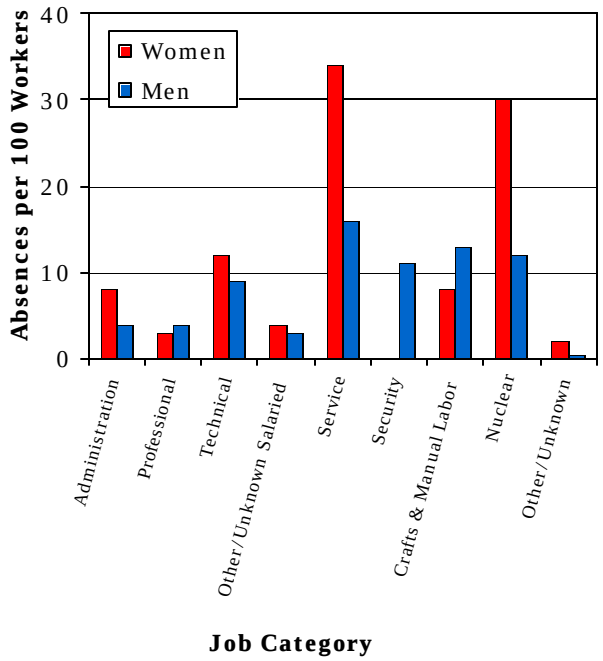
The average length of absence by gender and age is shown in Figure 4. The average length of absence was 50 days for women and 45 days for men. Absences among women averaged 1 to 9 days longer than absences among men in the same age group. The average length of absence tended to increase with age among workers less than 50 years old.

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	22	1,017	46
	30-39	95	4,596	48
	40-49	134	7,664	57
	50+	105	4,695	45
	Total	356	17,972	50
Men	16-29	13	542	42
	30-39	111	5,255	47
	40-49	210	10,024	48
	50+	208	8,455	41
	Total	542	24,276	45

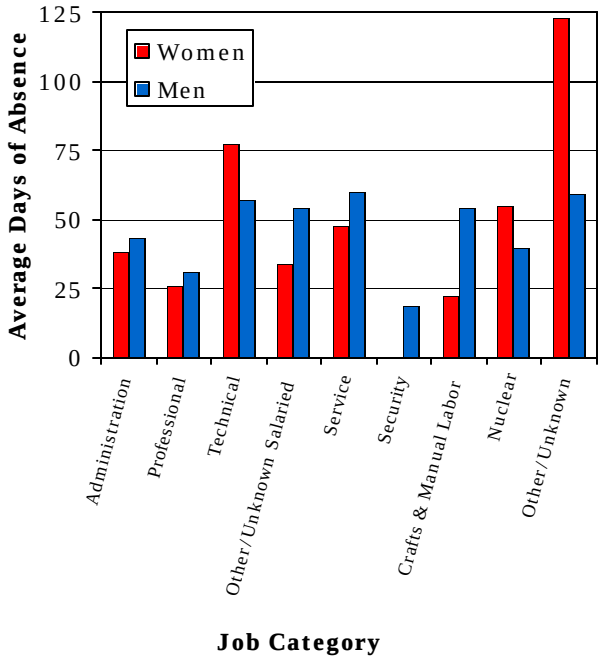
Figure 5 presents the 5-day absence rate by job category for men and women. With the exception of the Professional, Security, and Crafts and Manual Labor groups, women had higher rates of absence for every job category compared with men. As in 1998, women in the Security group did not report any 5-day absences in 1999. In the Administration, Service, Nuclear, and Other / Unknown job categories, the absence rate among women was at least twice the rate among men. The 5-day absence rate among men and women was highest for the Service group (women 34 / 100 and men 16 / 100). Men and women in this job category also had the highest absence rates in 1998.

Figure 5. Absence Rate by Job Category and Gender



The average length of absence also varied by job category as shown in Figure 6. Among women, workers in the Other / Unknown (123 days) and the Technical (77 days) groups averaged the longest number of days absent. Workers classified as Service (60 days) and Other / Unknown (59 days) had the longest average absence among men. Several women who reported very long absences influenced the long average absence duration among women in the Other / Unknown and Technical groups. One woman in the Other / Unknown group had an absence that lasted over 5 years, and two women in the Technical group had absences lasting over 1 year.

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



Diagnostic Categories

Epidemiologic surveillance monitors *all* illnesses and injuries among active workers, because it is not always possible to determine what health effects are due to occupational exposures and what are due to other causes. Most illness and injury diagnoses 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. Epidemiologic surveillance includes all reported diagnoses in the analyses. 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 (may include weekends or holidays) are presented in Figure 7. Lost calendar days for each absence are counted more than once when multiple diagnoses occur in different diagnostic categories for the same absence. There were 507 diagnoses reported by female workers and 709 diagnoses reported by male Hanford employees in 1999.

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	12	554	6	341
Blood	2	78	0	0
Cancer	9	649	20	2,316
Digestive	55	1,539	98	2,644
Endocrine/ Metabolic	14	382	16	655
Existing Birth Condition	1	24	0	0
Genitourinary	41	1,197	10	336
Heart/ Circulatory	10	426	48	2,606
Infections/ Parasites	17	489	30	851
Injury	74	2,794	161	6,878
Miscarriage	6	75	NA	NA
Muscles & Skeleton	81	4,693	136	8,314
Nervous System	29	1,176	36	1,291
Psychological	51	5,357	29	1,640
Respiratory	70	815	68	1,184
Skin	3	182	17	448
Unspecified Symptoms	32	1,696	34	781

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

Female employees accrued 17,972 lost calendar days due to injury and illness. Five diagnostic categories accounted for 66 percent of all reported conditions: muscles and skeleton (16 percent), injuries (15 percent), respiratory (14 percent), digestive (11 percent), and psychological (10 percent). Rheumatism accounted for 36 percent of all muscles and skeleton conditions. Sprains and strains (36 percent) and fractures (18 percent) were

the most common injuries. Allergic reactions and complications of medical care each accounted for four injury diagnoses. Upper respiratory infections (49 percent) and pneumonia and influenza (24 percent) accounted for the majority of the respiratory disorders. Digestive conditions were primarily due to diseases of the gallbladder and pancreas (53 percent). Eighty percent of psychological conditions were reported as anxiety, stress, adjustment reaction, and depression. The most frequent number of lost calendar days of work among women was due to psychological disorders, muscles and skeleton conditions, and injuries. One woman absent for over 5 years accounted for more than a third of the number of days absent for psychological conditions.

Men accrued 24,276 lost calendar days due to injury and illness. The most frequently reported conditions were injuries (23 percent), muscles and skeleton conditions (19 percent), and digestive conditions (14 percent). Sprains and strains accounted for 30 percent of the injuries. Fractures and dislocations made up another 37 percent. One worker reported two diagnoses (headaches) as a result of an explosion at a plutonium recovery facility in 1997. Among the injury diagnoses, 4 were allergic reactions and 11 were complications of medical care. Forty percent of the muscles and skeleton problems were dorsopathies (back, disc, or neck problems), 29 percent were arthritis and other joint disorders, and 24 percent were rheumatism. At Hanford, hernias accounted for 39 percent of the digestive conditions reported by men. Gallbladder disease and intestinal disorders accounted for 38 percent. The most frequent number of lost calendar days among men was due to muscles and skeleton conditions and injuries.

The more frequently reported health conditions varied little with age among men and women. Few diagnoses were reported among men or women 16-29 years old. Injuries and muscles and skeleton conditions showed up in all age categories for men. Digestive disorders were reported frequently by men in all age groups, except 16-29 year olds. Men in all age groups except the oldest group frequently reported respiratory conditions. Among women, muscles and skeleton disorders, respiratory diseases, and digestive conditions were frequently reported.

Figure 8 shows the frequency of reported diagnoses by job category for men and women. Conditions of the muscles and skeleton, digestive disorders, and injuries were common in nearly all job categories. Among men in the Other / Unknown Salaried category, the four cancer diagnoses were reported by four workers. Two workers reported

prostate cancer, one worker reported colon cancer, and one worker reported a lymphoma.

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

Job Category	Men	Women
Administration	Digestive (18) Muscles & Skeleton (17) Heart/Circulatory (16)	Muscles & Skeleton (36) Respiratory (35) Injury (32)
Professional	Injury (30) Digestive (25) Muscles & Skeleton (25)	Digestive (7) Unspecified Symptoms (5) Injury (4)
Technical	Injury (21) Muscles & Skeleton (10) Nervous System (8) Respiratory (8)	Psychological (12) Muscles & Skeleton (11) Respiratory (10) Injury (9)
Other/Unknown Salaried	Digestive (5) Cancer (4) Heart/Circulatory (3) Psychological (3)	Injury (3) Endocrine/Metabolic (2) Digestive (1) Genitourinary (1) Miscarriage (1) Muscles & Skeleton (1) Nervous System (1) Psychological (1)
Service	Muscles & Skeleton (15) Injury (10) Digestive (9)	Injury (9) Digestive (8) Muscles & Skeleton (7) Respiratory (7)
Security	Injury (6) Digestive (5) Muscles & Skeleton (5)	None
Crafts & Manual Labor	Injury (41) Muscles & Skeleton (34) Digestive (17)	Muscles & Skeleton (2) Digestive (1) Endocrine/Metabolic (1) Respiratory (1)
Nuclear	Injury (32) Muscles & Skeleton (23) Digestive (13)	Muscles & Skeleton (16) Injury (14) Psychological (10)
Other/Unknown	Muscles & Skeleton (5) Injury (4)	Respiratory (9) Muscles & Skeleton (5) Digestive (4) Psychological (4)

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 161 diagnoses of injuries and women reported 74 diagnoses involving injuries during 1999. Men, therefore, reported more than twice as many injuries as women. As there are more than twice as many men as women at Hanford, 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 1999? To correctly answer that question, the total number of men and women in the work force must be considered. A more accurate way to compare risk among men and women is to calculate the injury rate for each gender. Rates are calculated by dividing the number of injury diagnoses in a given gender by the total number of employees of that gender. Multiply this number by 1,000 to get the diagnosis rate per 1,000 workers. For example:

161 injury diagnoses ÷ 10,081 men =
.016 x 1,000 =
16 injury diagnoses per 1,000 men

74 injury diagnoses ÷ 4,820 women =
.015 x 1,000 =
15 injury diagnoses per 1,000 women

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

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

In the following set of analyses, the four age groups were collapsed into two groups, workers less than 50 years of age and those 50 or older. These groups were collapsed to ensure that

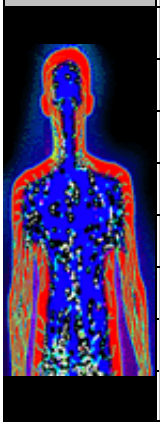
the number of diagnoses in each group was large enough to analyze. The "Other / Unknown Salaried" and "Other / Unknown" groups were combined into one job category. Five groups of diagnoses of particular interest to workers are presented in Figure 9: all illnesses and injuries combined, cancer, heart / circulatory system, respiratory system, and injury.

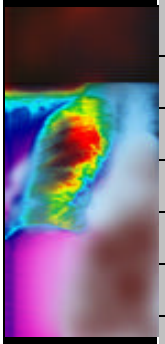
Women generally had higher rates for all diagnoses combined than men for all job categories regardless of age. Among women and men, rates tended to be higher among the older workers. Female workers in the Service and Nuclear groups were at highest risk for illness or injury. Males in these same two job categories were also at high risk, as well as Crafts and Manual Labor workers. These job categories also had the highest rates in 1998. Women in the Security group reported no absences during 1999.

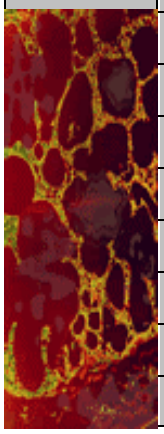
Cancer rates presented in this report are based on reported 5-day absences during the year. A worker may experience several periods of absence from one cancer diagnosis due to medical complications or treatment regimens. *Incident cancer rates* are based on the number of new cancer cases diagnosed within a given time, usually a year. The cancer rates in this report can appear substantially higher than the actual incidence of cancer due to the number of associated absences from work. The cancer rates in this report are not, therefore, comparable to the incident rates frequently published in many articles on cancer with which you may be familiar.

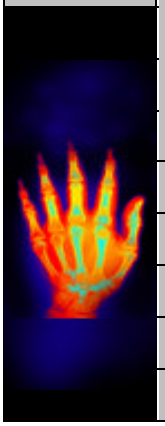
The likelihood that an individual in the U.S. develops cancer increases with age. Cancer rates tended to be higher among older men compared to younger men. The opposite was true among women. Twenty-eight 5-day absences were reported, involving 9 diagnoses among 8 women and 20 diagnoses among 19 men. Prostate cancer was the most frequently reported cancer diagnosis among men. Twelve prostate cancer diagnoses were reported by 12 men; 2 men were less than 50 years old. In 1998, only 4 men reported prostate cancer. The 8 remaining cancer diagnoses reported by men in 1999 were for six different sites. None of the men or women who reported cancer in 1999 had reported cancer in the period 1994-1998. In 1999, 3 women reported 3 diagnoses for breast cancer; the youngest woman to report breast cancer was 47 years old. Of the remaining 6 cancer diagnoses, four

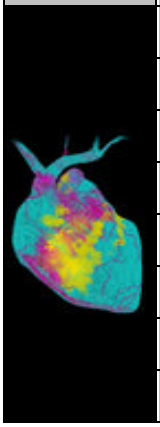
Figure 9. Illness and Injury Rates by Job Category, Gender, and Age

Diagnostic Category	Rate per 1,000			
All Illnesses & Injuries Combined	Job Category	Age	Men	Women
	Administration	<50	33	118
		50+	76	106
	Professional	<50	35	38
		50+	76	126
	Technical	<50	110	157
		50+	99	164
	Service	<50	251	424
		50+	232	535
	Security	<50	84	0
		50+	257	0
	Crafts & Manual Labor	<50	147	152
		50+	186	0
	Nuclear	<50	172	394
		50+	120	714
	Other/Unknown	<50	13	27
		50+	20	66

Diagnostic Category	Rate per 1,000			
Respiratory	Job Category	Age	Men	Women
	Administration	<50	6	17
		50+	9	14
	Professional	<50	3	0
		50+	9	0
	Technical	<50	13	25
		50+	0	30
	Service	<50	27	85
		50+	0	47
	Security	<50	13	0
		50+	0	0
	Crafts & Manual Labor	<50	16	30
		50+	24	0
	Nuclear	<50	7	63
		50+	22	0
	Other/Unknown	<50	1	3
		50+	0	27

Diagnostic Category	Rate per 1,000			
Cancer	Job Category	Age	Men	Women
	Administration	<50	2	3
		50+	4	2
	Professional	<50	0	0
		50+	3	10
	Technical	<50	3	3
		50+	12	0
	Service	<50	0	17
		50+	0	0
	Security	<50	0	0
		50+	0	0
	Crafts & Manual Labor	<50	2	0
		50+	3	0
	Nuclear	<50	2	0
		50+	0	0
	Other/Unknown	<50	1	0
		50+	5	0

Diagnostic Category	Rate per 1,000			
Injury	Job Category	Age	Men	Women
	Administration	<50	4	9
		50+	11	29
	Professional	<50	12	0
		50+	5	39
	Technical	<50	27	16
		50+	25	60
	Service	<50	37	102
		50+	43	70
	Security	<50	26	0
		50+	57	0
	Crafts & Manual Labor	<50	43	0
		50+	56	0
	Nuclear	<50	54	47
		50+	11	286
	Other/Unknown	<50	4	4
		50+	0	5

Diagnostic Category	Rate per 1,000			
Heart/ Circulatory	Job Category	Age	Men	Women
	Administration	<50	4	1
		50+	12	6
	Professional	<50	1	2
		50+	8	0
	Technical	<50	3	3
		50+	12	30
	Service	<50	5	0
		50+	72	0
	Security	<50	0	0
		50+	0	0
	Crafts & Manual Labor	<50	2	0
		50+	9	0
	Nuclear	<50	5	0
		50+	22	0
	Other/Unknown	<50	1	0
		50+	4	0

different sites were reported. Workers in the Technical and Other / Unknown Salaried groups were at over 3 times the risk of reporting a cancer diagnosis in 1999 compared to workers in other job categories. There was no evidence of an excess of any one particular type of cancer for either men or women by job category.

Women reported 10 heart / circulatory diagnoses, 4 were among women under 50 years old. Four of the 10 diagnoses involved hypertension or

ischemic heart disease (restricted blood flow through an artery). Among men, workers aged 50 or older had the highest rates of heart / circulatory problems. Thirty-one of the 44 absences among men occurred in workers aged 50 or older; 61 percent (20 / 33) of the diagnoses among these older workers were for hypertension or ischemic heart disease. Workers in the Service group were 3 times more likely to report heart / circulatory diagnoses compared to workers in other job categories.

Respiratory disease rates did not change consistently with age. Among women, 64 of the 70 diagnoses for respiratory disease were respiratory infections (influenza, pneumonia, and bronchitis). As in 1998, women in the Service group had the highest rates of respiratory disease in 1999. Among men, 64 of the 68 respiratory diagnoses were for respiratory infections (influenza, pneumonia, and bronchitis). Respiratory disease rates among men of all ages were highest among workers in the Service and Crafts and Manual Labor groups. Respiratory disease was almost 3 times more common among Crafts and Manual Labor workers and over 3 times more common among Service workers compared to workers in other job categories. Service workers were also at higher risk of reporting a respiratory condition in 1998 compared to workers in other job categories.

Injury rates were greater for older workers among women, except for Service workers. The injury rate was not related to age among men. Among men, Crafts and Manual Labor and Nuclear workers were more likely to report a non-occupational injury than were workers in other job categories. Among women, workers in the Service and Nuclear groups had the highest reporting of non-occupational injury. The variation in the rates among the women was probably due to the small number of diagnoses reported in some of the job categories. Workers in the Service, Crafts and Manual Labor, and Nuclear groups were at least 3 times more likely to report an injury than other workers, a trend that continues from 1998. Technical workers were at almost twice the risk of reporting an injury compared to other workers. The risk of specific injuries varied by job category. Technical workers were over 4 times more likely to report a back sprain or strain compared to workers in other job categories. Service workers were at 7 times greater risk of a sprain or strain other than to the back, 6 times greater risk of a late effect of an injury, and 9 times greater risk of complication of medical care compared with other workers. Dislocations were 7 times more common among Security workers compared with other workers. Crafts and Manual Labor workers had 7 to 8 times the risk of an upper limb fracture or a back sprain or strain, over 4 times the risk of a sprain or strain other than the back, and almost 4 times the risk of a late effect of an injury than other workers. The risk of a lower limb fracture, a sprain or strain, or a complication of medical care was at least 3 times, and of late effects from an injury almost 9 times greater for workers in the Nuclear group compared to other job categories.

The risk of illness and injury among workers classified in one job category was compared with other workers in the remaining job categories. Technical and Security workers were at almost

twice the risk, and Service, Crafts and Manual Labor, and Nuclear workers were at about 3 times the risk of all injury and illness compared with workers in other groups. Administration workers were twice as likely to report a genitourinary disorder compared to workers in other job categories. Technical workers were at 2 to 4 times the risk of infections, psychological, and nervous system disorders compared to other job categories. Among Service workers, the risk of unspecified symptoms was 11 times, skin conditions was 7 times, benign growths 6 times, and psychological, nervous system, digestive, and muscles and skeleton disorders over 3 times greater than other workers. The risk of skin and muscles and skeleton conditions was over 3 times greater, and digestive disorders 2 times greater in the Crafts and Manual Labor group compared to other job categories. Nuclear workers were at almost 5 times greater risk of endocrine / metabolic disorders and unspecified symptoms; 3 to 4 times the risk of infections, psychological, and muscles and skeleton conditions; and over 2 times the risk of digestive disorders as workers in other jobs.

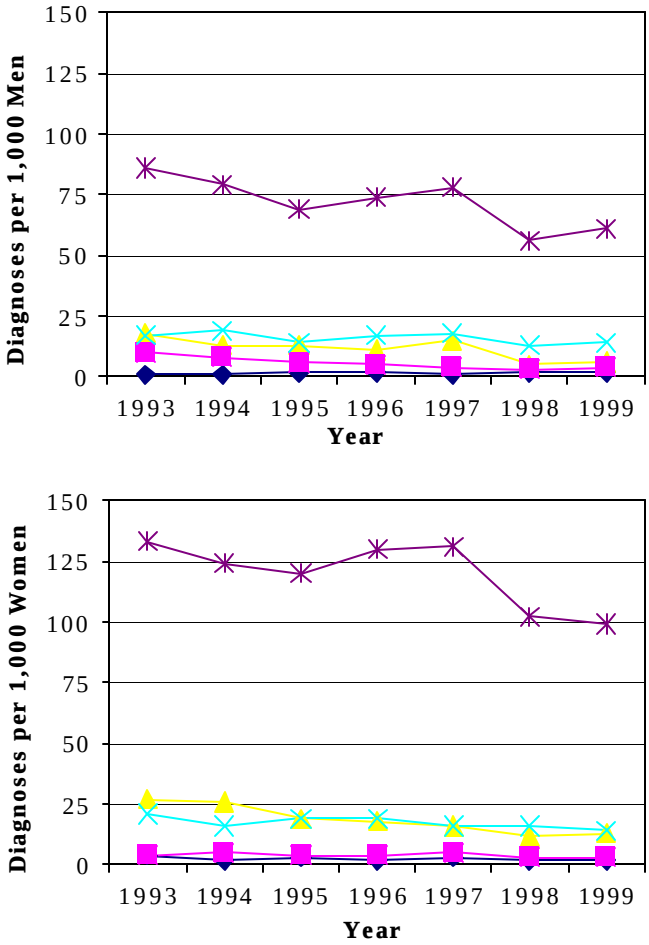
Time Trends

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 different groups of differing ages. 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 the *1993* and *1994 Annual Epidemiologic Surveillance Report* due to the elimination of health conditions resulting from maternity leave.

Figure 10. Age-Adjusted Rates for Selected Diagnostic Categories Among Men and Women from 1993 to 1999



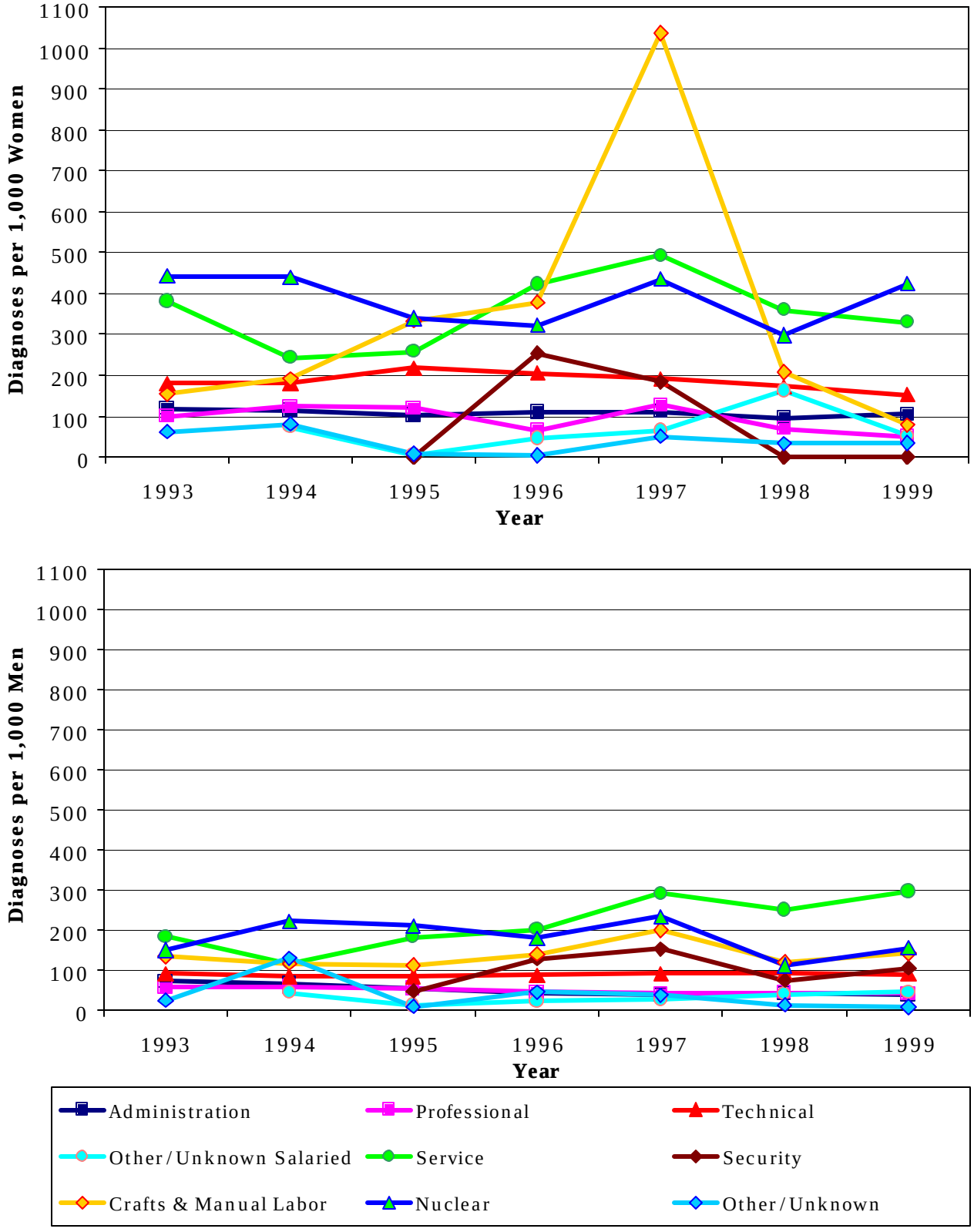
*For 1993, rate based on external causes of injury data; for 1994 through 1999, rate based on injury and poisoning data.

The age-adjusted rates for all illness and injury categories changed little from 1998 to 1999. Over the past 7 years, these rates have generally

decreased among men and women. Cancer and injury rates remained about the same over the 7-year period for both males and females. The rates of respiratory and heart / circulatory conditions and injuries reported in 1999 changed little from those reported in 1998 among men and women. From 1993 through 1998, respiratory rates declined among both men and women, and heart / circulatory disease rates steadily declined among men. These decreases were not due to a decline of any one particular diagnosis.

Age-adjusted rates for all illnesses and injuries combined are shown for the various job categories in Figure 11. Hanford reported Service and Security job categories as two separate categories starting in 1995. From 1993 through 1998, the rates for all diagnostic categories combined remained fairly constant, especially over the last 4 years, among men. Among women, the trend in the rates has been less consistent across the job categories. The rates in the Administration, Other / Unknown Salaried, Nuclear, and Other / Unknown groups have changed little over the 7-year period. Rates have decreased among women in the Professional, Technical, and Crafts and Manual Labor groups. For the last 2 years, women in the Security group have not reported any absences. The decline in rates among Professional women resulted from fewer diagnoses from nervous system, respiratory, and muscles and skeleton conditions and injuries. Among Technical workers, decreases in respiratory, digestive, and muscles and skeleton conditions have contributed to the decline. The dramatic change in the rates for all illness and injury among women in the Crafts and Manual Labor group between 1998 and 1999 resulted from a decrease in injuries. This is opposite to the decline observed from 1997 to 1998 when a reduction was seen in most diagnostic categories except injuries. Although these decreases reflect a decline in illnesses or injuries, other events should also be considered, such as changes in reporting requirements for absenteeism or policies related to the administration of sick leave.

Figure 11. Age-Adjusted Rates for All Diagnoses Combined Among Women and Men by Job Category from 1993 to 1999



Sentinel Health Events for Occupations

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

Eighty-three definite sentinel health event diagnoses affecting 59 workers were identified in 1999 (Figure 12). Nineteen of 1,216 (2 percent) diagnoses were identified as possible sentinel health events. Seventeen of the 19 diagnoses were carpal tunnel syndrome, reported by 14 workers and resulting in 845 lost calendar days. Fourteen of these diagnoses were reported by women. Seven female Administration workers reported 10 of the carpal tunnel diagnoses.

Figure 12. Characteristics of SHEOs by Gender

	Total Number of SHEO Diagnoses		Total Number of Days Absent	
	Men	Women	Men	Women
Definite	61	22	2,294	1,479
Possible	4	15	226	704
Total	65	37	2,520	2,183

Disabilities Among Active Workers

There were no disability data reported in 1999.

Deaths Among Active Workers

There were no death data reported in 1999.

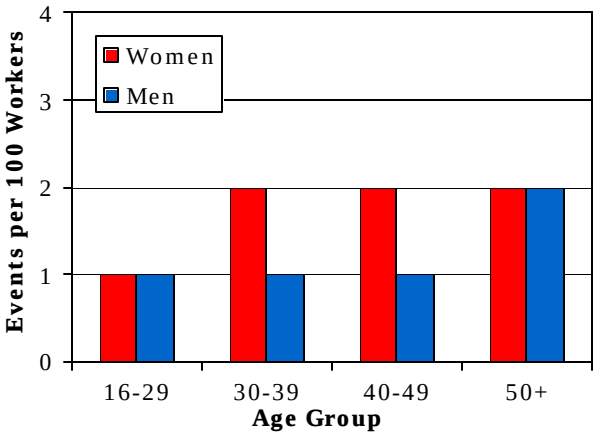
OSHA-Recordable Events

The Occupational Safety and Health Administration (OSHA) requires that employers maintain a record of occupational injuries and illnesses occurring among employees and to make that information available to OSHA on 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 job-related.

The distribution of OSHA events per 100 workers by gender and age is shown in Figure 13. Occupational injuries resulted in a total of 2,651 lost or restricted workdays at Hanford in 1999. There were 66 women and 124 men who had one recordable OSHA event and 3 women and 6 men with two or more OSHA events. Men reported almost twice as many OSHA events as women, although the rate of workers with an OSHA event was the same for men and women (1 per 100 workers). The occurrence of OSHA-recordable events did not appear related to age among women or men. The average number of workdays lost or with restricted activity was similar for women (12 days) and men (13 days) and did not appear related to age.

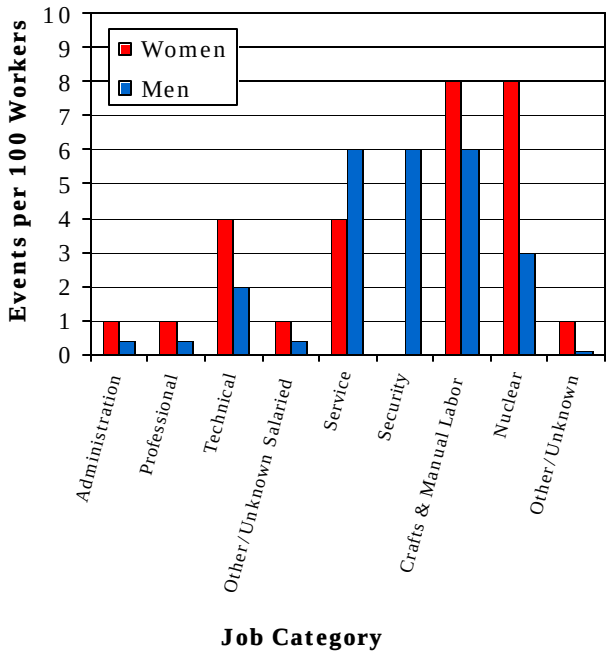
Figure 13. OSHA-Recordable Events by Gender and Age



There was a 22 percent decrease in the number of OSHA-recordable events in 1999 (208) compared to the recordable events in 1998 (265). The overall reduction in occupational injuries reported may reflect changes in the types of work being done at the site, or changes in the availability of OSHA data.

The rates of OSHA-recordable events by job category and gender are shown in Figure 14. Among female workers, those in the Nuclear and Crafts and Manual Labor categories had the highest rate of OSHA events, 8 per 100 workers. Nuclear workers had the highest average number of workdays lost or with restricted activity for OSHA events among women (28 days). The second highest average number of lost or restricted workdays among women occurred in the Other / Unknown category (19 days). Among male workers, the highest rates of OSHA events were among Service, Security, and Crafts and Manual Labor workers, 6 per 100. Nuclear workers reported the highest average number of lost or restricted workdays (30 days). The Supporting Tables contain more detailed data about the number of OSHA events and the number of days of work lost or with restricted activity.

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



Diagnostic and Accident Categories for OSHA-Recordable Events

There were a total of 208 OSHA events recorded on the OSHA 200 Logs. From these, there were 145 diagnoses among women and 245 diagnoses among men as shown in Figure 15. Forty-eight percent of the health conditions reported were for injuries. Sprains and strains were the most common type of OSHA-recordable injuries among both men and women, followed by open wounds for men, and open wounds and bruises for women. Sprains and strains accounted for 41 percent of all OSHA-recordable injuries in 1999 (48 percent in 1998). Sixty-eight percent of the sprains and strains were associated with overexertion and strenuous movements, and an additional 17 percent were associated with falls. Conditions related to the muscles and skeleton also occurred frequently.

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

Diagnostic Category	Gender	
	Women	Men
Digestive	1	0
Infections/Parasites	1	0
Muscles & Skeleton	62	94
Nervous System	9	7
Psychological	0	3
Skin	1	6
Unspecified Symptoms	8	12
Injury	63	123
Fractures – Neck, Trunk	0	2
Fractures – Upper Limb	0	5
Fractures – Lower Limb	3	1
Dislocations	0	10
Back Sprains & Strains	17	27
Other Sprains & Strains	8	24
Intracranial Injuries	1	1
Open Wounds – Head, Neck, Trunk	3	7
Open Wounds – Upper Limb	6	15
Open Wounds – Lower Limb	0	1
Superficial Injuries	5	9
Bruises	9	5
Crushing Injuries	1	1
Foreign Bodies Entering Orifice	2	6
Burns	5	2
Unspecified Injuries	0	4
Adverse Reactions to Non-Medical Substances	1	1
Adverse Reactions to External Causes	2	2

Ninety-two percent (191) of the 208 OSHA events were described as “an accident” in the OSHA logs. This distribution is shown in Figure 16. The type of accident reported most often

was "other accidents," a broad category that includes being struck by an object, injuries from cutting or piercing objects, overexertion, and contact with hot or corrosive material. Overexertion or strenuous movements accounted for 58 percent of these accidents. Falls were the second most common type of accident.

Figure 16. OSHA-Recordable Accidents by Type and Gender

Accident Category	Gender	
	Women	Men
	Number of Accidents	Number of Accidents
Motor Vehicle Traffic	0	5
Falls	16	16
Natural/Environmental Factors	4	5
Submersion/Suffocation/ Foreign Bodies	1	7
Drug Reaction	1	0
Other Accidents	46	91
Caught Between Objects	3	3
Cutting/Piercing Instrument/Object	4	9
Electric Current	0	1
Hot, Corrosive, or Caustic Material/Steam	2	2
Overexertion and Strenuous Movements	23	56
Repetitive Trauma	9	5
Struck by an Object	5	15

Among the 17 events not attributed to a particular accident, 4 events resulted in tenosynovitis plus 3 cases of joint pain. There were 3 skin disorders, 2 cases of anxiety / stress, 2 adverse reactions to food, and 1 case each for carpal tunnel syndrome, lesion of the sciatic nerve, and an eye disorder.

Rates of OSHA-Recordable Events

The rates of all diagnoses combined for OSHA-recordable events by age and job categories and gender are shown in Figures 17 and 18. Women in the Crafts and Manual Labor and Nuclear groups and male Service, Security, and Crafts and Manual Labor workers tended to have higher rates than other job categories for all diagnoses combined. There was no consistent pattern between rates and age. Most of the OSHA health conditions involved occupational injury. When these diagnoses were considered separately, the same job categories listed above for all diagnoses combined had the highest rates for injuries among men and women.

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

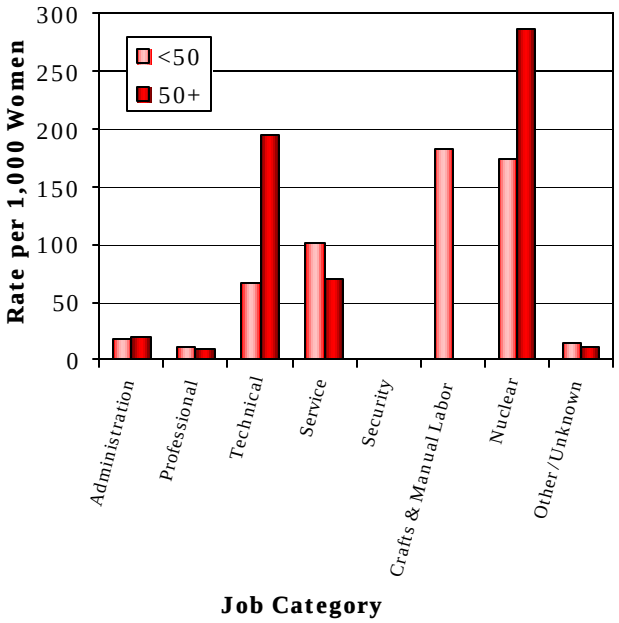
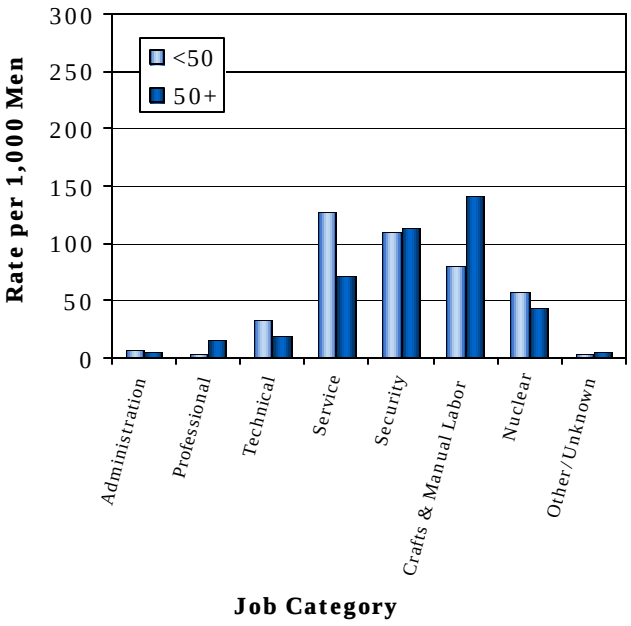


Figure 18. OSHA-Recordable Rates by Age and Job Categories Among Men, All Diagnoses Combined



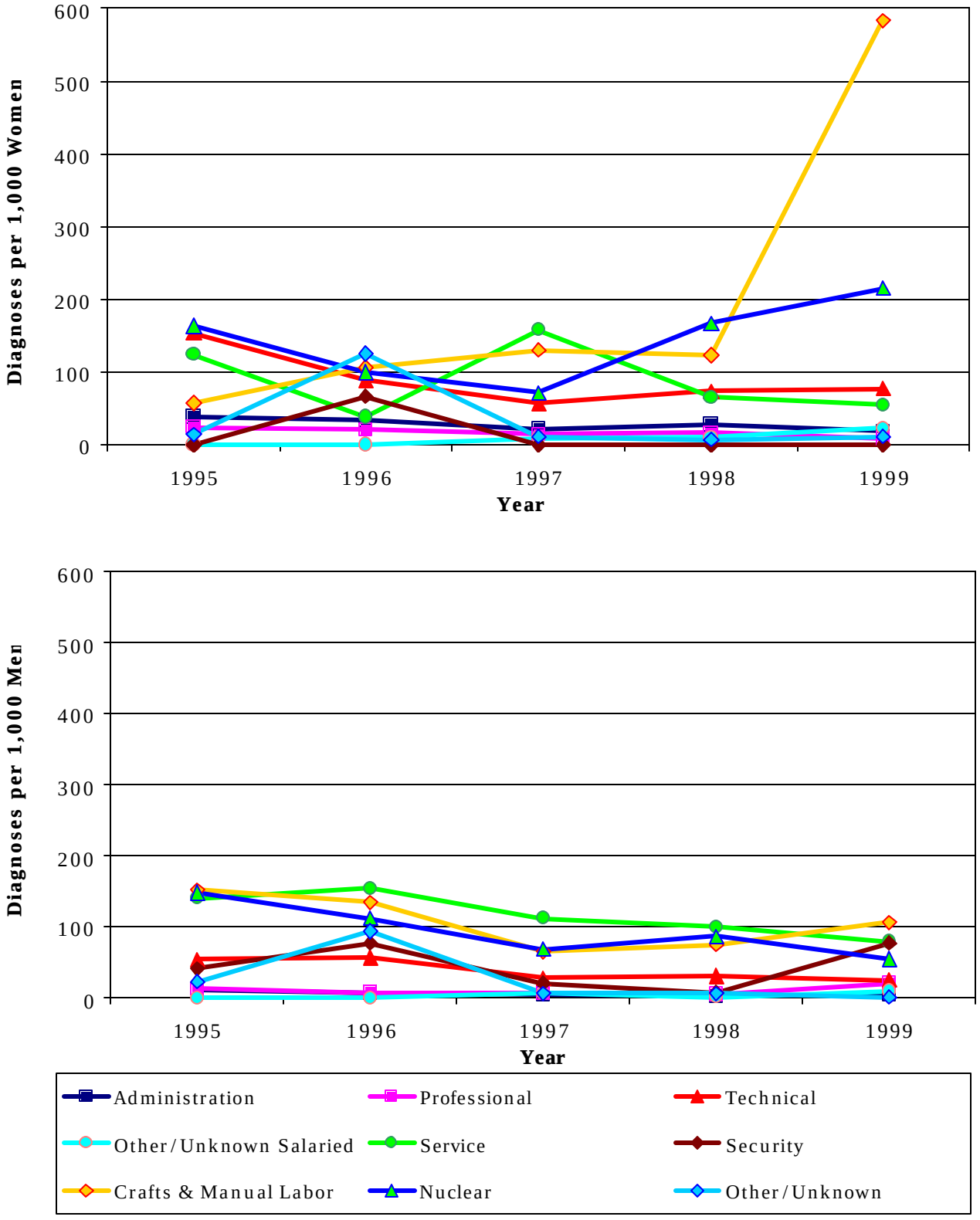
Hanford workers missed 835 workdays and had 1,816 days restricted as a result of occupational injuries. Nuclear workers experienced almost half (45 percent) of the restricted workdays. Technical, Service, and Crafts and Manual Labor workers together reported an additional 41 percent of the restricted workdays. These four job categories made up 22 percent of the Hanford work force in 1999. More than two-thirds of the lost workdays were reported by Security, Crafts and Manual Labor, and Nuclear workers. The two largest groups, Administration (29 percent of the work force) and Professional (25 percent of the work force), reported 10 percent of the lost workdays and only 5 percent of the days restricted. Service workers had the highest percentage of lost and restricted workdays in 1996 and 1997 of any occupational group. This group also had one of the highest percentages of lost and restricted workdays in 1995. In 1999, Nuclear workers and Crafts and Manual Laborers, who each made up 6 percent of the work force, had the highest percentages of lost and restricted workdays (36 percent and 18 percent, respectively). These two job categories were also responsible for the highest percentages of lost and restricted workdays in 1998.

Crafts and Manual Labor, Service, and Security workers were at least 6 times more likely to experience an injury as other workers, followed by Nuclear workers (3 times) and Technical workers (2 times). Workers in these job categories were at least 3 times more likely to suffer a sprain or strain as other workers. Crafts and Manual Laborers and Service workers were at 8 times higher risk for open wounds of the upper limb. The risk of bruises was 13 times greater for Security workers and 6 times greater for Crafts and Manual Laborers than other categories. Crafts and Manual Labor workers were also at increased risk for superficial injuries (11 times), along with Nuclear workers (6 times). Technical, Service, Security, Crafts and Manual Labor, and Nuclear workers were at least 3 times as likely as other workers to report muscles and skeleton disorders. Nervous system disorders were more likely among Crafts and Manual Laborers (11 times) and Nuclear workers (9 times). In addition, Nuclear and Security workers were more likely to report unspecified symptoms (7 times and 11 times, respectively).

Time Trends for OSHA-Recordable Events

The age-adjusted rates for all diagnostic categories combined from 1995 to 1999 by job category and gender are shown in Figure 19. During the 5-year period, the overall rates for OSHA-recordable events among men and women did not change greatly for the majority of the job categories. The decline in rates, which began in 1997 for female Other / Unknown workers, did not continue into 1999. For the third year in a row, women in the Security group reported no OSHA events. Among men in the Professional and Security job categories, significant increases in rates of OSHA-recordable events from 1998 to 1999 were noted. Both categories experienced an increase in muscles and skeleton disorders. Security workers also showed an increase in injury diagnoses. For Security workers, there was an increase in all muscles and skeleton disorders, while Professional workers showed an increase in joint disorders. For all occupational categories combined, there were no significant changes in injury rates from 1998 to 1999 for both men and women.

Figure 19. Age-Adjusted Rates for All OSHA-Recordable Diagnoses Combined Among Women and Men by Job Category from 1995 to 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 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

NOTES