

# 2001

## Hanford Site Annual Epidemiologic Surveillance Report



## **Hanford Site 2001 Epidemiologic Surveillance Report**

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ACKNOWLEDGEMENT

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# Hanford Site 2001

## At A Glance

### Overall Illness and Injury:

- Our inclusion of absences lasting fewer than 5 days accounted for 52 percent (123 of 235 diagnoses) of the increase in diagnoses among women and 67 percent (349 of 521 diagnoses) among men. The reason for the increase in the number of diagnoses lasting more than 5 days is unclear; a possible explanation is improved reporting by the site.
- Female workers in the Service and Crafts and Manual Labor groups were at the highest overall risk for illness or injury. Workers in the Service and Crafts and Manual Labor job categories have had high rates since 1998 for both men and women.
- Breast cancer made up 72% of the cancers reported among women in 2001. Twelve women reported 13 diagnoses for breast cancer, but in calendar year 2000 only 1 woman reported breast cancer.
- The rate of prostate cancer diagnoses has increased substantially since 1995. The reasons for this increase are not known. It is possible that the increase reflects growing emphasis on screening for prostate cancer among the local medical community. Improved reporting of absences could also produce an apparent upward trend. We saw no evidence that any occupational group was represented in excess or that the age distribution was unusual among men reporting this disease.

### Occupational Injuries (OSHA):

- The number of OSHA-recordable events decreased 3 percent from 2000 to 2001. The decrease may reflect changes in the types of work being done at the site, improved safety performance, or changes in the availability of OSHA data.
- Service workers had the highest rate of OSHA events, and on average, their absences were of the longest duration.
- As in past years, sprains and strains were the most common type of OSHA-recordable injuries, followed by open wounds. Sprains and strains accounted for 37 percent of all OSHA-recordable injuries in 2001. Conditions related to the muscles and skeleton were also common (21 percent).
- Sixty-five percent of the lost workdays were reported by Service and Craft and Manual Labor workers.

- We saw no significant changes in injury rates from 2000 to 2001 for the work force as a whole. Looking at individual job categories, we noted a sharp increase among women in the Crafts and Manual Labor and Nuclear job categories and a more modest increase among men in the Security job category.
- Overall, occupational injury rates decreased between 2000 and 2001 for many job categories, but the decreases were not significant. Over the longer term, the injury rates have changed very little among Administration, Professional, and Other/Unknown Salaried workers. The only noteworthy long-term change we observed was the relatively steady decrease in the occupational injury rate among male Nuclear workers and female Technical workers.

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## 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 workdays, occupational injuries and illnesses, and disabilities and deaths among current workers. Epidemiologic surveillance has been ongoing at Hanford since 1992.



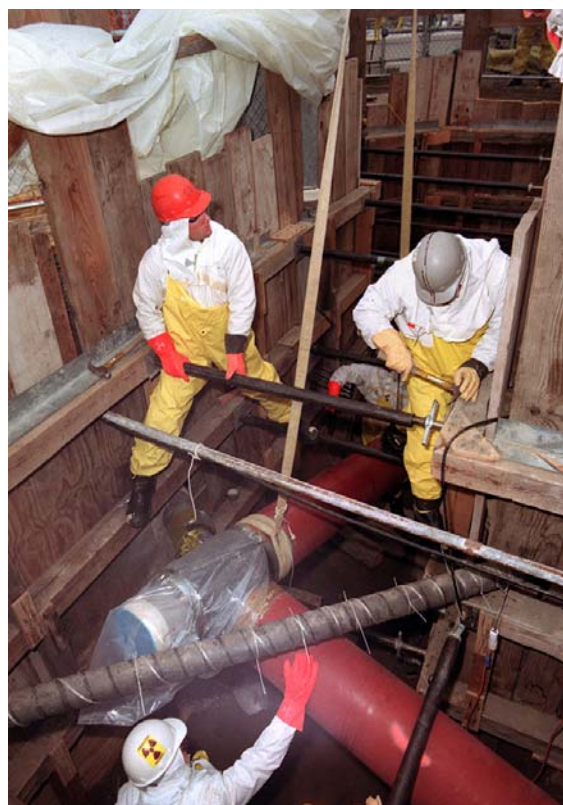
This report provides a summary of epidemiologic surveillance data collected from Hanford during the period January 1, 2001 through December 31, 2001. The data were collected by a coordinator at Hanford and submitted to the Epidemiologic Surveillance Data Center, located at Oak Ridge Institute for Science 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 Occupational Health.

The information in this report provides highlights of the data analyses conducted on the 2001 data collected from Hanford. Surveillance reports and additional Supporting Tables are posted on the Office of Occupational Health Web site [www.eh.doe.gov/health/epi/surv](http://www.eh.doe.gov/health/epi/surv) or are available by request. The main sections of the report include:

work force characteristics; absences due to injury or illness; 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 2001 report includes sections on time trends that provide comparative information on the health of the work force from 1993 through 2001.

**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. 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 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 2 countries eventually led to the addition of 8 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 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 has been stored at Hanford in aging and deteriorating tanks. Included in the site's 1999 and 2000 accomplishments were removal of waste from high-heat, self-boiling tanks and resolution of associated flammability issues.

In 2001, workers at Hanford's Plutonium Finishing Plant began the welding process on a new package for long-term plutonium storage. This new package will enable Hanford to have the capability to complete safe, long-term storage of plutonium and is significant in terms of reducing risk to workers and the public. Hanford is the first site in the DOE complex to be ready to comply with a new DOE packaging standard for plutonium.

A team of contractors manages the Hanford site. The team of prime contractors for the Richland Operations Office is made up of Battelle Memorial Institute; Bechtel Hanford, Inc.; Fluor Hanford, Inc.; and Hanford Environmental Health Foundation. The team of prime contractors for the Office of River Protection is composed of CH2M Hill Hanford Group, Inc. and Bechtel National, Inc.



## The Hanford Work Force - 2001

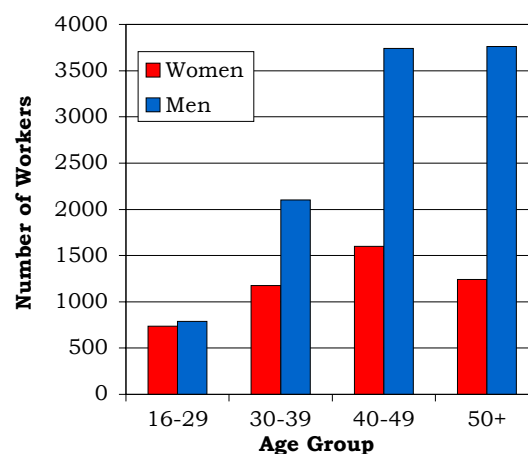
A total of 15,143 Hanford employees were included in epidemiologic surveillance in 2001, 165 fewer workers than were present in 2000. The gender and age distribution of the 2001 work force is shown in Figure 1. Significant features of the work force include:

1. There were 4,752 (31 percent) women and 10,391 (69 percent) men in the work force.
2. The average age of male workers at Hanford was 45 years; the average age of female workers was 42 years.
3. There was no information on the distribution of workers by race.
4. The Hanford work force decreased 24 percent from a high of 19,655 employees in 1994 to a low of 14,847 in 1997.
5. Women have consistently made up about a third of the work force.
6. The average age of the work force has shifted gradually over the past 7 years. The percentage of workers under age 40 has decreased, and the percentage of workers aged 40 or older has increased.

Individual job titles, as reported by Hanford, were grouped together into job categories because there were either too few workers or health events within a particular job title to permit analyses to focus specifically on those workers. Beginning in 1995, Hanford reported Service and Security as 2 separate job categories. The distribution of workers by job category and gender is shown in Figure 2. Among both men and women, approximately one-third of the work

force was in the Other Unknown Salaried and Other/Unknown job categories. Among the other job categories, men and women were not distributed equally. More than one-third (42 percent) of the men were in the Administration and Professional job categories. The largest percentage of the women (36 percent) were in the Administration group.

**Figure 1. The Work Force by Gender and Age**



**Figure 2. The Work Force by Job Category and Gender**

Job Category	Women	Men
Administration	1,736 36%	1,601 15%
Professional	551 12%	2,787 27%
Technical	339 7%	781 8%
Other/Unknown Salaried	568 12%	1,234 12%
Service	96 2%	234 2%
Security	8 <1%	163 2%
Crafts & Manual Labor	37 1%	849 8%
Nuclear	155 3%	756 7%
Other/Unknown	1,262 26%	1,986 19%

## Number and Length of Absences

### ***A Note to the Reader:***

*Prior to the Year 2001 report, epidemiologic surveillance at Hanford examined illness and injury absences of 5 or more consecutive workdays (also referred to as “5-day absences”). This approach 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. Eligible health events also would have included those with an absence on a Friday that continued through Tuesday, the length of that absence including the weekend.*

*As indicated in Order 440.1, all injuries and illnesses due to a work-related incident must be reported. Non-occupational illnesses and injuries that involve absences of fewer than 5 days do not routinely require a medical clearance for return to work and, as noted above, have been excluded from these analyses until report year 2001. However, in 2001, Hanford chose to include absences of shorter duration, which most likely will impact many of the rates, proportions, and trends presented in the 2001 Epidemiologic Surveillance Report. Some of the rates show an increase, and the reader is cautioned to take this into account when interpreting the data presented in the pages that follow. In general, OSHA-recordable events, reportable regardless of whether or not an absence is involved, have not been affected by the change in reporting.*

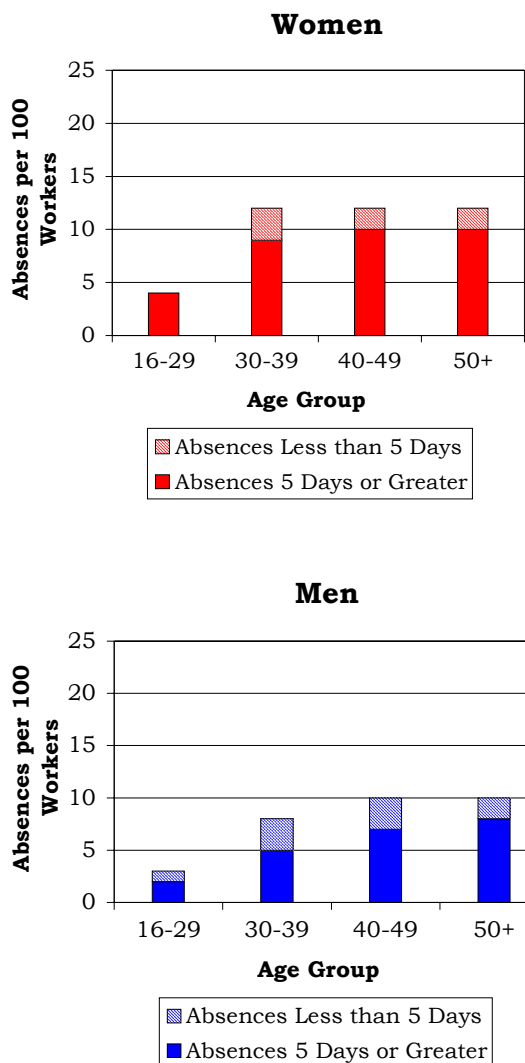
Another change from earlier surveillance reports is the exclusion of specific health events that did not result from injury or illness. These include 63 absences due to maternity

leave reported by 63 women and 12 absences due to elective surgery or procedures not related to the treatment of an illness or injury reported by 12 individuals.



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. Women experienced 513 absences, resulting in an absence rate of 11 per 100 workers (513/4,752). The absence rate among men was about 9 per 100 workers (915/10,391). The absence rate increased 60 percent for women and 69 percent for men from 2000 to 2001. A portion of this increase results from the inclusion of 341 absences lasting fewer than 5 days that accounted for 24 percent of all absences reported in 2001. No absences lasting fewer than 5 days were reported in the 2000 report. The rate of absences lasting 5 days or more was 6 per 100 workers for men (662/10,391) and 9 per 100 workers for women (425/4,752).

**Figure 3. Absence Rate by Gender and Age**



The distribution of absences due to injury or illness varied by age and gender. Women had a greater rate of absences than did men in all age groups. As in 2000, the rates of absence increased with age among men until age 40, after which they remained constant. Among women, the rates remained constant for workers 30 years of age and older. In contrast, the rates increased with age among women in 2000.

The average length of absence by gender and age is shown in Figure 4. The average length of absence was 38

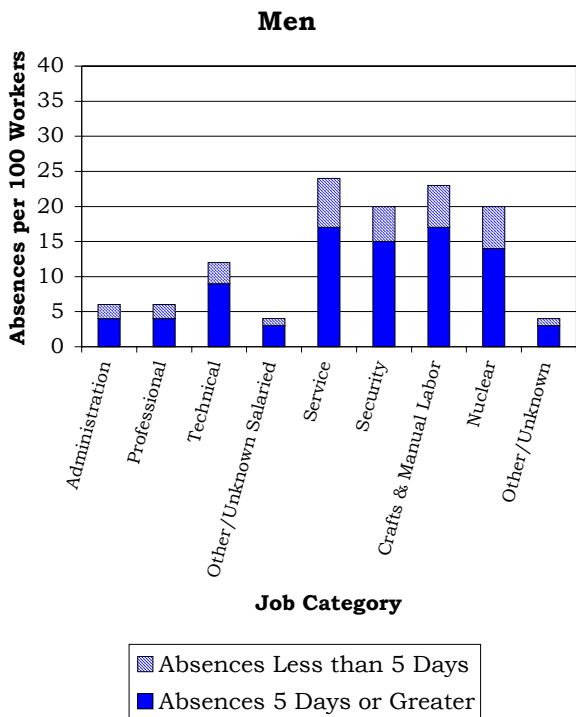
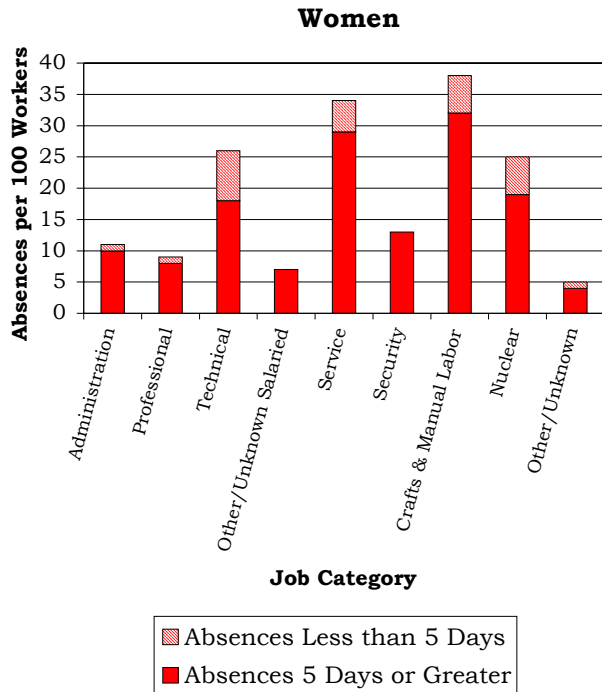
days for women and 26 days for men. The average absence length decreased about 30 percent for men and women from 2000 to 2001. The inclusion of absences lasting less than 5 days is partially responsible for this decrease. Absences among women averaged 8 to 19 days longer than absences among men in the same age group. The average length of absence increased with age among men, but not among women.

**Figure 4. Number of Days Absent by Gender and Age**

Gender	Age	Number of Absences		Number of Days Absent	
		< 5 Days	≥ 5 Days	Total	Average
Women	16-29	3	26	833	29
	30-39	35	109	6,219	43
	40-49	29	164	6,970	36
	50+	21	126	5,550	38
	Total	88	425	19,572	38
Men	16-29	11	16	501	19
	30-39	47	113	3,915	24
	40-49	113	248	8,518	24
	50+	82	285	10,890	30
	Total	253	662	23,824	26

Figure 5 presents the absence rate by job category for men and women. Absence rates for women in the Technical group, men in the Security group, and both men and women in the Service, Nuclear, and Crafts and Manual Labor groups were affected most by including absences of fewer than 5 days. Women had higher rates of absence than did men for every job category except the Security group. In the Technical group, the absence rate among women was more than twice that of men. The absence rates among women and men were highest for Service workers (34/100 women and 24/100 men) and Crafts and Manual Labor workers (38/100 women and 23/100 men). Men and women in these job categories also had high absence rates in 2000.

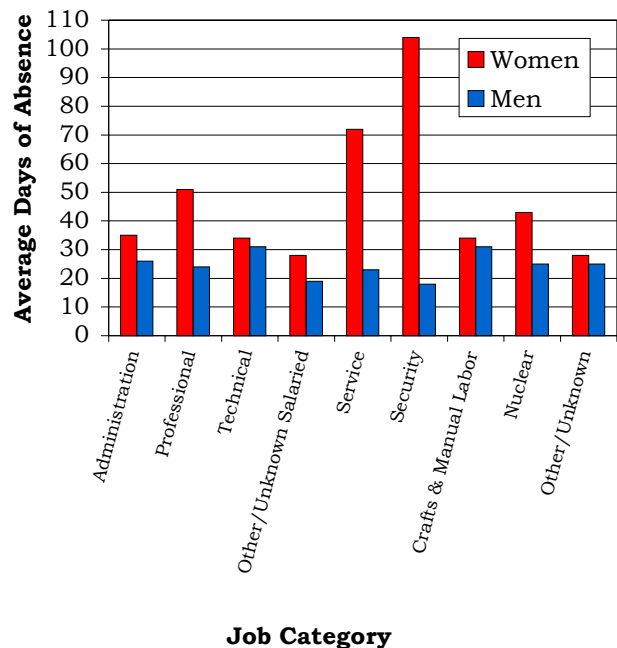
**Figure 5. Absence Rate by Job Category and Gender**



The average length of absence also varied by job category as shown in Figure 6. Women had longer absences than did men in every job category. Among men, workers in the Technical and Crafts and Manual Labor job categories had the longest average absences (31 days). Among women, Security and Service workers averaged the longest number of days absent (104 days and 72 days, respectively). The Security group had only 1 absence, which was the result of a knee injury. Ten of the 33 events in the Service group resulted in absences lasting more than 3 months. Four were due to falls, and 5 were due to overexertion.



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



## Diagnostic Categories

Epidemiologic surveillance monitors *all* illnesses and injuries among active workers because it is not always possible to determine which health effects are due to occupational exposures and which 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 1 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 (which 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 714 diagnoses reported by female workers and 1,267 diagnoses reported by male Hanford Site employees in 2001. The number of reported diagnoses increased by 49 percent for women and 70 percent for men from 2000 to 2001. Including absences lasting fewer than 5 days accounted for 52 percent of the increase in the number of diagnoses (123 of 235 diagnoses) among women and 67 percent (349 of 521 diagnoses) among men. The reason for the increase in the number of diagnoses above this level is unclear; a possible explanation is better reporting by the site.

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

Diagnostic Category	Women		
	Number of Diagnoses < 5 days	Number of Diagnoses ≥ 5 days	Number of Lost Calendar Days
Benign Growths	3	19	625
Blood	0	1	92
Cancer	1	17	1,278
Digestive	5	44	1,097
Endocrine/ Metabolic	1	20	1,036
Existing Birth Condition	0	1	17
Genitourinary	7	62	1,985
Heart/ Circulatory	5	20	590
Infections/ Parasites	1	19	885
Injury	37	90	4,754
Miscarriage	0	5	97
Muscles & Skeleton	26	115	5,777
Nervous System	3	51	1,675
Psychological	4	38	1,236
Respiratory	5	56	783
Skin	4	5	172
Unspecified Symptoms	21	28	1,159



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

Diagnostic Category	Men		
	Number of Diagnoses < 5 days	Number of Diagnoses ≥ 5 days	Number of Lost Calendar Days
Benign Growths	7	7	238
Blood	1	0	2
Cancer	5	36	1,958
Digestive	11	109	2,493
Endocrine/ Metabolic	5	16	689
Existing Birth Condition	0	3	174
Genitourinary	5	33	779
Heart/ Circulatory	21	77	2,882
Infections/ Parasites	2	20	681
Injury	133	192	6,181
Miscarriage	NA	NA	NA
Muscles & Skeleton	46	172	6,377
Nervous System	11	32	1,887
Psychological	5	31	1,765
Respiratory	13	109	1,325
Skin	13	19	357
Unspecified Symptoms	71	62	1,045

Women accrued 19,572 lost calendar days due to injury and illness. Four diagnostic categories accounted for 56 percent of all reported conditions: muscles and skeleton injuries, genitourinary, and respiratory. Major contributors to these diagnostic categories are shown in Figure 8. Conditions of the muscles and skeleton and injuries resulted in the most lost calendar days among women. Among absences lasting fewer than 5 days,

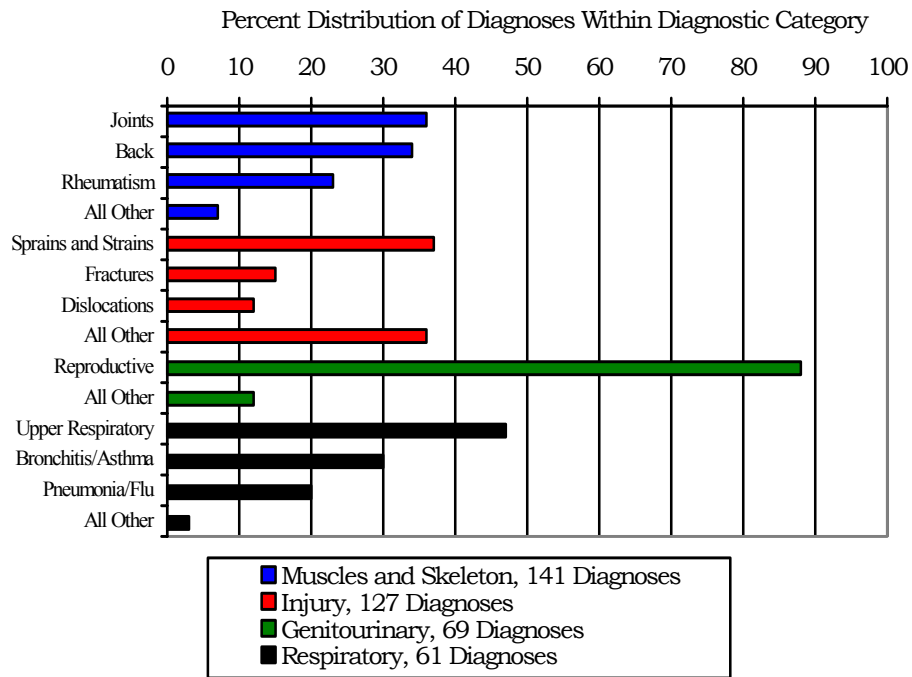
injuries and muscles and skeleton conditions were also the most frequently reported, followed by unspecified conditions. Types of conditions reported for injuries and the muscles and skeleton were similar, regardless of the length of absence. Abdominal pain, digestive symptoms, and chest pain were the most frequently reported unspecified conditions.

Men accrued 23,824 lost calendar days due to injury and illness. The most frequently reported conditions were injuries, muscles and skeleton conditions, respiratory disorders, and unspecified conditions. Figure 9 shows major contributors to these diagnostic categories among men. Unspecified symptoms that were frequently reported by men included headaches, dizziness, shortness of breath, abdominal pain, nausea, and most commonly, chest pain or discomfort. The most lost calendar days among men were due to muscles and skeleton conditions and injuries. The diagnoses for absences lasting fewer than 5 days were similar to those for longer absences.

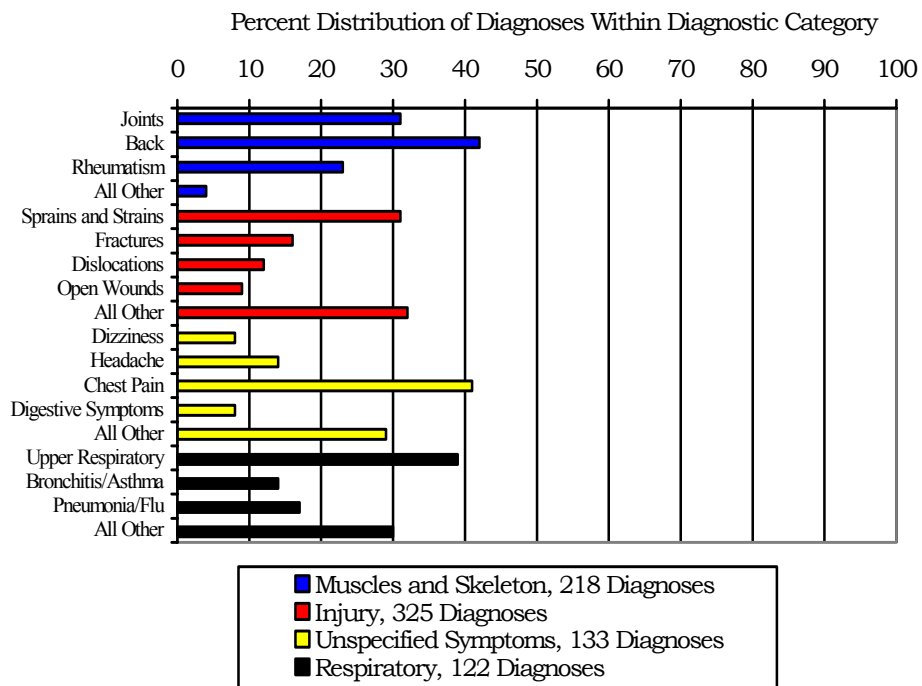
The most frequently reported health conditions varied little with age among men and women. Few diagnoses were reported among workers 16 to 29 years old. Figure 10 shows the frequency of reported diagnoses by job category for men and women. Conditions of the muscles and skeleton and injuries were common in all job categories among men and among women in all but the Security job category.



**Figure 8. Common Diagnoses Among Female Hanford Workers in 2001**



**Figure 9. Common Diagnoses Among Male Hanford Workers in 2001**



**Figure 10. Most Frequently Reported Diagnoses by Job Category and Gender**

Job Category	Men	Women
Administration	Muscles & Skeleton (33) Injury (26) Heart/Circulatory (18)	Muscles & Skeleton (50) Genitourinary (38) Injury (30)
Professional	Digestive (35) Injury (30) Muscles & Skeleton (30)	Injury (10) Muscles & Skeleton (10) Respiratory (9)
Technical	Injury (37) Muscles & Skeleton (21) Unspecified Symptoms (17)	Injury (25) Muscles & Skeleton (23) Psychological (10) Respiratory (10)
Other/Unknown Salaried	Injury (15) Muscles & Skeleton (15) Heart/Circulatory (10) Unspecified Symptoms (10)	Muscles & Skeleton (9) Respiratory (9) Psychological (8)
Service	Injury (21) Muscles & Skeleton (14) Heart/Circulatory (10)	Injury (14) Muscles & Skeleton (14) Unspecified Symptoms (6)
Security	Muscles & Skeleton (13) Injury (11) Unspecified Symptoms (5)	Injury (1)
Crafts & Manual Labor	Injury (90) Muscles & Skeleton (46) Respiratory (37)	Injury (6) Muscles & Skeleton (3) Unspecified Symptoms (3)
Nuclear	Injury (72) Unspecified Symptoms (31) Muscles & Skeleton (29) Respiratory (28)	Injury (17) Muscles & Skeleton (13) Genitourinary (4) Nervous System (4)
Other/Unknown	Injury (23) Muscles & Skeleton (17) Digestive (13)	Muscles & Skeleton (19) Injury (18) Respiratory (8) Unspecified Symptoms (8)

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 122 diagnoses and women reported 61 diagnoses involving respiratory conditions during 2001. Men, therefore, reported twice as many respiratory diagnoses as women. As there were more than twice as many men as women at Hanford, it seems reasonable to expect more respiratory conditions among men than women. Does this mean that men were at greater risk of respiratory conditions compared with women in 2001? 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 respiratory rate for each gender. Rates are calculated by dividing the number of respiratory 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:

$$122 \text{ respiratory diagnoses} \div 10,391 \text{ men} = .012 \times 1,000 = 12 \text{ respiratory diagnoses per 1,000 men}$$

$$61 \text{ respiratory diagnoses} \div 4,752 \text{ women} = .013 \times 1,000 = 13 \text{ respiratory diagnoses per 1,000 women}$$

Comparing these rates now correctly suggests that the rates of reported respiratory diagnoses 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 a respiratory condition. 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 absences over a year. Conversely, 1 absence may be associated with multiple diagnoses, e.g., the flu and a sprained wrist.



In the following set of analyses, the 4 age groups were collapsed into 2 groups, workers younger 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 1 job category. The rates of all illnesses and injuries combined are presented in Figure 11. Four groups of diagnoses of particular interest to workers are presented in Figure 12: cancer, heart/circulatory system, respiratory system, and injury.

**Figure 11. Rates for All Illnesses and Injuries Combined by Job Category, Gender, and Age**


Diagnostic Category	Rate per 1,000			
	Job Category	Age	Men	Women
All Illnesses & Injuries Combined	Administration	<50	77	144
		50+	78	156
	Professional	<50	65	131
		50+	92	107
	Technical	<50	164	396
		50+	203	197
	Service	<50	362	621
		50+	324	368
	Security	<50	303	0
		50+	0	500
	Crafts & Manual Labor	<50	229	615
		50+	469	545
	Nuclear	<50	290	298
		50+	309	355
	Other/Unknown	<50	50	63
		50+	52	160

**Figure 12. Rates for Selected Diagnostic Categories by Job Category, Gender, and Age**


Diagnostic Category	Rate per 1,000			
	Job Category	Age	Men	Women
Cancer	Administration	<50	0	3
		50+	5	5
	Professional	<50	2	0
		50+	7	8
	Technical	<50	7	7
		50+	11	15
	Service	<50	6	0
		50+	0	26
	Security	<50	0	0
		50+	0	0
	Crafts & Manual Labor	<50	9	0
		50+	8	91
	Nuclear	<50	2	8
		50+	22	0
	Other/Unknown	<50	2	3
		50+	2	3

Diagnostic Category	Rate per 1,000			
	Heart/Circulatory	Job Category	Age	Men
	Administration	<50	7	4
		50+	15	6
	Professional	<50	4	17
		50+	18	0
	Technical	<50	10	0
		50+	5	0
	Service	<50	18	17
		50+	99	0
	Security	<50	8	0
		50+	0	0
	Crafts & Manual Labor	<50	2	0
		50+	28	0
	Nuclear	<50	13	0
		50+	7	0
	Other/Unknown	<50	1	3
		50+	10	12

Women generally had higher rates than men for all diagnoses combined in all job categories regardless of age. Among men, rates tended to be higher among older workers. There was no relationship with age among women. Female workers in the Service and Crafts and Manual Labor groups were at the highest risk for illness or injury. The same 2 job categories were also at high risk among men. Workers in the Service and Crafts and Manual Labor job categories have had high rates since 1998 for both men and women.

Diagnostic Category	Rate per 1,000			
	Respiratory	Job Category	Age	Men
	Administration	<50	1	13
		50+	1	8
	Professional	<50	7	12
		50+	8	31
	Technical	<50	22	37
		50+	16	0
	Service	<50	43	17
		50+	14	53
	Security	<50	30	0
		50+	0	0
	Crafts & Manual Labor	<50	22	38
		50+	69	0
	Nuclear	<50	35	16
		50+	44	0
	Other/Unknown	<50	2	5
		50+	2	31

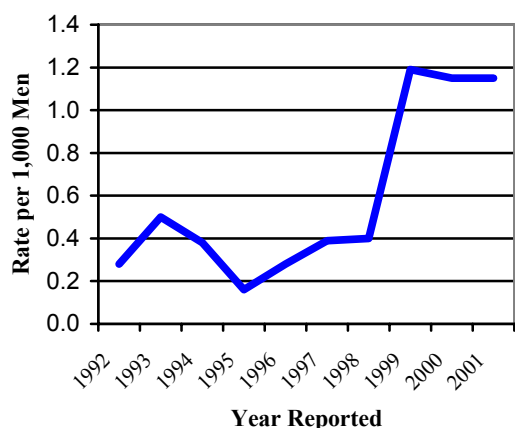
Cancer rates presented in this report are based on reported absences during the year. A worker may experience several periods of absence from 1 cancer diagnosis due to medical complications or treatment regimens. *Incident cancer rates* are based on the number of new cancer cases diagnosed within a given 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 incidence rates frequently published in many articles on cancer with which you may be familiar.

Diagnostic Category	Rate per 1,000			
	Injury	Job Category	Age	Men
	Administration	<50	18	16
		50+	14	19
	Professional	<50	14	21
		50+	6	8
	Technical	<50	43	73
		50+	60	76
	Service	<50	104	224
		50+	56	26
	Security	<50	83	0
		50+	0	500
	Crafts & Manual Labor	<50	81	192
		50+	136	91
	Nuclear	<50	97	97
		50+	88	161
	Other/Unknown	<50	14	9
		50+	8	31

The likelihood that an individual in the U.S. develops cancer increases with age. Cancer rates tended to be higher among older workers compared with younger workers for men and women. Fifty-seven absences were reported involving 18 diagnoses among 16 women and 41 diagnoses among 33 men. Hanford workers reported 40 diagnoses for cancer in 2000. The increase of 19 diagnoses from 2000 to 2001 is partially the result of including diagnoses for absences lasting fewer than 5 days; 6 diagnoses, all for skin cancer, were among these shorter absences.

Prostate cancer was the most frequently reported cancer diagnosis among men. Twelve men reported 12 prostate cancer diagnoses; only 2 were over 60 years of age. None of these men had reported cancer previously. As Figure 13 shows, the rate of prostate cancer diagnoses has increased substantially since 1995. The reasons for this increase are not known. It is possible that the increase reflects growing emphasis on screening for prostate cancer among the local medical community. Alternatively, improved reporting of absences by workers could produce an apparent upward trend. We saw no evidence that any occupational group was represented in excess or that the age distribution was unusual among men reporting this disease.

**Figure 13. Prostate Cancer Among Male Hanford Workers from 1992 to 2001**

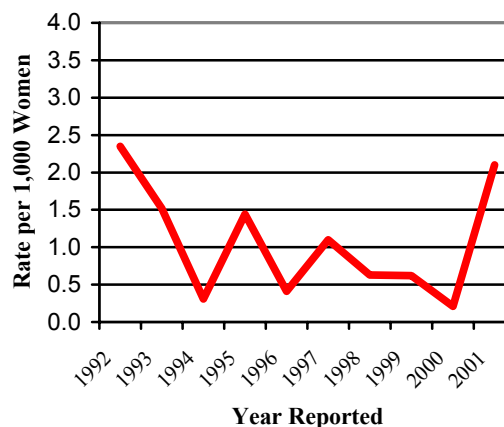


Five men reported 8 diagnoses for skin cancer of the face (4), neck and scalp (2), ear (1), and arm (1). The 21 remaining cancer diagnoses reported by men in 2001 were for 12 different areas of the body. Five men who reported cancer in 2001 had reported cancer previously between 1994-2000. Four men reported the same cancer in

2001 as in a previous year; the other man who reported skin cancer on the neck and scalp in 2001 had a previous diagnosis for an ill-defined cancer on the head, neck, and face area in 2000.

Among women, breast cancer made up 72% of the cancers reported in 2001. Twelve women reported 13 diagnoses for breast cancer, while in 2000 only 1 woman reported breast cancer. Among the 12 women reporting breast cancer in 2001, half were in the Administration group, which made up 37 percent of the women in the Hanford work force. Among the 12 women, 7 were at least 50 years old; 2 had previously reported breast cancer in 1999. Despite a noteworthy increase from the year 2000 breast cancer rate (Figure 14), the rate of approximately 2 women per 1,000 is not substantially out of the range observed in previous years, nor is there any evidence of a consistent trend. Of the remaining 5 cancer diagnoses, 4 different sites were reported. One woman who reported Hodgkin's Disease in 2001 reported the same cancer in 2000. Technical workers were 3 times more likely to report a cancer diagnosis in 2001 compared with workers in other job categories.

**Figure 14. Breast Cancer Among Female Hanford Workers from 1992 to 2001**





Women reported 25 heart/circulatory diagnoses; 17 were among women under 50 years old. High blood pressure and ischemic heart disease accounted for 24 percent of the heart/circulatory diagnoses among younger women and 63 percent of the diagnoses among older women. Five of the 25 diagnoses reported in 2001 were for absences fewer than 5 days. Five of the 9 women who reported high blood pressure or ischemic heart disease (restricted blood flow through an artery) in 2001 were aged 50 years or older.



Among men, workers aged 50 or older generally had the highest rates of heart/circulatory problems. Fifty-eight of the 92 absences among men occurred in workers aged 50 or older; 67 percent (42/63) of the diagnoses among these older workers were for high blood pressure or ischemic heart disease. Service workers were over 3 times more likely to report heart/circulatory diagnoses than were workers in other job categories.

Respiratory disease rates for women tended to be higher among younger workers, but we saw no relationship with age among men. Among women, 29 of the 61 diagnoses for respiratory disease were upper respiratory infections, 12 diagnoses were for influenza and pneumonia, and 18 were for bronchitis and asthma. Only 5 diagnoses were reported for absences lasting fewer than 5 days, suggesting the possibility that many brief absences related to respiratory disease might not be reported. Women in the Service group had the highest rates of respiratory disease in 2001, a trend that has existed since 1998.

Among men, 79 of the 122 respiratory diagnoses (65 percent) were for upper respiratory infections, 21 (17 percent) were for influenza and pneumonia, and 17 (14 percent) were for bronchitis and asthma. Thirteen diagnoses were for absences shorter than 5 days. As in 2000, respiratory disease rates among men of all ages combined were highest among workers in the Crafts and Manual Labor group. Respiratory disease was over 4 times more common among Crafts and Manual Labor workers, 3 times more common among Nuclear workers, over twice as common among Service workers, and almost twice as common among Technical workers compared with workers in other job categories. Both Service workers and Crafts and Manual Labor workers have been at higher risk of reporting a respiratory condition compared with workers in other job categories for a number of years.

Injury rates tended to be higher for older women but higher among younger men. Among men and women, the Crafts and Manual Labor group was most likely to report non-occupational injuries. Injuries were



relatively frequent in several job categories. Workers in the Service, Security, Crafts and Manual Labor, and Nuclear groups were at least 3 times more likely to report an injury than other workers. Technical workers were also at increased risk.

The risk of specific injuries varied by job category (Supporting Tables, Appendix N). Technical workers were almost 4 times more likely to report a back sprain or strain compared with workers in other job categories. Service workers were at almost 12 times the risk of a complication resulting from an injury, at over 9 times the risk of reporting an open wound to the arm, and at over 5 times the risk of reporting a bruise or sprain or strain other than to the back compared with other workers. Injury complications, open wounds of the arm, and dislocations were substantially more common among Security workers compared with other workers. Crafts and Manual Labor workers were at increased risk for many types of injuries, including unspecified effects from external causes, open wounds of the arm, back sprains or strains, leg fractures, sprains and strains other than to the back, contusions, dislocations, and for complications of medical care. Among Nuclear workers, the risk of a toxic effect from a substance other than medicine was almost 13 times greater, an injury complication almost 5 times greater, and a fractured arm or sprain or strain almost 4 times greater compared with workers in other job categories.

The overall risk of illness and injury among workers classified in each job category was compared with the risk among workers in the remaining job categories. Technical workers were at almost twice the risk, and Service, Security, Crafts and Manual Labor,

and Nuclear workers were at 2 to 3 times the risk of all injuries and illnesses compared with workers in other groups. Except for the Security group, these increased risks were also observed since 1999. Technical workers were at almost twice the risk of conditions of the muscles and skeleton and 2 to 4 times the risk of unspecified conditions, benign growths, skin conditions, and infections compared with other job categories. Among Service workers, the risk of nervous system, muscles and skeleton, and unspecified conditions was about 3 times greater than for other workers. Conditions of the genitourinary system were almost 6 times and muscles and skeleton conditions over 3 times as likely to be reported by Security workers compared with other workers. The risk of nervous system conditions was over 2 times greater; of psychological, skin, muscles and skeleton, and unspecified conditions at least 3 times greater; of genitourinary disorders over 4 times greater; and of metabolic disorders over 6 times greater in the Crafts and Manual Labor group compared with other job categories. Nuclear workers were at 2 to 3 times greater risk of muscles and skeleton conditions and disorders of the nervous and digestive systems as were workers in other job categories.



## 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 1 rate is calculated for an entire group. This allows us to make comparisons between groups with differing age distributions. Age-adjusted rates are calculated using the age distribution of the 1970 U.S. population as a reference.

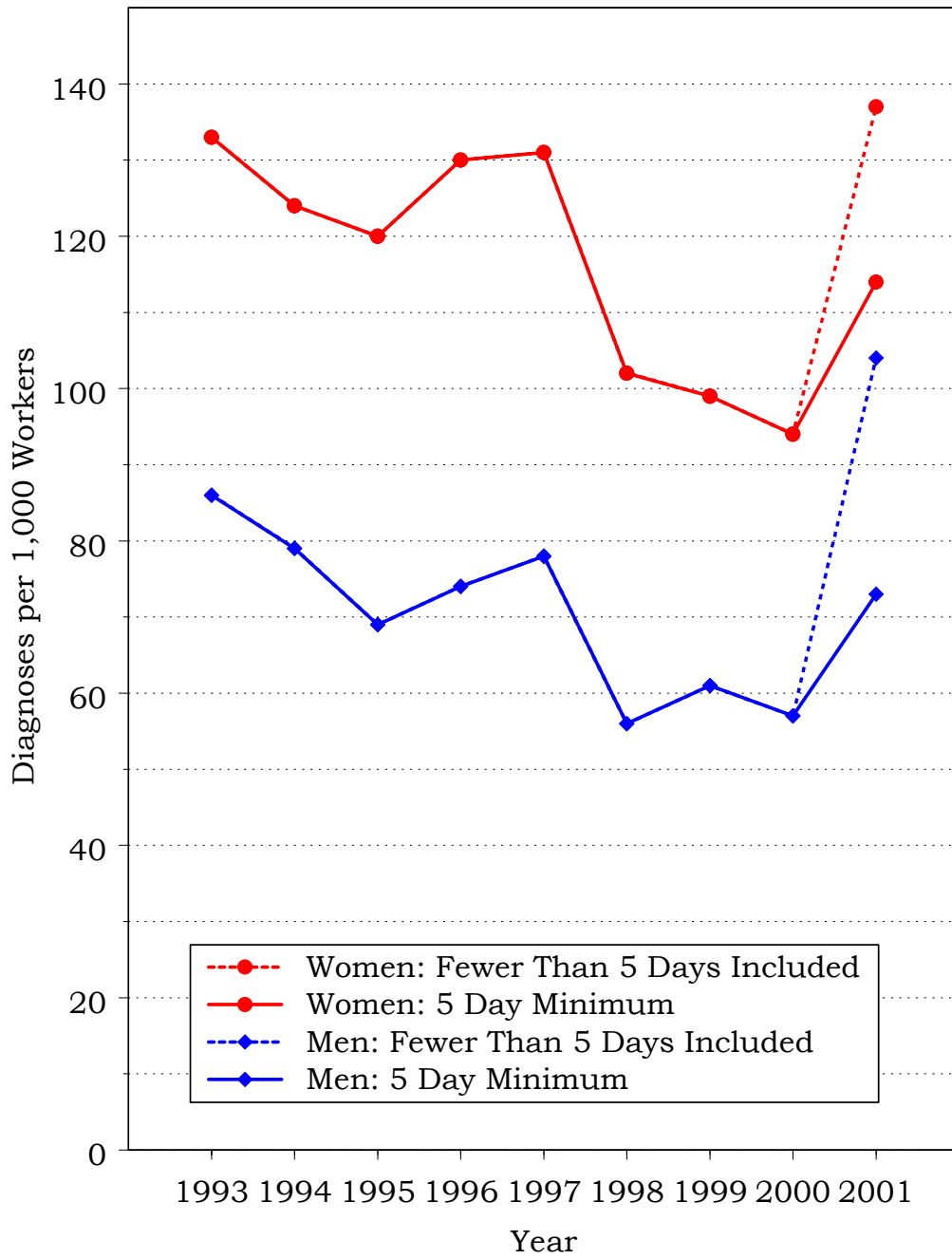
Age-adjusted rates for all illness and injury categories combined and for selected illness and injury categories are presented in Figures 15 and 16. It is important to note that the age-adjusted rates for 1994 presented in this report differ from the rates presented in the *1994 Annual Epidemiologic Surveillance Report* due to the elimination of health conditions resulting from maternity leave.

The age-adjusted rates for all illness and injury categories combined changed little from 1998 to 2000 but increased in 2001 (Figure 15). From 1993 to 2000, these rates have tended to decrease among men and women, with the overall rate among women consistently higher than that of men. Several of the rates that have shown a steady or downward trend for a number of years increased in 2001 (Figure 16). These included injuries among men and women and digestive conditions among men. The addition of absences lasting fewer than 5 days noticeably increased the rates of all injuries and illnesses combined in men and women (Figure 15). The rate of injuries among men and women and

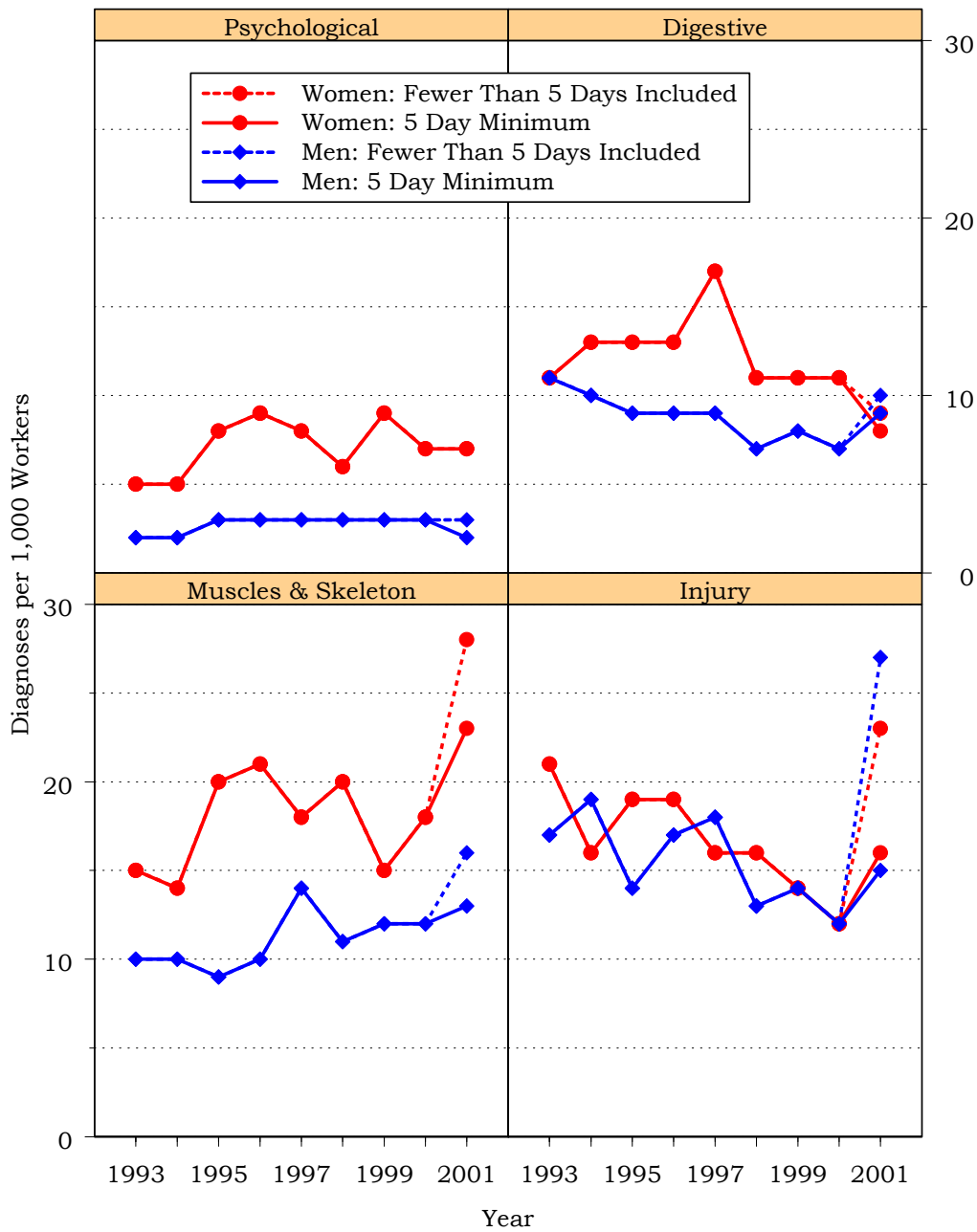
muscles and skeleton conditions among women also increased with the addition of shorter absences (Figure 16).

Age-adjusted rates for all illnesses and injuries combined are shown for the various job categories in Figure 17. Hanford has reported Service and Security job categories as 2 separate categories since 1995. Until 2001, the rates for all diagnostic categories combined remained fairly constant among men in most job categories, especially over the past 5 years. Among women, the trend in the rates has been less consistent across the job categories. The rates increased among men and women in most job categories during 2000-2001. A substantial portion of the increase was the result of adding the diagnoses for absences lasting less than 5 days. In almost all job categories, injuries were the most frequently reported diagnoses among these shorter absences; muscles and skeleton disorders and unspecified conditions also appeared frequently. This did not account for all of the increase in the rates for most job categories; the additional increase was due to an increase in all types of diagnoses in most of the job categories where an increase occurred. The dramatic changes in the rates among women in the Security, Service, and Crafts and Manual Labor groups reflect in part the instability of rates based on the small number of women in these job categories. Although these increases reflect an increase 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 15. Age-Adjusted Rates for All Diagnoses Combined Among Women and Men from 1993 to 2001**

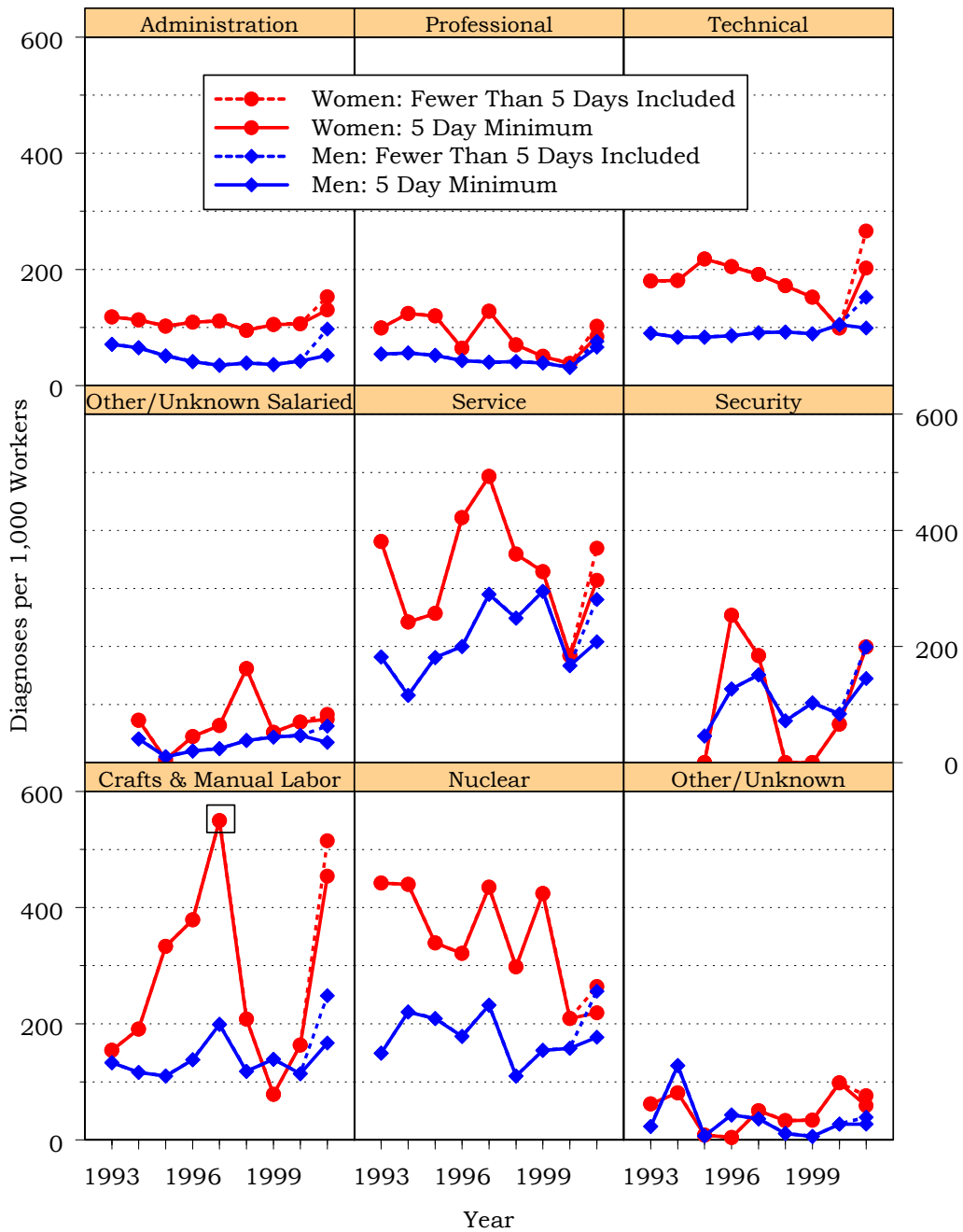


**Figure 16. Age-Adjusted Rates for Selected Diagnostic Categories Among Women and Men from 1993 to 2001**



Note: For 1993, the injury rate is based on external causes of injury data; for 1994 through 2001, the rates are based on injury and poisoning data. Psychological rates for women in 2001 for all absences including fewer than 5 days and absences with a minimum of 5 days are equal (7).

**Figure 17. Age-Adjusted Rates for All Diagnoses Combined Among Women and Men by Job Category from 1993 to 2001**



Note: Other/Unknown Salaried job category workers were included in various job categories in 1993. Security workers were included in the Service job category in 1993 and 1994. The 1997 Crafts & Manual Labor rate for women was truncated to 550 (□) for graphical presentation. The actual rate was 1,037.

## 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 2 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 10 definite sentinel health event diagnoses affecting 1 male and 4 females in 2001 (Figure 18). These diagnoses included berylliosis, a respiratory disorder, a back condition, and psychological disorders. Forty-five of 1,981 (2 percent) diagnoses were identified as possible sentinel health

events. Thirty-one of the 45 diagnoses reported by 28 workers were carpal tunnel syndrome and resulted in 1,205 lost calendar days. Twenty-one women reported 22 of these diagnoses; 7 men reported the remaining 9 diagnoses.

**Figure 18. Characteristics of SHEOs by Gender**

	Total Number of SHEO Diagnoses		Total Number of Days Absent	
	Men	Women	Men	Women
<b>Definite</b>	1	9	59	168
<b>Possible</b>	21	24	667	1,064
<b>Total</b>	22	33	726	1,232

## Disabilities Among Active Workers

No disability data were reported in 2001.

## Deaths Among Active Workers

No death data were reported in 2001.

## 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 2 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 shown in Figure 19 suggests higher rates for workers aged 40 or older, regardless of gender. Occupational injuries resulted in a total of 2,840 lost or restricted



workdays reported by 71 women and 164 men at Hanford in 2001. There were 69 women and 157 men who had 1 recordable OSHA event and 2 women and 7 men with 2 or more OSHA events. Men experienced 70 percent of all reported OSHA events, but the rate of workers with an OSHA event was the same for men and women (2 per 100 workers). The average number of workdays lost or with restricted activity was similar for women (13 days) and men (11 days). For both men and women, the average number of workdays lost or with restricted activity increased with age beginning with the 30–39 year age group.

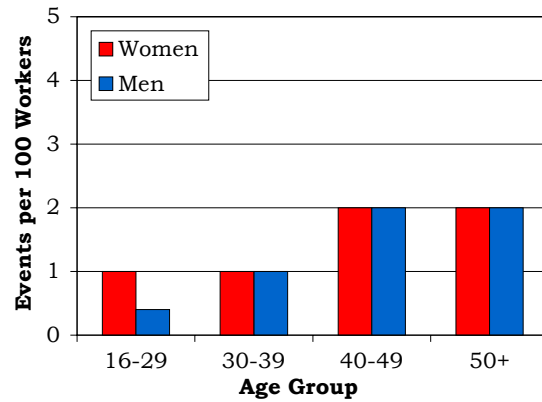


There was a 3 percent decrease in the number of OSHA-recordable events in 2001 (244) compared with the OSHA-recordable events in 2000 (251). This may reflect changes in the types of work being done at the site, improved safety performance, or changes in the availability of OSHA data.

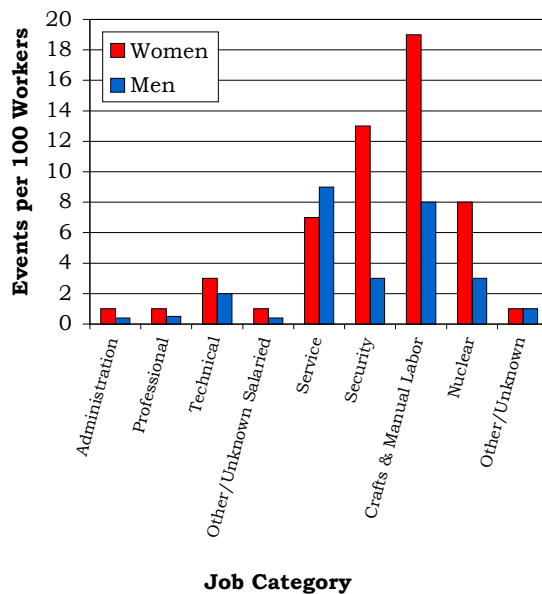
The rates of OSHA-recordable events by job category and gender are shown in Figure 20. Overall, Service workers had the highest rate of OSHA events (9 per 100 workers) and the highest average number of lost or restricted workdays (25 days). Among women, those in the Crafts and Manual Labor

and Security job categories had the highest rates of OSHA events (19 and 13 per 100 workers, respectively). Service workers reported the highest average number of lost or restricted workdays among women (32 days) and men (23 days). Among men, the highest rate of OSHA events was among Service workers (9 per 100 workers). 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 19. OSHA-Recordable Events by Gender and Age**



**Figure 20. OSHA-Recordable Events by Job Category and Gender**



## Diagnostic and Accident Categories for OSHA-Recordable Events

A total of 244 OSHA events were recorded in the OSHA 200 Logs: 121 diagnoses among women and 246 diagnoses among men, as shown in Figure 21. Sixty-one 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. Sprains and strains accounted for 37 percent of all OSHA-recordable injuries in 2001 (38 percent in 2000). Sixty-two percent of the sprains and strains were associated with overexertion and strenuous movement. Conditions related to the muscles and skeleton also occurred frequently (77/367).

Ninety-two percent (224/244) of the OSHA events were the result of an accident (Figure 22). 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 and strenuous movements accounted for 52 percent of these accidents. The second most common type of accident overall was caused by falls.

Among the 20 events not attributed to a particular accident, 7 each were attributed to respiratory conditions and skin disorders. In addition, there were 3 muscles and skeleton conditions, 2 psychological disorders, and 1 beryllium sensitization.

**Figure 21. OSHA-Recordable Diagnoses by Diagnostic Category and Gender**

Diagnostic Category	Gender	
	Women	Men
Benign Growths	0	1
Digestive	0	1
Muscles & Skeleton	24	53
Nervous System	5	6
Psychological	4	0
Respiratory	8	7
Skin	2	5
Unspecified Symptoms	16	10
Injury	62	163
Fractures – Upper Limb	1	4
Fractures – Lower Limb	6	5
Dislocations	4	2
Back Sprains & Strains	13	25
Other Sprains & Strains	11	35
Open Wounds – Head, Neck, Trunk	3	14
Open Wounds – Upper Limb	6	23
Open Wounds – Lower Limb	0	2
Superficial Injuries	2	11
Bruises	3	18
Crushing Injuries	0	1
Foreign Bodies Entering Orifice	6	15
Burns	1	3
Unspecified Injuries	3	2
Adverse Reactions to Non-Medical Substances	2	2
Adverse Reactions to External Causes	1	1

**Figure 22. OSHA-Recordable Accidents by Type and Gender**

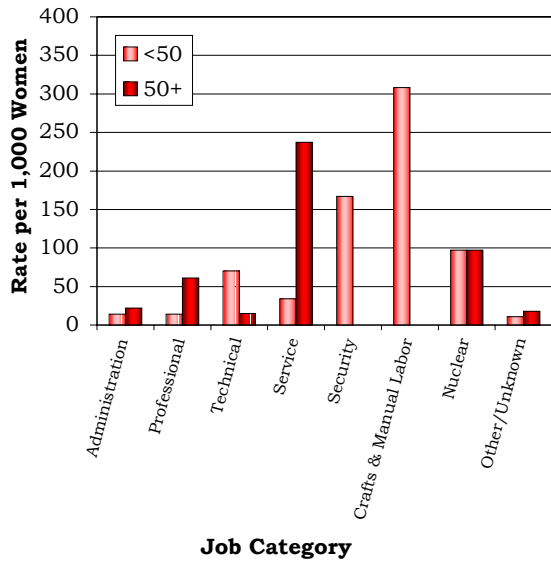
Accident Category	Gender	
	Women	Men
	Number of Accidents	Number of Accidents
Motor Vehicle Traffic	1	2
Motor Vehicle Non-Traffic	2	3
Poisoning – Non-Medicinal	2	1
Falls	9	31
Fire	0	1
Natural/Environmental Factors	2	3
Submersion/Suffocation/Foreign Bodies	7	11
Other Accidents	42	107
Struck by an Object	8	27
Caught Between Objects	1	3
Machinery	0	3
Cutting/Piercing Instrument/Object	4	16
Firearm	0	1
Hot, Corrosive, or Caustic Material/Steam	1	3
Overexertion/Strenuous Movements	25	52
Repetitive Trauma	3	1
Unspecified Accident	0	1
Total	65	159

**Rates of OSHA-Recordable Events**

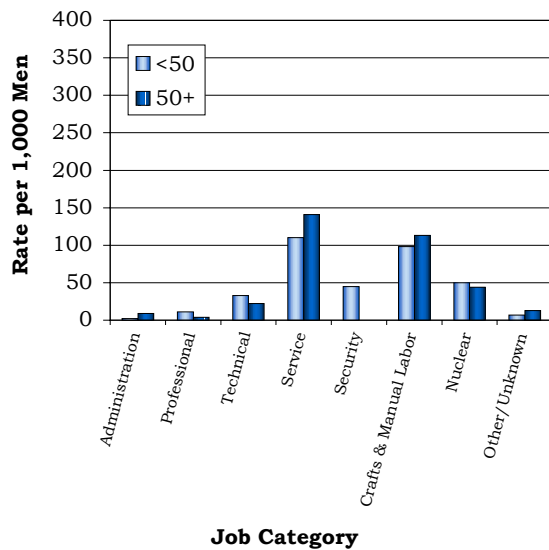
The rates of all diagnoses combined for OSHA-recordable events by age and job categories and gender are shown in Figures 23 and 24. Women in the Crafts and Manual Labor, Security, Service, and Nuclear groups and men in the Service and Crafts and Manual Labor job categories tended to have higher rates than other job categories for all diagnoses combined. There was no consistent pattern between rates and age among men or women. Most of the OSHA health conditions involved an 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 both men and women.

Hanford workers missed 662 workdays and had 2,178 restricted days as a result of occupational illnesses and injuries. Crafts and Manual Labor workers experienced over one-third (34 percent) of the lost workdays and 41 percent of the restricted workdays, although they comprised about 6 percent of the work force. Service workers, 2 percent of the work force, accounted for almost one-fourth (24 percent) of the restricted workdays and almost one-third (31 percent) of the lost workdays. Technical and Nuclear workers together, a combined 13 percent of the work force, reported an additional 22 percent of the restricted workdays. Sixty-five percent of the lost workdays were reported by Service and Craft and Manual Labor workers. Two of the larger groups, Administration and Professional (each 22 percent of the work force), reported 5 percent of the restricted workdays and 9 percent of the workdays lost.

**Figure 23. OSHA-Recordable Rates by Age and Job Categories Among Women, All Diagnoses Combined**



**Figure 24. OSHA-Recordable Rates by Age and Job Categories Among Men, All Diagnoses Combined**



These percentages are similar to prior years. Crafts and Manual Labor workers comprised only 5 percent of the work force in 2000 and had the highest percentage of lost and restricted workdays (34 percent). In 1999, Nuclear and Crafts and Manual Labor workers, 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 2 job categories also were responsible for the highest percentages of lost and restricted workdays in 1998.

We compared specific job categories with all other job categories to determine which groups were at particularly high risk for various injuries, relative to the remainder of the work force. Crafts and Manual Labor workers were almost 8 times more likely to experience an injury as other workers. Service workers were 11 times more likely and Crafts and Manual workers almost 9 times more likely to suffer a sprain or strain of the back. Crafts and Manual Labor workers, Service workers, and Nuclear workers were all at substantially higher risk for a sprain or strain other than to the back, compared with other workers. Service workers were at 27 times higher and Crafts and Manual Labor workers at 5 times higher risk for open wounds of the head, neck, or trunk. Crafts and Manual Labor workers and Service workers were more likely to report muscles and skeleton disorders (7 and 5 times, respectively), and respiratory

conditions were more likely among Technical workers (15 times). Conditions of the nervous system were 8 times more likely among Service workers. Security workers were more likely to report fractures of a lower limb (12 times). Nuclear workers were 20



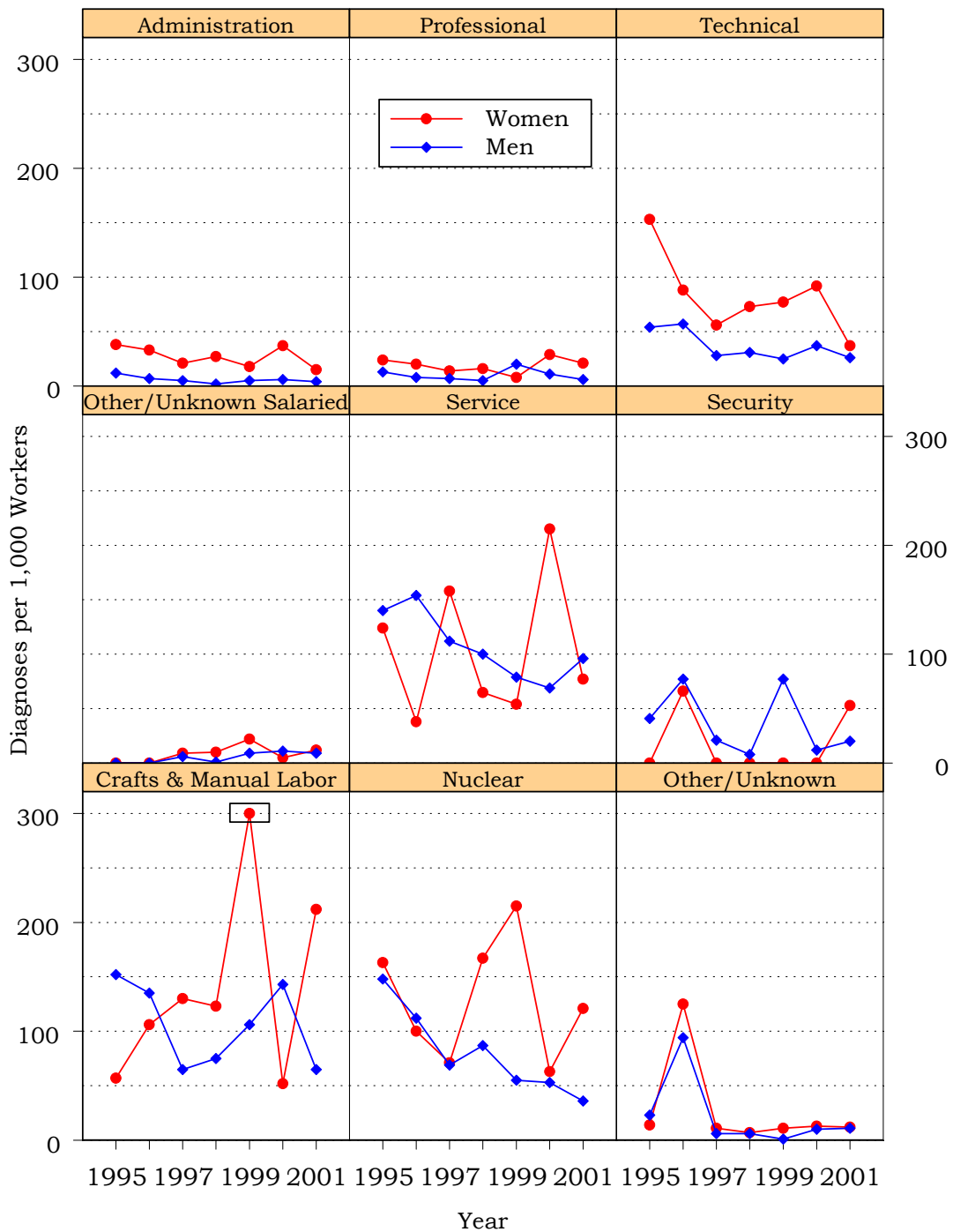
times more likely to report a superficial injury. As is apparent from these comparisons, workers in a variety of occupations involving hands-on activities, relatively greater physical demands, or work in more challenging environments were at generally higher risk than were jobs primarily involving office work. Further details about relative risks of various injuries in specific job categories can be found in the Supporting Tables for this report.

## Time Trends for OSHA-Recordable Events

For the work force as a whole, there were no significant changes in injury rates from 2000 to 2001 for either men or women. While the overall rates did not change greatly for the majority of the job categories from 1995 through 2000, the 2001 rates show several changes (Figure 25). Among men, rates decreased in most job categories. After a significant decrease in rates from 1999 to 2000, a slight increase was noted among men in the Security job category. Among women in Administration, Technical, and Service groups, there was a noticeable decrease in rates from 2000 to 2001. The 4-year trend of no OSHA events for female Security workers ended in 2001 with a sharp increase. Rates increased sharply for women in the Crafts and Manual Labor and Nuclear job categories.



**Figure 25. Age-Adjusted Rates for All OSHA-Recordable Diagnoses Combined Among Women and Men by Job Category from 1995 to 2001**



Note: The 1999 Crafts & Manual Labor rate for women was truncated to 300 (□) for graphical presentation. The actual rate was 583.



## Glossary

**Adjustment:** A mathematical procedure for rates in which the effects of differences of a characteristic (such as age or gender) between groups have been removed. The purpose of adjustment is to allow comparisons between two or more groups with the effect of the differences for the characteristic removed.

**Age-Adjusted Rate:** A rate that has been mathematically adjusted to account for the effects of differences in the age composition between groups.

**Age-Specific Rate:** A rate that is calculated for a specific age group (e.g., 16 to 29 years old). Only people in the specific age group are included in the calculation of the rate.

**Confidence Interval:** A range of values determined by the degree of random variability in the data. The width of the confidence interval is affected by the size of the group being studied and how often the event whose true value is sought occurs. Generally, as the size of the group or the frequency of the event increases, the width of the confidence interval decreases. The level of confidence, for example a 95 percent confidence level, indicates the percentage (e.g., 95 percent) of time that the true value is expected to fall within the confidence interval if the mathematical procedure is repeated 100 times.

**Demographics:** Characteristics of human populations related to their size, density, age distribution, and vital status.

**Diagnosis (diagnoses):** Identification of a disease or health condition from signs and symptoms.

**Diagnosis Rate:** The number of occurrences of a given disease or health condition observed during a given time period per the number of workers at risk of getting that disease during that time period. It is usually multiplied by 100 or 1,000 to produce a rate expressed as a convenient number.

**Diagnostic Category:** A particular type of disease, a group of related health conditions, or diseases that all affect the same organ system.

**Epidemiologic Surveillance:** The ongoing evaluation of the health of a human population which is based on the collection and interpretation of demographic and health information for that population.

**Epidemiology:** The study of the distribution and determinants of diseases and health conditions in human populations.

**ICD-9-CM Code:** An abbreviation for the *International Classification of Diseases, 9th Revision, Clinical Modification*. An internationally accepted standardized system for the classification of disease and health data collected from medical records.

**OSHA:** An acronym for the Occupational Safety and Health Administration.

**OSHA Event:** An abbreviation used throughout this report for an OSHA-Recordable Event.

**OSHA-Recordable Event:** An accident that occurs on the job and involves fatalities (regardless of time between injury and death), time lost from work, transfer of employment, medical treatment other than first aid, loss of consciousness, or restriction of work or motion. Also included is any diagnosed occupational health event reported to the employer that is neither fatal nor results in workdays lost. By law, these events are recordable in the OSHA 200 Log.

**Person-Year:** A unit of measurement combining the number of people being studied with the time that each was observed equivalent to 1 person followed for 1 year. For example, 5 people followed for 1 year contribute 5 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.

<b>Abbreviated Categories Used in the Annual Report</b>	<b>ICD-9-CM Codes</b>
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**

<b>All conditions</b>	001-V82	All reported health events
<b>Infectious and parasitic diseases</b>	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
<b>Malignant neoplasms</b>	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)
<b>Benign neoplasms and neoplasms of uncertain behavior and unspecified nature</b>	210-229 235-239	Tumors that are not cancerous or do not exhibit cancerous behavior, regardless of the part of the body affected
<b>Endocrine, nutritional, and metabolic diseases and disorders of the immune system</b>	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

<b>Disorders of the blood and blood forming organs</b>	280-289	Anemia and hemophilia (excludes leukemia)
<b>Mental disorders</b>	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
<b>Diseases of the nervous system and sense organs</b>	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



<b>Diseases of the circulatory system</b>	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

<b>Diseases of the respiratory system</b>	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
<b>Diseases of the digestive system</b>	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

<b>Complications of pregnancy, childbirth, and the puerperium</b>	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
<b>Diseases of the skin and subcutaneous tissue</b>	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

<b>Diseases of the musculoskeletal system and connective tissue</b>	710-739	Arthritis, systemic lupus erythematosus, ankylosing spondylitis, herniated intervertebral disk (“slipped disk”), lumbago, sciatica, rheumatism, tendonitis, and osteoporosis
• Arthropathies and related disorders	710-719	Arthritis; joint pain and stiffness; and other diseases of the connective tissue which supports and connects internal organs, forms bones and blood vessel walls, and attaches to bones
• Dorsopathies	720-724	Swelling of the spine; herniated, slipped, and ruptured disk; rheumatoid arthritis of the spine; lumbago; and sciatica
• Rheumatism, excluding the back	725-729	Swelling and degeneration of joints, muscles, tendons; tennis elbow; and bursitis
• Osteopathies, chondropathies, and acquired musculoskeletal deformities	730-739	Fracture caused by bone disease; osteoporosis; curvature of the spine; flat foot; hammer toe; and development of deformities of the nose, toes, feet, legs, arms, and hands
<b>Congenital anomalies</b>	740-759	Spina bifida; cleft palate; harelip; and various chromosomal anomalies, such as Klinefelter’s syndrome
<b>Certain conditions originating in the perinatal period</b>	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
<b>Symptoms, signs, and ill-defined conditions</b>	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
<b>Injury and poisoning</b>	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
<b>Supplementary classifications related to personal or family history of disease</b>	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
<b>Supplementary classifications related to health care for reproduction and child development</b>	V20-V28	Problems related to pregnancy, postpartum care, contraception, outcome of delivery, and physical development of child
<b>Contact with health services for reasons other than illness or injury</b>	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**