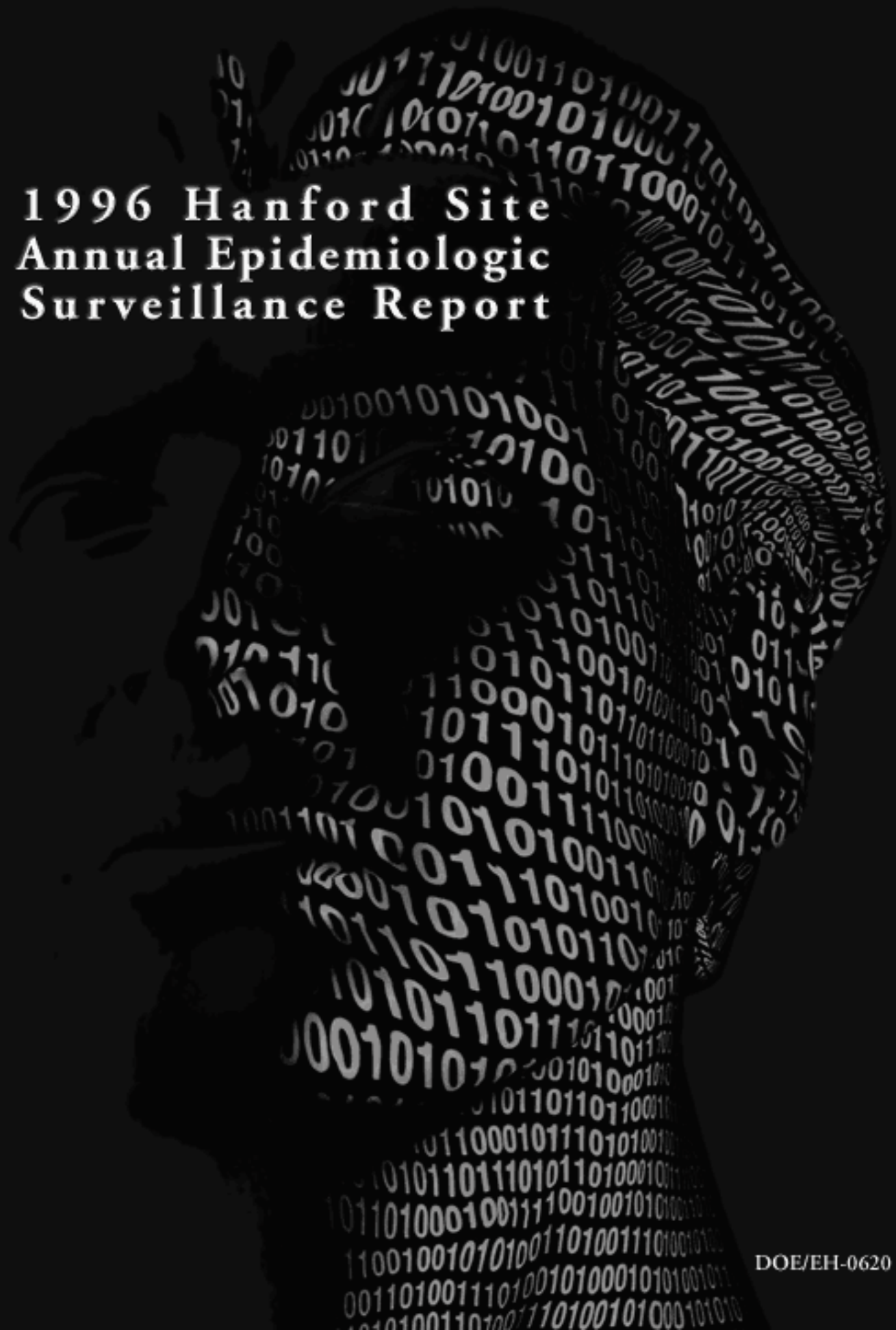
1996 Hanford Site Annual Epidemiologic Surveillance Report



DOE/EH-0620

HANFORD SITE

1996 Epidemiologic Surveillance Report

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

Dr. Cliff Strader at **cliff.strader@eh.doe.gov**
or Dr. Bonnie Richter at **bonnie.richter@eh.doe.gov**
United States Department of Energy
Office of Health Studies
Mail Stop: 270CC/EH-6
19901 Germantown Road
Germantown, MD 20874-1290

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

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

HANFORD SITE 1996

At a Glance

The most frequently reported health conditions for both men and women were: respiratory illness, injuries, and muscles and skeleton disorders.

Approximately 6 percent of the work force had a least one absence in 1996, which is about the same as in 1994 and 1995.

As in past years, rates of illness and injury were lower in Administration, Professional, Other/Unknown, and Technical occupations than among Service, Security, Crafts and Manual Laborers, and workers in the Nuclear trades.

The highest rates of injury occurred among Service workers, and were more likely among all workers less than 50 years of age.

Occupational injuries (OSHA-recordable) resulted in a total of 4,784 lost or restricted workdays at Hanford in 1996.

Twenty-five workers reported one or more diagnoses of cancer in 1996. There was no evidence that any one particular type of cancer appeared more frequently, nor was any one occupation particularly at higher risk.

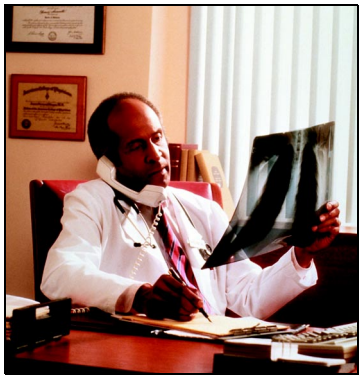
Introduction

The U.S. Department of Energy's (DOE) commitment to assuring the health and safety of its workers includes the conduct of epidemiologic surveillance activities that provide an early warning system for health problems among workers. The Epidemiologic Surveillance

Program monitors illnesses and health conditions that result in an absence of 5 or more consecutive workdays, occupational injuries and illnesses, and disabilities and deaths among current workers.

This report provides a summary of epidemiologic surveillance data collected from Hanford during the period January 1, 1996 through December 31, 1996. 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 preliminary data analyses were carried out. The Office of Health Studies reviews these data and prepares the final report. Epidemiologic surveillance has been ongoing at Hanford since 1992.

The Epidemiologic Surveillance report for Hanford has been redesigned for 1996. The information presented in this report provides highlights of the data analyses conducted. Surveillance reports and additional supporting tables are posted on the Office of Health Studies' Web site **(http://www.eh.doe.gov/epi/surv)**, or are available by request. The main sections of the report include: work force characteristics; absences due to injury or illness of 5 or more consecutive workdays; workplace injuries, illnesses, and deaths that were reportable to the Occupational Safety and Health Administration ("OSHA-recordable" events); and disabilities and deaths among current workers.



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

Absences related to maternity leave were excluded. This 1996 report includes a section on time trends that provides comparative information on the health of the work force over time. DOE sites vary by mission, function, job classification, and worker exposures; therefore, 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 patterns of illness and injury observed.

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 lead 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 shutdown 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 it 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.

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 Project Hanford are the management contractor team.

The Hanford Work Force - 1996

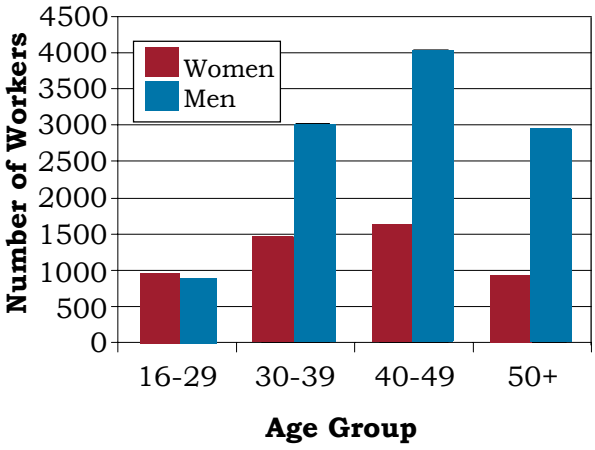
A total of 15,744 Hanford employees were included in epidemiologic surveillance in 1996, nearly 3,000 fewer workers than were present in 1995. The age and gender distribution of the 1996 work force is shown in Figure 1. There were 4,900 (31 percent) women and 10,844 (69 percent) men in the workforce. The average age of male workers at Hanford was

43 years and 40 years for women. There was no information on the distribution of workers by race.

Surveillance data have been collected at Hanford since 1992. The Hanford work force decreased 20 percent from a high of 19,655 in 1994 to a low of 15,744 in 1996.

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 decreased and the percentage of workers age 40 or more increased.

Figure 1. The Work Force by Gender and Age



Hanford reported Service and Security occupations as two separate categories starting in 1995. Individual job titles reported by Hanford were grouped together into occupational 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. The distribution of workers by gender and occupation is shown in Figure 2. Men and women were not distributed equally among the various occupational groups. Sixty-one percent of the women worked in the Administration group, while only 16 percent worked in the Professional and 2 percent in the Crafts and Manual Labor groups. More that one-third of male workers were in the Professional group, an additional 25 percent were Administration workers. The Supporting Tables (available on the Web) contain a more detailed distribution of the work force by gender, age, and occupational group.

Figure 2. The Work Force by Job Category and Gender

Job Category	Women	Men
Administration	2,983 61%	2,781 25%
Professional	799 16%	4,096 38%
Technical	513 10%	1,092 10%
Other/Unknown Salaried	34 1%	80 1%
Service	127 3%	305 3%
Security	17 < 1%	197 2%
Crafts & Manual Labor	80 2%	1,405 13%
Nuclear	156 3%	659 6%
Other/Unknown	191 4%	229 2%

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 Monday, the length of that absence includes the weekend. All injuries and illnesses due to a work-related incident must be reported regardless of the length of absence. Non-occupational illnesses and injuries that involve absences less than 5 days do not routinely require a medical clearance for return to work and are therefore excluded from these analyses. One change from earlier surveillance reports is the exclusion of specific health events resulting in an absence of 5 or more consecutive workdays, but did not result from injury or illness. These include 86 absences among women due to maternity leave and absences for 19 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 occupation into account because the risk of illness and injury varies by these factors. This is done either by stratification into distinct categories or by statistical methods of adjustment.

The rate of absences among male and female workers is shown in Figure 3. There were 468 5-day absences among women, resulting in an absence rate of 10 per 100 workers (468/4,900). The 5-day absence rate among men was about 6 per 100 workers (682/10,844). The distribution of 5 or more consecutive workday absences due to injury or illness varied by age and gender. Women had a slightly greater rate of 5-day absences than men, and the rates of absence tended to increase with age among both sexes.

The average length of absence by gender and age is shown in Figure 4. The average length of absence was 41 days for women and 31 days for men. Absences among women averaged 8 to 14 days longer than absences among men in the same age group. Although there was no clear cut trend, those in the oldest age groups were on average out longer than other workers, with the exception of women in the 16-29 age group.

Figure 3. Absence Rate by Gender and Age

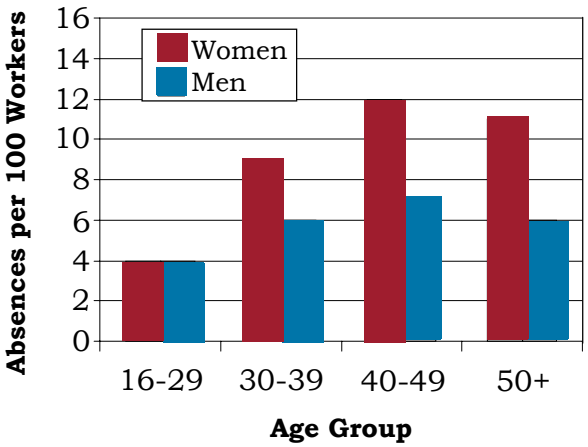


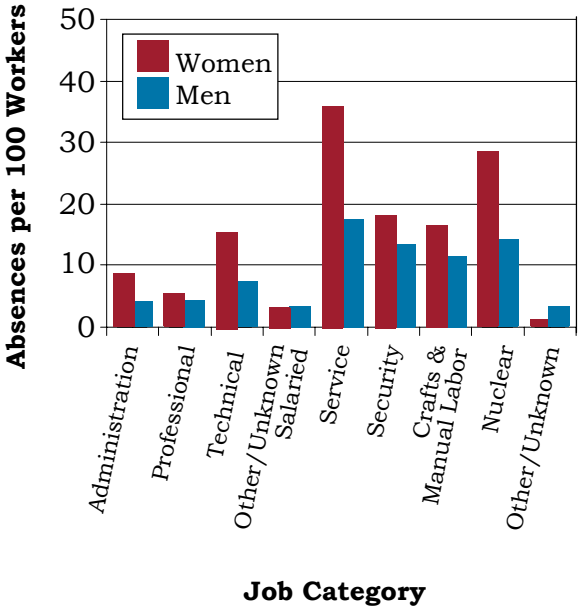
Figure 4. Number of Days Absent by Gender and Age

Gender	Age	Number of Absences	Number of Days Absent	Average Number of Days Absent
Women	16 - 29	38	1,861	49
	30 - 39	134	5,141	38
	40 - 49	192	7,016	37
	50 +	104	4,977	48
	Total	468	18,995	41
Men	16 - 29	33	1,143	35
	30 - 39	170	4,685	28
	40 - 49	288	8,419	29
	50 +	191	6,927	36
	Total	682	21,174	31

Figure 5 presents the 5-day absence rate by job category for men and women. In general, women had higher rates of absence for nearly every occupational category compared with men. The 5-day absence rate among women was highest for Service workers (35/100) and Nuclear workers (28/100). Among men, the absence rates were highest for Service workers (17/100), Nuclear workers (14/100), and Security (13/100).

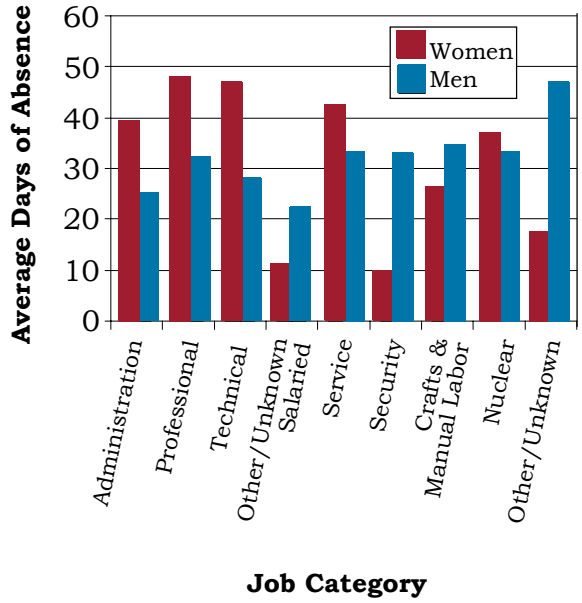
The average length of absence also varied by job category as shown in Figure 6. Among women, Professional and Technical workers averaged the longest number of days absent, 48 and 47 days respectively. Workers classified as "Other" or "Unknown" had the longest average absence (47 days) among men.

Figure 5. Absence Rate by Job Category and Gender



Crafts and Manual Labor, Security and Other/Unknown salaried were the other job categories where the average duration of absence among male workers exceeded that of female workers. Additional information about the number and length of these absences can be found in the Supplemental Tables.

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 number of lost calendar days (may include weekends or holidays) are presented in Figure 7. There were 647 diagnoses reported by female workers and 875 diagnoses reported by male Hanford employees in 1996.

Female employees accrued 18,995 lost calendar days due to injury and illness. Three diagnostic categories, muscles and skeleton (18 percent), respiratory (14 percent), and injuries (14 percent) accounted for 46 percent of all reported conditions. Rheumatism accounted for 39 percent of all muscles and skeleton conditions. Sprains and strains (25 percent) and fractures (24 percent) were the most common injuries. Respiratory conditions were primarily due to chronic obstructive pulmonary disease (34 percent), pneumonia and influenza (29 percent), and other diseases of the upper respiratory tract (27 percent).

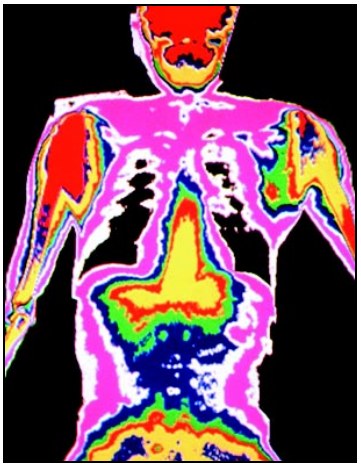
Figure 7. Number of Diagnoses and Lost Calendar Days by Diagnostic Category (Categorized by ICD-9-CM) and Gender

Diagnostic Category	Women		Men	
	Number of Diagnoses	Number of Lost Calendar Days	Number of Diagnoses	Number of Lost Calendar Days
Benign Growths	18	589	12	331
Blood	0	0	1	178
Cancer	11	649	22	1,090
Digestive	72	1,690	113	2,251
Endocrine / Metabolic	11	621	13	751
Existing Birth Condition	3	136	3	188
Genitourinary	63	2,235	23	465
Heart / Circulatory	18	942	56	1,988
Infections / Parasites	16	409	40	763
Injury	88	4,263	189	5,609
Miscarriage	2	40	NA	NA
Muscles & Skeleton	114	4,178	124	5,561
Nervous System	44	2,150	39	1,312
Psychological	45	2,338	39	1,216
Respiratory	90	1,772	142	1,944
Skin	6	219	18	472
Unspecified Symptoms	46	2,287	41	1,133

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

The most frequent number of lost calendar days of work among women was due to injuries and muscles and skeleton conditions. Women under age 40 frequently reported psychological disorders. Thirty diagnoses for psychological disorders were reported by 24 workers, with all but 4 related to stress, anxiety, or depression.

Men accrued 21,174 lost calendar days due to injury and illness. The reported conditions were categorized as injuries (22 percent), respiratory (16 percent), and muscles and skeleton (14 percent) conditions. Forty-eight percent of the muscles and skeleton problems were dorsopathies (back, disc, or neck problems), 25 percent were rheumatism, and 25 percent were arthritis. At Hanford, acute respiratory infections, flu, and pneumonia accounted for over half (53 percent) of the respiratory conditions reported by men. Sinusitis and bronchitis made up another third of the diagnoses. Sprains and stains accounted for 39 percent of the injuries. Fractures, dislocations, bruises, unspecified injuries, and complications of medical care made up most of the remainder. The most frequent number of lost calendar days among men was due to muscles and skeleton conditions, injuries, and digestive diseases.



The more frequently reported health conditions varied little with age. Injuries, respiratory conditions, and muscles and skeleton conditions showed up in nearly all age categories for men and women. Heart / Circulatory diagnoses appeared among common conditions among men 50 years and older. Among the 29 diagnoses reported by 27 men aged 50 or more, 21 were due to ischemic heart disease (insufficient blood flow to the heart and heart attack). Digestive disorders were more frequently reported by women aged 30–49, and by men beginning at age 40. Regarding the digestive conditions, women reported more gallbladder disorders (36 percent) and fewer hernias (13 percent) than men (14 and 42 percent, respectively).

Figure 8 shows the frequency of reported diagnoses by job category for men and women. Conditions of the muscles and skeleton and injuries were common in nearly all occupational groups, as were respiratory diagnoses. Sprains and strains were 35 percent of the reported injuries. Fractures, dislocations, and bruises made up an additional 35 percent. Twelve (4.3 percent) of the 277 injury diagnoses were related to poisoning; all were allergic reactions except for one spider bite, one snake bite, one exposure to paint fumes, and one chemical sensitivity to solvents. Complications of medical care are also included in the injury category; 16 (5.8 percent) such diagnoses were reported.

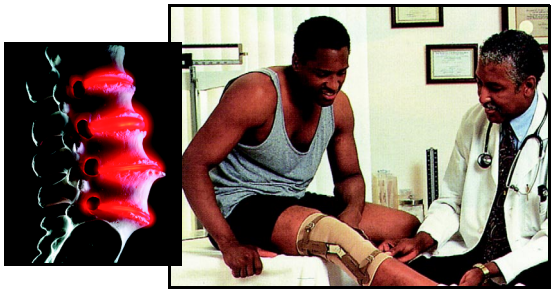


Figure 8. Most Frequently Reported Diagnoses by Job Category and Gender

Job Category	Men	Women
Administration	**Injury (33)** **Digestive (20)** **Respiratory (19)**	**Muscles & Skeleton (60)** **Digestive (47)** **Respiratory (46)**
Professional	**Injury (32)** **Digestive (31)** **Muscles & Skeleton (25)**	**Injury (9)** **Nervous System (7)** **Muscles & Skeleton (6)**
Technical	**Injury (22)** **Respiratory (21)** **Muscles & Skeleton (15)**	**Injury (17)** **Respiratory (15)** **Psychological (11)** **Muscles & Skeleton (11)**
Other/ Unknown Salaried	**Digestive (1)** **Heart/ Circulatory (1)** **Muscles & Skeleton (1)**	**Digestive (1)**
Service	**Injury (21)** **Respiratory (14)** **Muscles & Skeleton (11)**	**Muscles & Skeleton (18)** **Injury (12)** **Respiratory (10)**
Security	**Injury (9)** **Digestive (8)** **Muscles & Skeleton (5)**	**Muscles & Skeleton (2)** **Injury (1)**
Crafts & Manual Labor	**Injury (44)** **Muscles & Skeleton (40)** **Respiratory (28)**	**Muscles & Skeleton (5)** **Digestive (4)** **Respiratory (4)**
Nuclear	**Respiratory (37)** **Injury (28)** **Digestive (15)**	**Muscles & Skeleton (12)** **Respiratory (11)** **Psychological (7)**
Other/ Unknown	**Heart/ Circulatory (2)** **Skin (2)**	**Genitourinary (2)**

Note: Numbers in parentheses represent the 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 189 diagnoses of injuries and women reported 88 diagnoses involving injuries during 1996. Men, therefore, reported over twice the number of injuries as women. As there are more than twice as many men than 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 1996? 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 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:

189 injury diagnoses
÷ 10,844 men = .017 x 1,000 =
17 injury diagnoses per 1,000 men

88 injury diagnoses
÷ 4,900 women = .018 x 1,000 =
18 injury diagnoses per 1,000 women

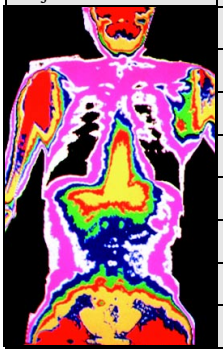
Comparing these rates now correctly suggest that reported absences due to injuries among women are slightly greater than the rates for men. They are called *crude rates* because they do not account for possible differences between men and women such as age and other factors that might affect the individual's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

The absence 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 (Figure 9). Also, the job category "Other/Unknown Salaried" has been combined with the "Other/Unknown" job category. Five groups of diagnoses of particular interest to workers are presented: all illnesses and injuries combined, cancer, heart/circulatory system, respiratory system, and injury. Additional information about 20 other disease groups are also analyzed and can be found in the Supplemental Tables.

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

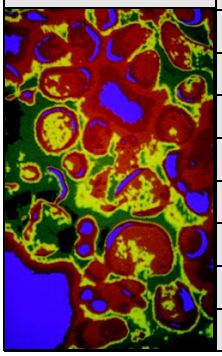
Diagnostic Category: All Illnesses & Injuries Combined



Rate per 1,000

Job Category	Age	Men	Women
Administration	<50	47	113
	50+	62	127
Professional	<50	38	59
	50+	61	87
Technical	<50	96	183
	50+	98	234
Service	<50	206	430
	50+	264	708
Security	<50	153	250
	50+	206	0
Crafts & Manual Labor	<50	143	225
	50+	149	667
Nuclear	<50	200	375
	50+	143	286
Other/Unknown	<50	51	14
	50+	13	0

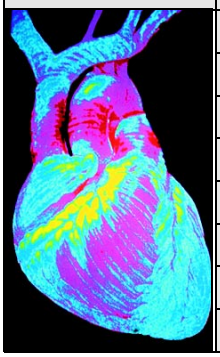
Diagnostic Category: Cancer



Rate per 1,000

Job Category	Age	Men	Women
Administration	<50	1	1
	50+	5	2
Professional	<50	0	7
	50+	3	0
Technical	<50	2	5
	50+	16	0
Service	<50	4	0
	50+	0	0
Security	<50	0	0
	50+	0	0
Crafts & Manual Labor	<50	1	0
	50+	7	0
Nuclear	<50	2	0
	50+	0	0
Other/Unknown	<50	0	0
	50+	0	0

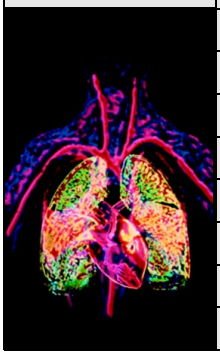
Diagnostic Category: Heart/Circulatory



Rate per 1,000

Job Category	Age	Men	Women
Administration	<50	2	2
	50+	5	6
Professional	<50	3	0
	50+	7	10
Technical	<50	2	5
	50+	5	13
Service	<50	4	38
	50+	14	21
Security	<50	0	0
	50+	88	0
Crafts & Manual Labor	<50	6	0
	50+	26	0
Nuclear	<50	3	8
	50+	0	0
Other/Unknown	<50	13	0
	50+	0	0

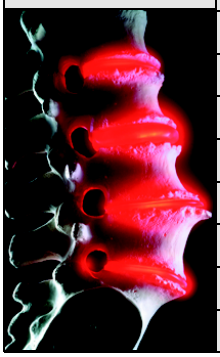
Diagnostic Category: Respiratory



Rate per 1,000

Job Category	Age	Men	Women
Administration	<50	8	14
	50+	5	22
Professional	<50	4	6
	50+	8	0
Technical	<50	18	32
	50+	27	13
Service	<50	43	63
	50+	56	104
Security	<50	12	0
	50+	0	0
Crafts & Manual Labor	<50	25	56
	50+	9	0
Nuclear	<50	62	70
	50+	0	71
Other/Unknown	<50	4	0
	50+	0	0

Diagnostic Category: Injury



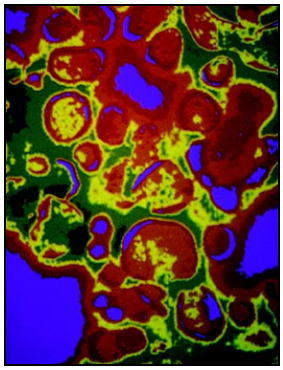
Rate per 1,000

Job Category	Age	Men	Women
Administration	<50	9	13
	50+	18	20
Professional	<50	8	11
	50+	6	10
Technical	<50	21	18
	50+	16	117
Service	<50	82	101
	50+	28	83
Security	<50	49	83
	50+	29	0
Crafts & Manual Labor	<50	33	28
	50+	28	0
Nuclear	<50	45	23
	50+	16	0
Other/Unknown	<50	0	0
	50+	0	0

Women generally had higher rates for all diagnoses, combined than men for all occupational categories regardless of age. Both women and men tended to have higher rates in the older age group. Among women, those at highest risk for illness or injury were in the Service, Crafts and Manual Labor, and nuclear job categories. Among men, Service, Security, and Nuclear workers were at higher risk compared with men in other job categories.

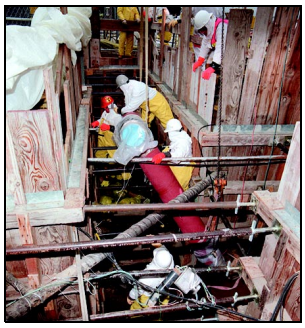
Cancer rates presented in this report are based on reported 5-day absences due to cancer. A worker may experience several periods of absence from one cancer diagnosis due to medical complications or treatment regimens. Incident cancer rates are based on the number of new cancer cases diagnosed with a 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 incidence 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. Forty-five percent of the 33 cancer diagnoses were reported by workers 50 years and older, who made up 25 percent of the work force. There was no evidence of an excess of any one particular type of cancer for either men or women by job category.



There were 11 reported cancer diagnoses among seven women in 1996. Three women who reported cancer in 1996 also reported the same cancer diagnoses (breast, ovarian, and colon) in 1995. The highest cancer rate, 7/1,000 was for women in the Professional job category. There were 5 reported cancers, 2 of the lip/oral cavity/pharynx and 3 with the sites not specified.

Eighteen men reported 22 cancer diagnoses in 1996. One man who reported lymphoma, reported the same cancer in 1994. Among men aged 50 and above, cancer rates were highest among Technical workers, 16/1,000. The four Technical workers reported the following cancer types: colorectal, prostate, testicular, and thyroid.

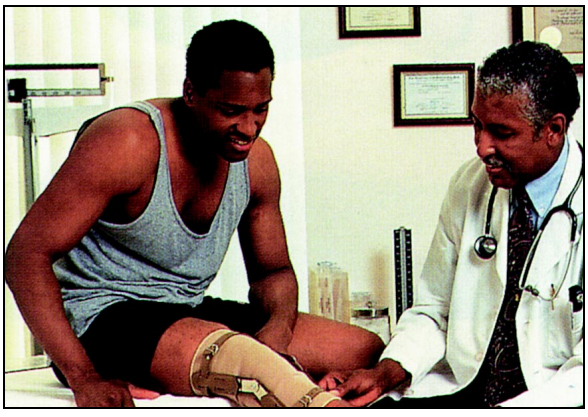


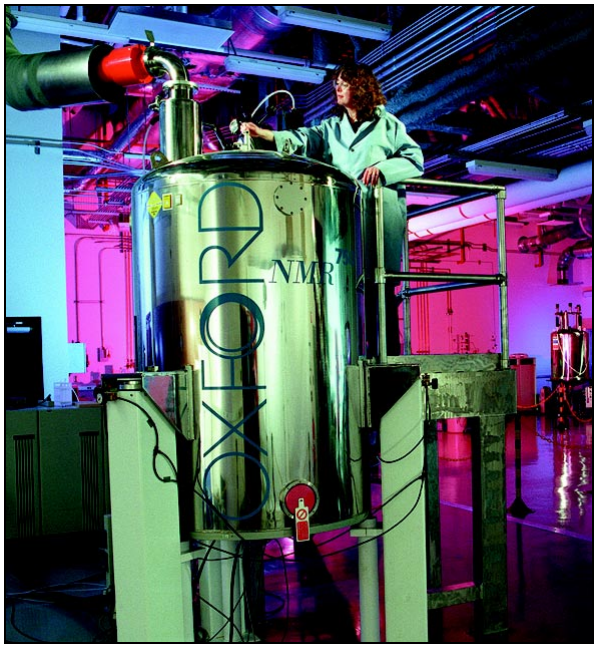
The rate of circulatory disease among males was highest for Security workers, 88/1,000. However, this represents 3 diagnoses (1 hypertension and 2 ischemic heart disease) reported by one man. The rate for Crafts and Manual Labor aged. 50 or greater was 26/1,000. The highest rate of circulatory disease among females was for Service workers less than 50, 38/1,000.

Respiratory disease rates did not change consistently with age. Respiratory disease risk among men of all ages was highest among workers in the Nuclear (56/1,000), Service (46/1,000), Crafts and Manual Labor (20/1,000), and Technical groups (19/1,000) compared with other job categories. The job categories at highest risk were similar for women, although the rates tended to be 1½ to 2 times higher: Nuclear

(71/1,000); Service (78/1000); Crafts and Manual Labor (50/1,000) and Technical (29/1,000). This increased risk reflects an increase in all types of respiratory diseases, not any one particular type.

Injury rates tended to be higher among workers less than 50 years compared with workers aged 50 or older. Service, Security, Crafts and Manual Labor, and Nuclear workers were more likely to report a non-occupational injury than were workers in other occupational groups. The variation in the rates among the women was probably due to the small number of diagnoses reported in some of the occupational groups. The risk of specific injuries varied by occupational category. Service workers were at 5 times greater risk for a lower limb fracture and at 6 times greater risk of a contusion compared with other occupational groups. Upper limb fractures were 29 times more common among Security workers compared with other workers. They were also 5 times more likely to have a sprain or strain. Nuclear workers had a 3 times greater risk of a sprain or strain other than the back and a 6 times greater risk of contusions compared with other workers.





Time Trends

Why Are Rates Age-Adjusted?

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

There are 4 years of epidemiologic surveillance data for Hanford workers and we can begin to analyze illness and injury trends over time in the work force. It is important to note that the age-adjusted rates for the year 1994 presented in this report differ from the

1994 Annual Epidemiologic Surveillance Report due to the elimination of health conditions resulting from maternity leave.

Age-adjusted rates for selected illness and injury categories are presented in Figure 10. Cancer and injury rates changed little over the 4 year period, and heart/ circulatory disease rates had a steady and significant decline among men. Among both men and women, respiratory rates declined steadily from 1993 through 1996. In each case, the decrease was not the result of the decline of any one particular type of diagnosis.

Hanford reported Service and Security occupations as two separate categories starting in 1995. We combined these two groups in order to examine trends from 1993 to 1996. There were increases in the percentage of workers classified as Administration and as Professional between 1993 to 1996. We observed decreases in the Technical and Other/Unknown groups for both men and women and in the Service group for men. These changes may reflect real shifts in the types of work being done at Hanford or reflect changes in the way contractors classify their workers.

From 1993 through 1996, the rates for all diagnostic categories combined remained fairly constant within each occupational group with three exceptions (Figure 11). Rates for all diagnostic categories combined show a steady decrease among men in the Administration group due to a decline of circulatory, respiratory, and digestive diagnoses. Rates also declined among women in the Nuclear group as a result of the decrease in reported injury occurrence. Although these decreases reflect a decline in illness or injury, other events should also be considered, such as changes in reporting requirements for absenteeism or policies related to the administration of sick leave. There was a steady increase in the rate of all diagnostic categories combined among women in the Craft and Manual Labor group. No one specific diagnosis appears responsible for this increases.

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

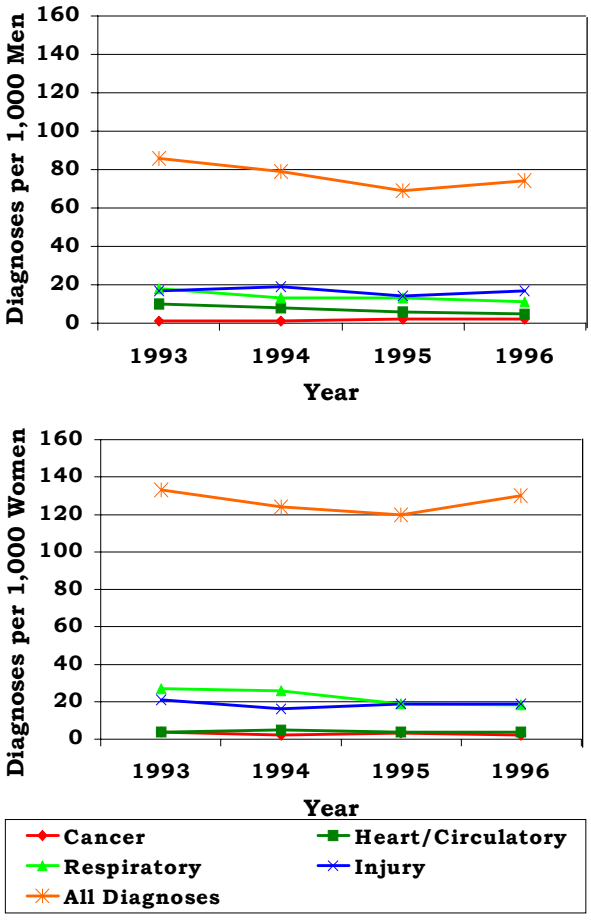
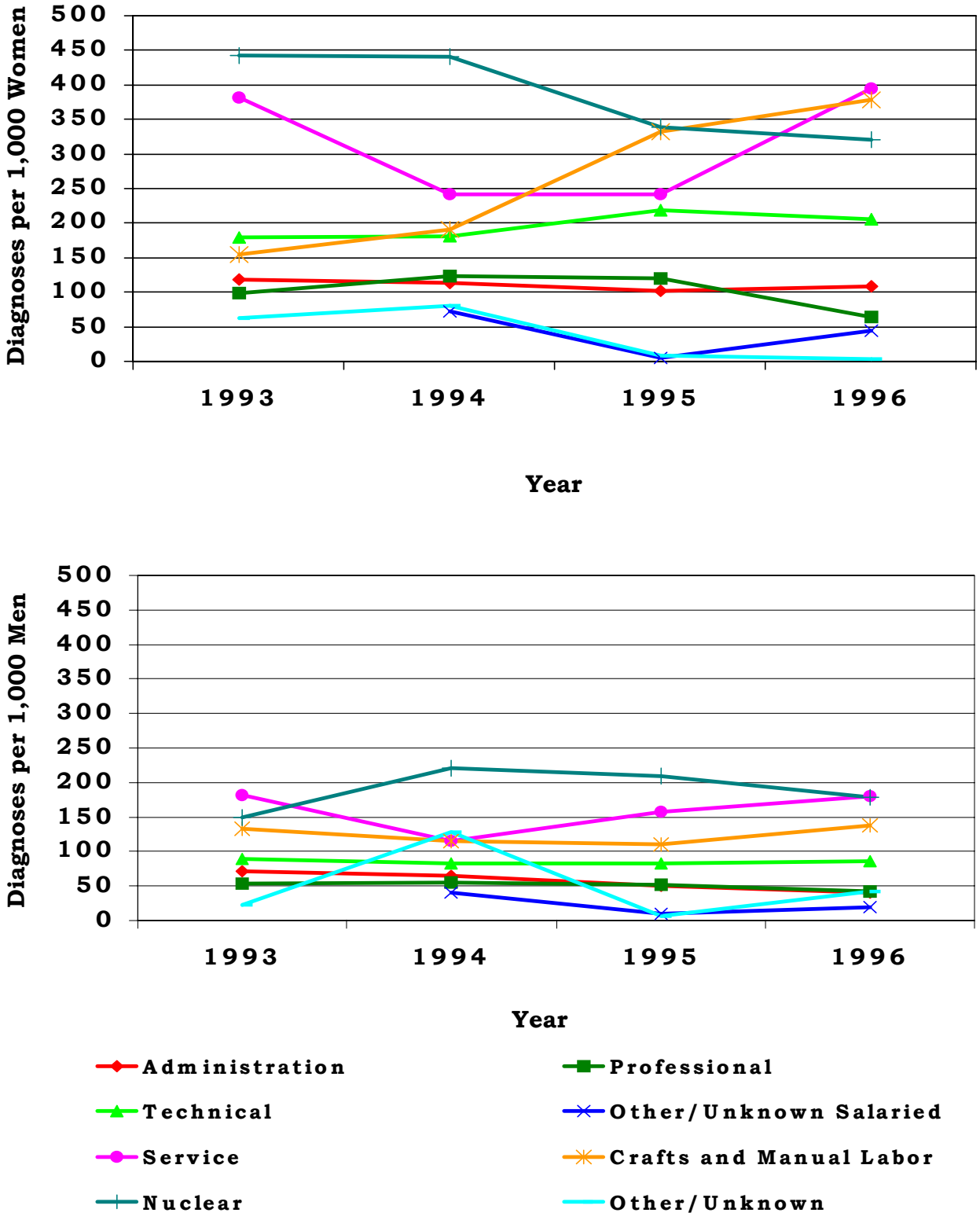


Figure 11. Age-Adjusted Rates for all Diagnoses Combined Among Women and Men by Job Category from 1993 to 1996



Sentinel Health Events for Occupations

A sentinel health event for occupation (SHEO) is a disease, disability, or death which is occupationally related. Its occurrence may serve as a warning signal that materials 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 (refer to the Supporting Tables).

Although sentinel health events may indicate an occupational exposure, many may result from non-occupational exposures. Due to this uncertainty, sentinel health events are assessed in two categories:

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

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

There were 39 (3 percent) SHEOs among the 1,150 health events reported in 1996. Forty-four diagnoses were reported among these events (Figure 12).

Figure 12. Characteristics of SHEOs by Gender

	Total Number of SHEO Diagnoses		Total Number of Days Absent	
	Men	Women	Men	Women
Definite	3	7	213	247
Possible	15	19	757	1,536
Total	18	26	970	1,783

Disabilities Among Active Workers

Hanford was not able to provide data on worker disabilities in 1996.

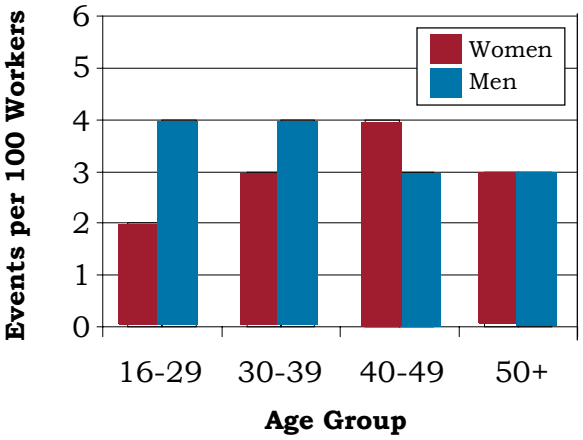
Deaths Among Active Workers

Hanford was not able to provide data on worker deaths in 1996.

OSHA-Recordable Events

The Occupational Safety and Health Administration 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.

Figure 13. OSHA-Recordable Events by Gender and Age

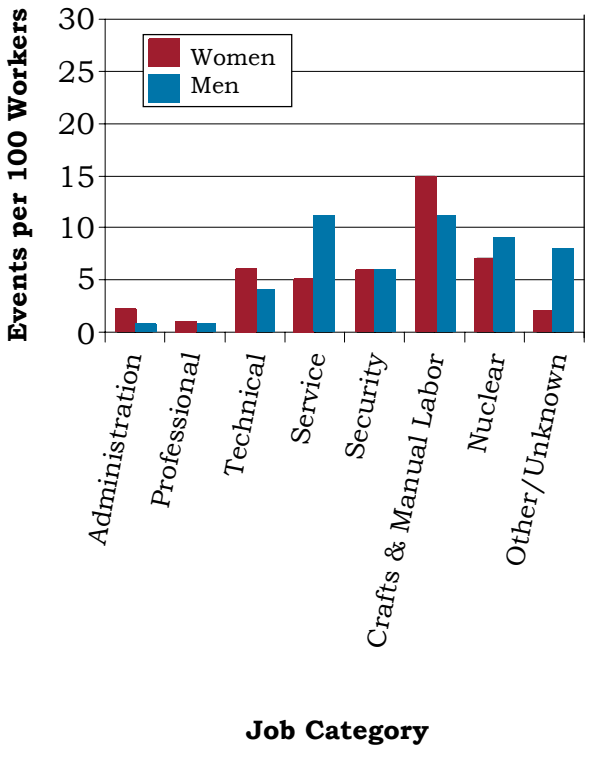


The distribution of OSHA events per 100 workers by age and gender is shown in Figure 13. Occupational injuries resulted in a total of 4,784 lost or restricted workdays at Hanford in 1996. There were 143 women and 356 men who had one recordable OSHA event and 4 women and 17 men with two or more OSHA events. Men reported almost 2½ times as many OSHA events as women, although the rate of workers with an OSHA event was similar for men and women (3 per 100 workers). The occurrence of OSHA-recordable injuries did not appear related to age. The average number of workdays lost or with restricted activity was similar for women (9.6 days) and men (9.1 days) and tended to increase with increasing age.

There was a 14 percent decrease in the number of OSHA-recordable events in 1996 compared with the 583 workers with a recordable event in 1995. 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 Craft and Manual Labor category had the highest rate of OSHA events, 15 per 100 workers. Among male workers, the highest rates of OSHA events were among Service and Craft and Manual Labor workers, 11 per 100. Service workers had the highest average number of workdays lost or with restricted activity for OSHA events among men (22 days) and women (61 days). Three of the six women with an OSHA event each had over 90 workdays with lost or restricted activity. No OSHA events were recorded among Other/Unknown Salaried workers. The Supporting Tables contain more detailed data about the number of OSHA events and 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 520 OSHA events recorded on the OSHA 200 logs. From these, there were 226 diagnoses among women and 488 diagnoses among men as shown in Figure 15.

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

Diagnostic Category	Gender	
	Women	Men
Digestive	0	6
Infections/Parasites	0	3
Muscles & Skeleton	60	80
Nervous System	24	28
Psychological	2	0
Respiratory	2	3
Skin	3	9
Unspecified Symptoms	18	23
Injury	117	336
Fractures-Neck, Trunk	2	5
Fractures-Upper Limb	2	11
Fractures-Lower Limb	4	6
Dislocations	1	5
Back Sprains and Strains	26	76
Other Sprains and Strains	22	56
Open Wounds-Head, Neck, Trunk	0	20
Open Wounds-Upper Limb	4	48
Open Wounds-Lower Limb	1	2
Superficial Injuries	5	19
Bruises	14	37
Crushing Injuries	1	1
Foreign Bodies Entering Orifice	2	16
Burns	3	13
Injuries to Nerves and Spinal Cord	1	1
Unspecified Injuries	18	11
Adverse Reactions to Non-Medical Substances	10	7
Adverse Reactions to External Causes	1	1
Complications of Surgical/Medical Care	0	1

Sixty-three 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 unspecified injuries for women. Sprains and strains accounted for 40 percent of all OSHA-recordable injuries in 1996 (36 percent in 1995). Sixty-three percent of the sprains and strains were associated with overexertion and strenuous movement, and an additional 27 percent were associated with falls. Conditions related to the muscles and skeleton also occurred frequently. Age and occupation did not appear related to the type of accident or the type of injury sustained.

An accident is defined as an injury diagnosis that resulted from the OSHA event. Ninety-five percent (492/520) of the OSHA events were the result of an accident (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 38 percent of these accidents. Falls made up the second most common type of accident.

Among the 28 events not attributed to a particular accident, 33 percent of the diagnoses were related to the skin; 21 percent to the muscles and skeleton; 15 percent to disorders of the nervous system. Three (60 percent) of the nervous system disorders were carpal tunnel syndrome.

Figure 16. OSHA-Recordable Accidents by Type and Gender

Accident Category	Gender	
	Women	Men
	Number of Accidents	Number of Accidents
Motor Vehicle Traffic	0	6
Motor Vehicle Non-Traffic	0	2
Poisoning-Non-Medicinal	5	3
Medical Misadventure	0	1
Falls	23	45
Fire	0	1
Natural/Environmental Factors	4	7
Submersion/ Suffocation/Foreign Bodies	2	15
Other Accidents	105	273
Caught Between Objects	4	13
Cutting/Piercing Instrument/Object	5	34
Hot, Corrosive, or Caustic Material/ Steam	3	12
Machinery	0	1
Noise	0	16
Overexertion and Strenuous Movements	33	111
Repetitive Trauma	56	23
Struck by an Object	4	62
Visible/UV Light	0	1

Rates of OSHA-Recordable Events

The rates of all diagnoses, combined, for OSHA-recordable events by job category, age category, and gender are shown in Figures 17 and 18. Workers in the Security, Crafts and Manual Labor, Nuclear, and Other/Unknown groups tended to have higher rates than other occupational groups for all diagnoses combined. Among men, younger workers tended to have higher diagnosis rates, but among women, older workers showed somewhat higher rates. Most of the OSHA health conditions involved occupational injury. When these diagnoses were considered separately, there was no clear age pattern for higher rates.

Hanford workers missed 1,636 workdays and had 3,148 days restricted as a result of occupational injuries. Four job groups experienced 78 percent of the lost workdays and 88 percent of the days restricted. These four groups comprised 27 percent of the work force: Technical (10 percent); Service (3 percent); Crafts and Manual Labor (9 percent); and Nuclear (5 percent). The two largest groups, Administration (37 percent of the work force) and Professional (31 percent of the work force), reported 19 percent of the lost workdays and only 10 percent of the days restricted. Service workers, who comprised about 3 percent of the work force had the highest percentage of lost and restricted workdays of any occupational group (23 percent of the restricted workdays and 25 percent of the lost workdays). This group also had one of the highest percentages of lost and restricted workdays in 1995.

Compared with the work force as a whole, Crafts and Manual Labor and Service workers had an overall occupational injury risk more than 3 times greater than the other occupational groups. The risks for specific types of injuries varied by occupational group. Compared with other workers, Service workers were more likely to suffer sprains and strains, bruises, or wounds due to foreign bodies. Crafts and Manual Labor workers were at relatively higher risk for sprains and strains, bruises, burns, adverse reactions to non-medical substances, fractures, open wounds, and wounds due to foreign bodies. The magnitude of these risks suggests the need for additional attention concerning injuries among Service workers and Crafts and Manual Laborers. These occupational injuries were responsible for substantial numbers of restricted and lost workdays. The 210 OSHA events among these workers resulted in 1,300 days of restricted activity and 960 lost workdays, a substantial loss of productivity.

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

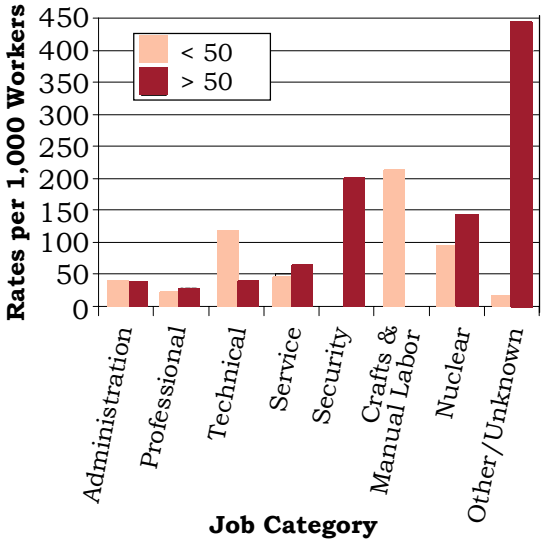
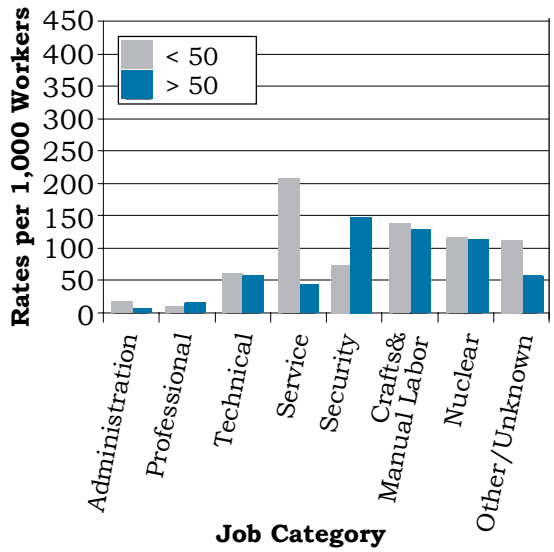


Figure 18. OSHA-Recordable Rates by Age and Job Category Among Men, All Diagnoses Combined



Time Trends for OSHA-Recordable Events

Data on OSHA-recordable events were not available for epidemiologic surveillance analysis prior to 1995. The assessment of time trends requires a minimum of 3 years of data. Time trend analyses for OSHA data will therefore appear in the *1997 Annual Epidemiologic Surveillance Report*.

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

NOTES

NOTES