2002

Hanford Site Annual Illness and Injury Surveillance Report

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www.eh.doe.gov/health/epi/surv

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At A Glance

The Hanford work force decreased 25 percent from a high of 19,655 employees in 1994 to a low of 14,660 in 2002. The average age of the work force has shifted gradually over the past 8 years. The percentage of workers under age 40 has decreased, and the percentage of workers aged 40 or older has increased.

There were 799 diagnoses reported by female workers and 1,440 diagnoses reported by male workers in 2002. The large increase in the number of reported diagnoses from 2000 to 2001 did not continue into 2002. The increase in the number of reported diagnoses from 2001 to 2002 was 13 percent.

Workers in the Crafts and Manual Labor job category have had high rates of diagnoses since 1998 for both men and women.

Hanford workers reported 40 diagnoses in 2000 and 59 diagnoses in 2001 for cancer. The increase of 19 diagnoses from 2000 to 2001 and 24 diagnoses from 2001 to 2002 is partially the result of including diagnoses for absences lasting fewer than 5 days. About one-third of the increase in 2001 and 2002 resulted from these shorter absences.

The rate of prostate cancer diagnoses, the most frequently reported cancer among men, which has increased substantially since 1995, continued to increase in 2002. The number of men reporting a prostate cancer diagnosis more than doubled from 2001. We saw no evidence that any occupational group was represented in excess or that the age distribution was unusual among men reporting this disease.

Among women, breast cancer made up 53 percent of the 19 cancer diagnoses reported in 2002. Nine women reported 10 diagnoses for breast cancer. This is a slight decrease from the 12 women who reported breast cancer in 2001.

Both male 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.

Several of the rates that have shown a steady or downward trend for a number of years have increased since 2001. These included injuries among men and women and muscles and skeleton conditions among men.

There were 305 definite sentinel health event diagnoses affecting 115 males and 50 females in 2002. This is a significant increase from 2001 when only 10 definite sentinel health event diagnoses were reported. This 2002 increase was impacted by the inclusion of more in-depth medical information in the event reporting.

The decrease in the number of OSHA-recordable events from 2000 (251) to 2001 (244) continued in 2002 (212). During this 3-year period, the OSHA-recordable events decreased 16 percent. 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.

As in 2001, Service workers had the highest rate of OSHA events.

Ninety-five percent (201/212) of the OSHA events were the result of an accident. Overexertion and strenuous movements accounted for 66 percent of these accidents. The second most common type of accident overall was caused by falls.

For the work force as a whole, there were no significant changes in injury rates from 2001 to 2002 for either men or women. In 2002, OSHA-recordable rates continued to decrease in several job categories among both men and women.

Introduction

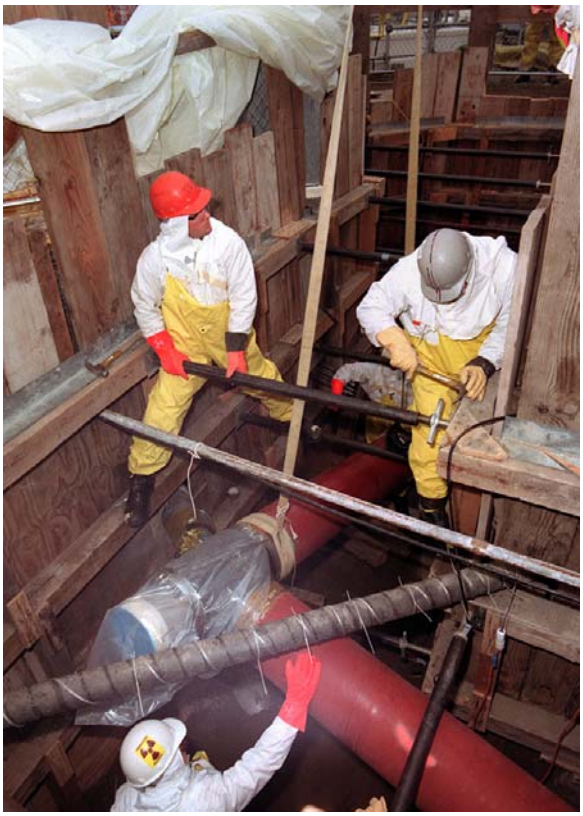
The U.S. Department of Energy's (DOE) commitment to assuring the health and safety of its workers includes the conduct of illness and injury surveillance activities that provide an early warning system for health problems among workers. The Illness and Injury Surveillance Program monitors illnesses and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

This report provides a summary of illness and injury surveillance data collected from Hanford during the period January 1, 2002 through December 31, 2002. The data were collected by a coordinator at Hanford and submitted to the Illness and Injury Surveillance Data Center at Oak Ridge Institute for Science and Education where quality control procedures and data analyses were performed. The analyses were interpreted and the final report prepared by the DOE Office of Epidemiology and Health Surveillance.

The information in this report provides highlights of the data analyses conducted on the 2002 data collected from Hanford. Surveillance reports and additional Supporting Tables are posted on the Office of Epidemiology and Health Surveillance Web site **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 2002 report includes sections on time trends that provide comparative information on the health of the work force from 1993 through 2002.

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 two 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 the defense production. By the 1990s, changing world conditions eventually halted defense production at Hanford. Hanford's current mission includes the safe cleanup and management of the site's legacy wastes and the development and deployment of science and technology. In 1998, Hanford's last plutonium production reactor, N Reactor, was deactivated.

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 their plutonium and is significant in terms of reducing risk to the 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.

Congress created the Office of River Protection (ORP) 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. Together with the State of Washington Department of Ecology, the DOE negotiated an aggressive schedule for pumping the waste. By the end of 2002, more than 2.5 million gallons of liquid radioactive waste had been removed successfully from aging underground tanks at the Hanford Site.

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 - 2002

A total of 14,660 Hanford employees were included in illness and injury surveillance in 2002, 483 fewer workers than were present in 2001. The gender and age distribution of the 2002 work force is shown in Figure 1. Significant features of the work force include:

1. There were 4,549 (31 percent) women and 10,111 (69 percent) men in the work force.

2. The average age of male workers at Hanford was 46 years; the average age of female workers was 42 years.

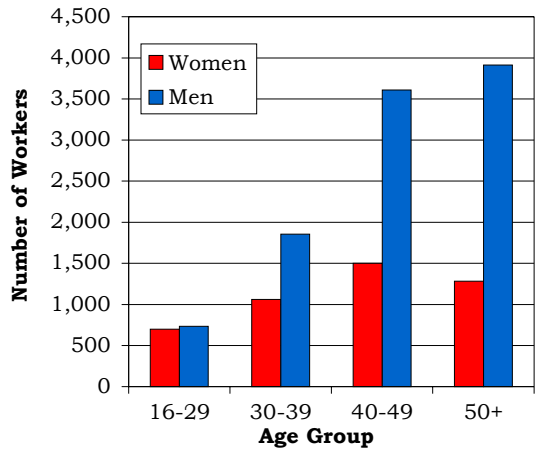
3. There was no information on the distribution of workers by race.

4. The Hanford work force decreased 25 percent from a high of 19,655 employees in 1994 to a low of 14,660 in 2002.

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 8 years. The percentage of workers under age 40 has decreased, and the percentage of workers aged 40 or older has increased.

Figure 1. The Work Force by Gender and Age



Individual job titles reported by Hanford were grouped into job categories because there were either too few workers or health events within a particular job title, limiting the analyses that could be conducted. 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 30 percent 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. Thirty-seven percent of the women were in the Administration group but only 15 percent of men were in this group. The Professional group included 28 percent of the men and 12 percent of the women in the work force**.** The Crafts and Manual Labor job category included 11 percent of the men in the work force but less than 1 percent of the women.

Figure 2. The Work Force by Job Category and Gender

Job Category	Women	Men
Administration	1,672 37%	1,504 15%
Professional	563 12%	2,781 27%
Technical	324 7%	757 7%
Other/Unknown Salaried	462 10%	967 10%
Service	92 2%	227 2%
Security	8 <1%	185 2%
Crafts & Manual Labor	44 1%	1,087 11%
Nuclear	164 4%	782 8%
Other/Unknown	1,220 27%	1,821 18%

Number and Length of Absences

A Note to the Reader:

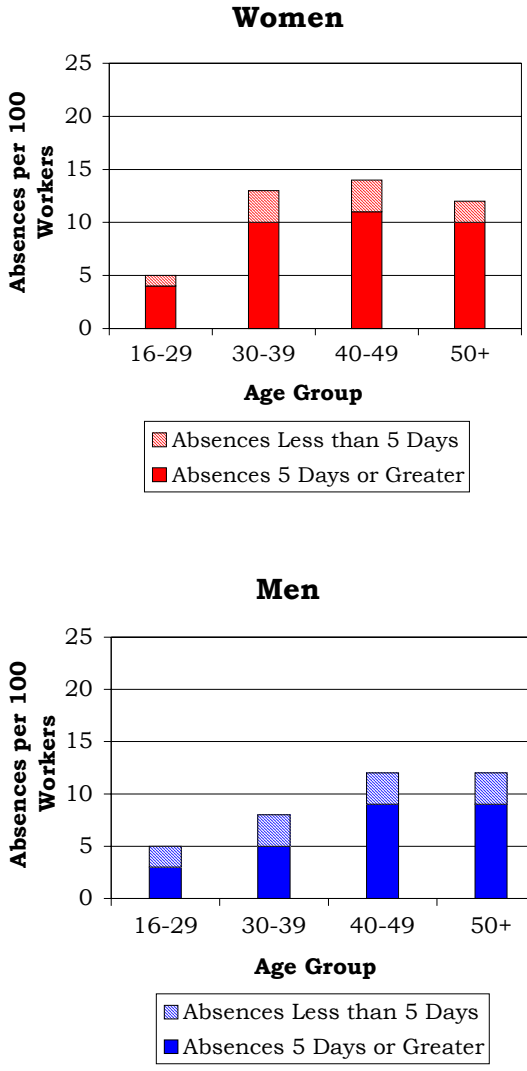
Prior to the year 2001 report, illness and injury surveillance at Hanford examined illness and injury absences of 5 or more consecutive workdays (also referred to as "5-day absences"). This approach is based on DOE Order 440.1 that requires contractor management to notify Occupational Medicine when a 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, with 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 all illness and injury surveillance reports from 2001 onward. 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 41 absences due to maternity leave reported by 41 women and 8 absences due to elective surgery or procedures not related to the treatment of an illness or injury reported by 8 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 542 absences, resulting in an absence rate of 12 per 100 workers (542/4,549). The absence rate among men was about 10 per 100 workers (1,057/10,111). The increase in the absence rate of 60 percent for women and 69 percent for men from 2000 to 2001 did not persist into 2002. The year of first reporting absences lasting less than 5 days was in 2001, which resulted in the large increase in the absence rate from 2000 to 2001.

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 rate of absence at least as great as men in all age groups. As in 2000 and 2001, 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. This same trend was seen for women in 2001.

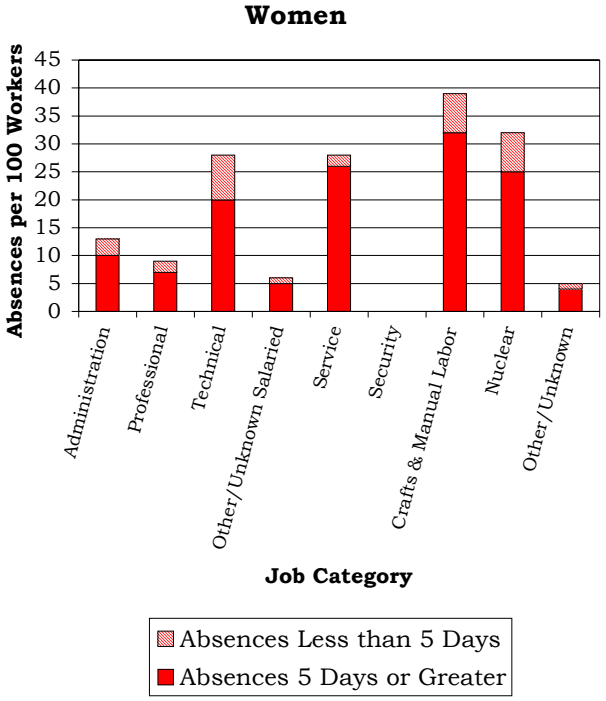
The average length of absence by gender and age is shown in Figure 4. The average length of absence was 33 days for women and 28 days for men. Absences among women averaged 2 to 9 days longer than absences among men in the same age group. The average length of absence increased with age among men and women up to age 50.

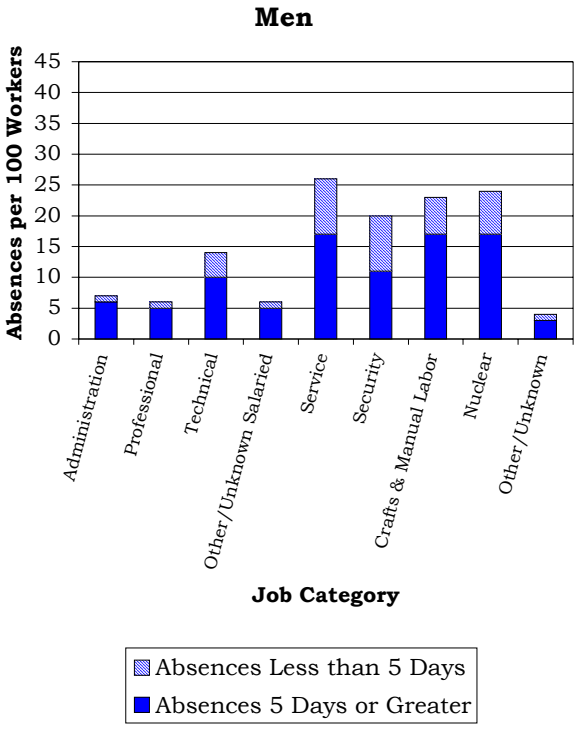
Figure 4. Number of Days Absent by Gender and Age

Gender	Age	Number of Absences		Number of Days Absent	
		< 5 Days	≥ 5 Days	Total	Average
Women	16-29	6	28	863	25
	30-39	36	105	4,575	32
	40-49	36	172	7,503	36
	50+	26	133	4,899	31
	Total	104	438	17,840	33
Men	16-29	15	23	868	23
	30-39	45	96	3,231	23
	40-49	111	308	12,822	31
	50+	96	363	13,104	29
	Total	267	790	30,025	28

Figure 5 presents the absence rate by job category for men and women. Women had higher rates of absence than did men for every job category except the Security and Other/ Unknown Salaried groups. The 8 women in the Security group did not report any absences in 2002. The absence rates were highest among female Crafts and Manual Labor workers (39/100 women) and among male Service workers (26/100 men).

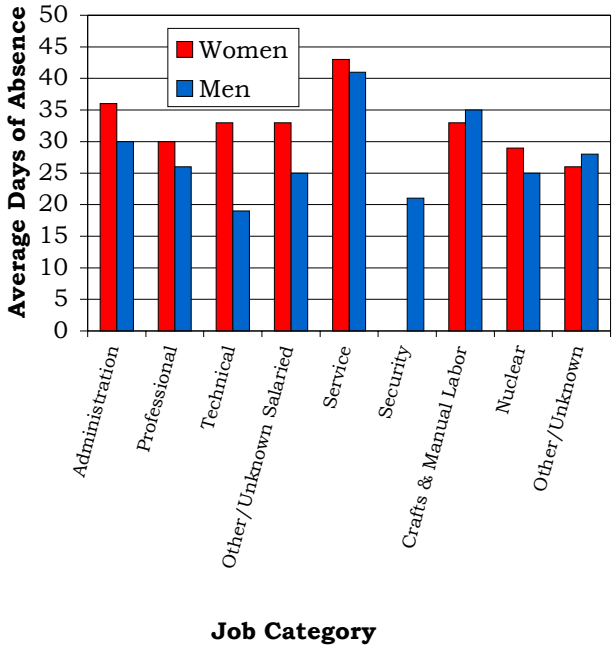
Figure 5. Absence Rate by Job Category and Gender





As shown in Figure 6, the average length of absence also varied by job category. Women had longer absences than did men in every job category except the Security, Crafts and Manual Labor, and Other/Unknown groups. Among men and women, workers in the Service job category had the longest average absences, 41 days and 43 days, respectively.

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



Diagnostic Categories

Illness and injury 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. Illness and injury 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 Figures 7a and 7b. 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 799 diagnoses reported by female workers and 1,440 diagnoses reported by male workers in 2002. The large increase in the number of reported diagnoses from 2000 to 2001 did not continue into 2002. The first year for including absences lasting fewer than 5 days was 2001, which explained the increase in diagnoses of 49 percent for women and 70 percent for men from 2000 to 2001. The increase in the number of reported diagnoses from 2001 to 2002 was 13 percent.

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	4	23	952
Blood	0	1	37
Cancer	0	19	923
Digestive	7	49	1,459
Endocrine/ Metabolic	2	11	315
Existing Birth Condition	0	0	0
Genitourinary	6	63	2,004
Heart/ Circulatory	4	26	719
Infections/ Parasites	2	13	574
Injury	45	115	3,867
Miscarriage	1	3	48
Muscles & Skeleton	39	107	4,230
Nervous System	9	43	1,918
Psychological	4	35	2,369
Respiratory	12	68	1,352
Skin	3	6	233
Unspecified Symptoms	33	46	1,661

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

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	10	14	325
Blood	0	1	7
Cancer	8	62	2,662
Digestive	22	125	3,327
Endocrine/ Metabolic	4	18	796
Existing Birth Condition	2	0	5
Genitourinary	8	19	410
Heart/ Circulatory	22	91	3,234
Infections/ Parasites	4	27	680
Injury	100	227	8,170
Miscarriage	0	0	0
Muscles & Skeleton	64	196	8,429
Nervous System	13	64	2,164
Psychological	5	38	2,181
Respiratory	18	107	1,303
Skin	18	20	640
Unspecified Symptoms	46	87	2,431

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

Women accrued 17,840 lost calendar days due to illness and injury. Four diagnostic categories accounted for 58 percent of all reported conditions: injuries, muscles and skeleton, respiratory, and unspecified symptoms. Major contributors to these diagnostic categories are shown in Figure 7c. Conditions of the muscles and skeleton and injuries resulted in the most lost calendar days among women.

Men accrued 30,025 lost calendar days due to illness and injury. The most frequently reported diagnoses, injuries, muscles and skeleton conditions, digestive disorders, and unspecified symptoms, accounted for 60 percent of all reported diagnoses. Figure 7d shows major contributors to these diagnostic categories among men. The largest number of lost calendar days among men was due to muscles and skeleton conditions and injuries.

Figure 7c. Common Diagnoses Among Female Hanford Workers in 2002

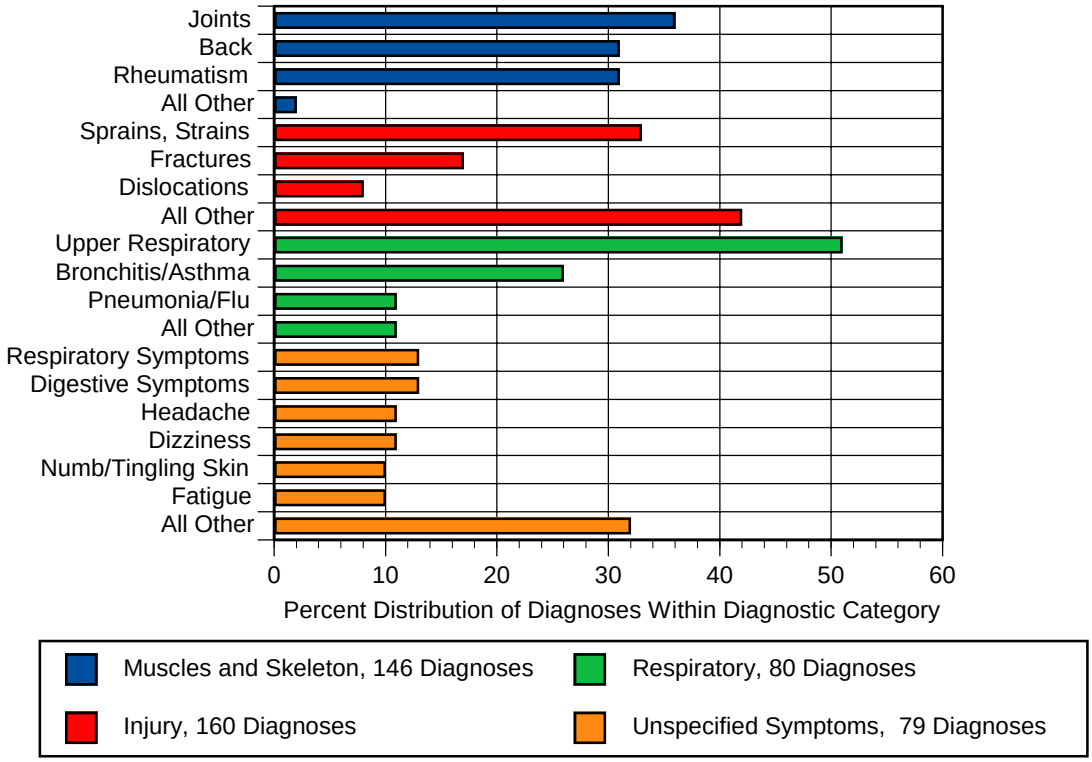
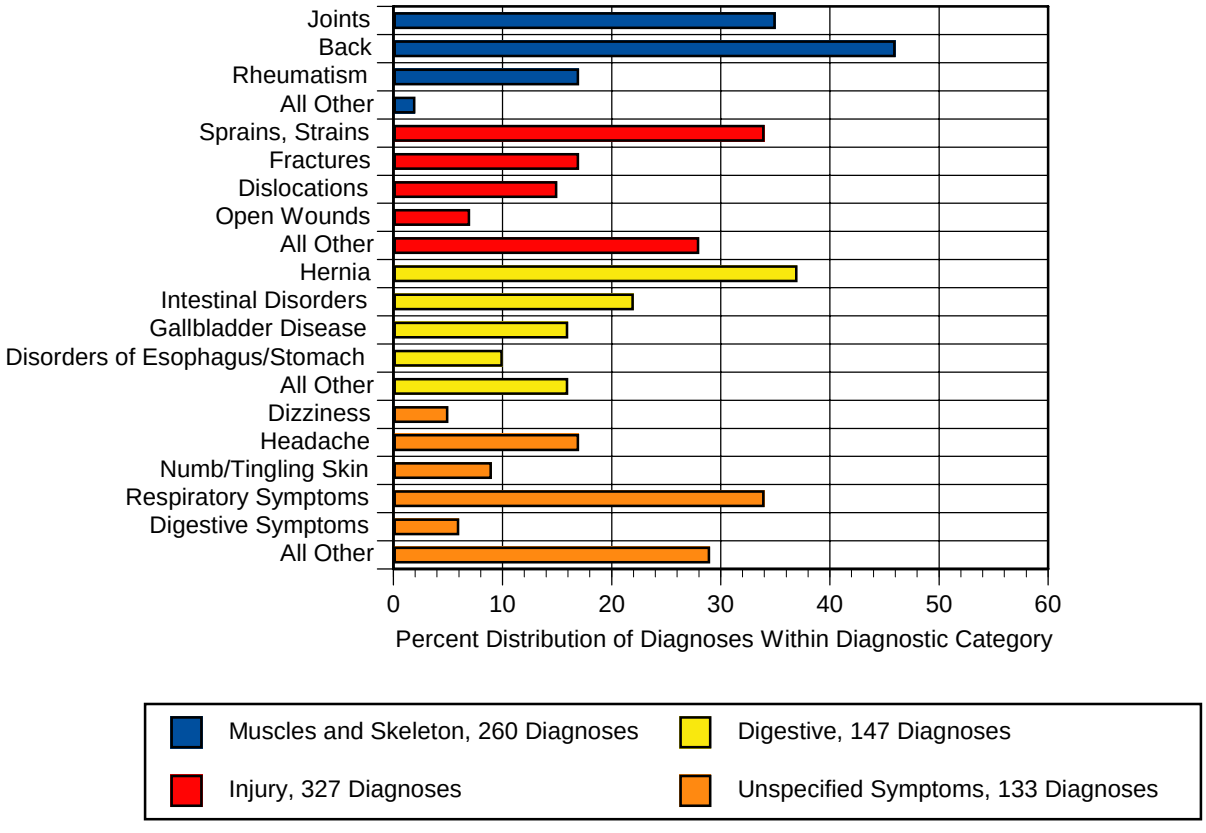


Figure 7d. Common Diagnoses Among Male Hanford Workers in 2002



The most frequently reported health conditions varied somewhat with age among men and women. Injuries and muscles and skeleton disorders were

the most frequently reported diagnoses among men and women in all age groups, except men under 30 years of age. Relatively few diagnoses were reported among workers 16 to 29 years old. 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 most job categories among men and women.

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

Job Category	Men	Women
Administration	Injury (26) Muscles & Skeleton (25) Digestive (19)	Muscles & Skeleton (57) Injury (54) Unspecified Symptoms (34)
Professional	Injury (41) Heart/Circulatory (35) Muscles & Skeleton (32)	Injury (17) Respiratory (15) Muscles & Skeleton (6)
Technical	Muscles & Skeleton (31) Injury (23) Digestive (18)	Muscles & Skeleton (29) Injury (25) Unspecified Symptoms (23)
Other/Unknown Salaried	Muscles & Skeleton (15) Digestive (14) Respiratory (12)	Muscles & Skeleton (9) Digestive (8) Injury (8)
Service	Injury (21) Muscles & Skeleton (21) Unspecified Symptoms (9)	Respiratory (9) Injury (6) Digestive (5)
Security	Injury (12) Digestive (8) Unspecified Symptoms (8)	None
Crafts & Manual Labor	Injury (100) Muscles & Skeleton (59) Respiratory (38)	Injury (11) Cancer (2) Digestive (2) Respiratory (2)
Nuclear	Injury (69) Muscles & Skeleton (50) Unspecified Symptoms (36)	Injury (20) Muscles & Skeleton (14) Genitourinary (10)
Other/Unknown	Injury (24) Muscles & Skeleton (20) Heart/Circulatory (10)	Muscles & Skeleton (27) Injury (19) Digestive (10) Genitourinary (10)

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, Figures 7a and 7b show that men reported 125 diagnoses and women reported 80 diagnoses involving respiratory conditions during 2002. Men, therefore, reported over 50 percent more respiratory diagnoses than 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 2002? 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:

125 injury diagnoses ÷ 10,111 men = .012 x 1,000 = 12 injury diagnoses per 1,000 men

80 injury diagnoses ÷ 4,549 women = .018 x 1,000 = 18 injury diagnoses per 1,000 women

Comparing these rates now correctly suggests that the rates of reported respiratory diagnoses were 50 percent higher for women compared with 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 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 9. Four groups of diagnoses of particular interest to workers are presented in Figure 10: cancer, heart/circulatory system, respiratory system, and injury

Figure 9. Rates for All Illnesses and Injuries Combined by Job Category, Gender, and Age

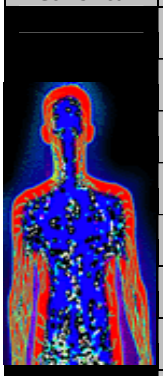
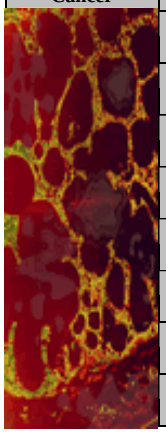
Diagnostic Category	Rate per 1,000			
All Illnesses & Injuries Combined	Job Category	Age	Men	Women
	Administration	<50	69	214
		50+	103	164
	Professional	<50	77	101
		50+	103	148
	Technical	<50	181	440
		50+	197	472
	Service	<50	370	370
		50+	284	421
	Security	<50	223	0
		50+	405	0
	Crafts & Manual Labor	<50	273	581
		50+	385	231
	Nuclear	<50	318	402
		50+	432	625
	Other/Unknown	<50	57	73
		50+	76	121

Figure 10. Rates for Selected Diagnostic Categories by Job Category, Gender, and Age

Diagnostic Category	Rate per 1,000			
Cancer	Job Category	Age	Men	Women
	Administration	<50	4	3
		50+	8	9
	Professional	<50	5	0
		50+	16	7
	Technical	<50	5	16
		50+	5	14
	Service	<50	0	0
		50+	12	0
	Security	<50	7	0
		50+	135	0
	Crafts & Manual Labor	<50	2	0
		50+	12	154
	Nuclear	<50	5	8
		50+	43	0
	Other/Unknown	<50	2	1
		50+	2	0

Diagnostic Category	Rate per 1,000			
Injury	Job Category	Age	Men	Women
	Administration	<50	17	32
		50+	18	33
	Professional	<50	20	17
		50+	9	67
	Technical	<50	33	75
		50+	22	83
	Service	<50	103	74
		50+	74	53
	Security	<50	68	0
		50+	54	0
	Crafts & Manual Labor	<50	87	355
		50+	98	0
	Nuclear	<50	100	114
		50+	43	156
	Other/Unknown	<50	12	17
		50+	13	10

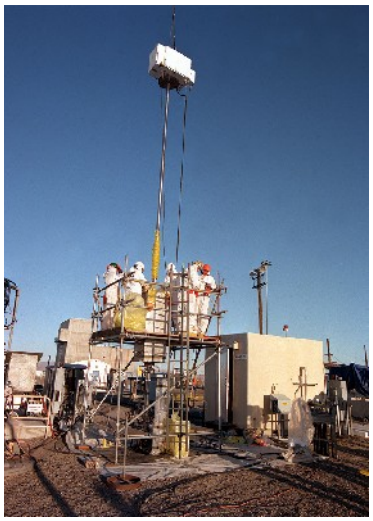
Diagnostic Category	Rate per 1,000			
Heart/ Circulatory	Job Category	Age	Men	Women
	Administration	<50	10	8
		50+	13	15
	Professional	<50	7	2
		50+	20	7
	Technical	<50	10	12
		50+	27	14
	Service	<50	0	37
		50+	25	0
	Security	<50	0	0
		50+	0	0
	Crafts & Manual Labor	<50	10	0
		50+	29	0
	Nuclear	<50	5	0
		50+	43	63
	Other/Unknown	<50	3	1
		50+	12	3

Diagnostic Category	Rate per 1,000			
Respiratory	Job Category	Age	Men	Women
	Administration	<50	0	18
		50+	5	10
	Professional	<50	5	24
		50+	6	34
	Technical	<50	14	32
		50+	16	97
	Service	<50	41	93
		50+	25	105
	Security	<50	14	0
		50+	81	0
	Crafts & Manual Labor	<50	31	32
		50+	39	77
	Nuclear	<50	27	23
		50+	31	63
	Other/Unknown	<50	8	4
		50+	7	10

Women generally had higher rates than men for all diagnoses combined in all job categories regardless of age. Older workers tended to have higher rates than younger workers regardless of job category. Female workers in the Crafts and Manual Labor, Technical, and Nuclear groups were at the highest risk for illness or injury. Among men, workers in the Service, Crafts and Manual Labor, and Nuclear groups were at highest risk. Workers in the Crafts and Manual Labor job category have had high rates since 1998 for both men and women.

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. *Incidence 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 with the

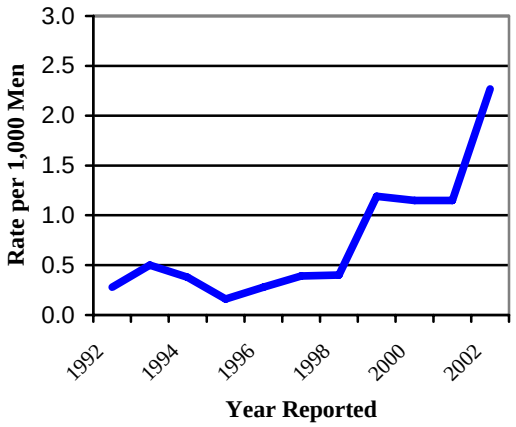
incidence rates frequently published in many articles on cancer with which you may be familiar.



The likelihood that an individual in the U.S. will develop cancer increases with age. For men and women, cancer rates tended to be higher among older workers compared with younger workers. Eighty-three absences were reported involving 19 diagnoses among 18 women and 70 diagnoses among 49 men. Hanford workers reported 40 diagnoses in 2000 and 59 diagnoses in 2001 for cancer. The increase of 19 diagnoses from 2000 to 2001 and 24 diagnoses from 2001 to 2002 is partially the result of including diagnoses for absences lasting fewer than 5 days. About one-third of the increase in 2001 and 2002 resulted from these shorter absences.

Prostate cancer was the most frequently reported cancer diagnosis among men. Twenty-five men reported 29 prostate cancer diagnoses. Only 1 was over 60 years of age; 3 men had reported prostate cancer previously. This is a substantial increase from 2001 when 12 men reported 12 prostate cancer diagnoses; only 2 were over 60 years of age. As Figure 10a shows, the rate of prostate cancer diagnoses, which has increased substantially since 1995, continued to increase in 2002. 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 10a. Prostate Cancer Among Male Hanford Workers from 1992 to 2002

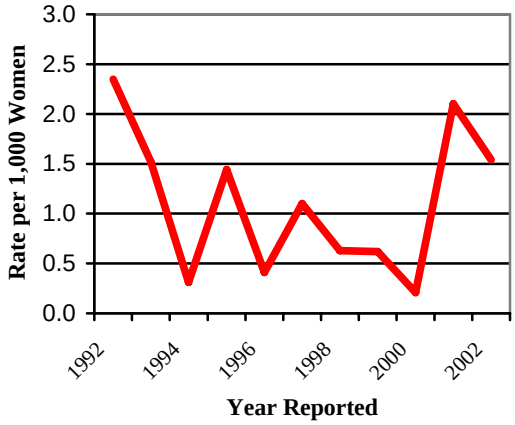


Four men reported 8 diagnoses for skin cancer of the face (3), neck and scalp (2), trunk (1), arm (1), and leg (1). One man in the Professional occupational group reported breast cancer. The 32 remaining cancer diagnoses reported by men in 2002 were for 17 different areas of the body. Ten men who reported cancer in 2002 had reported cancer previously between 1998 and 2001; the cancers were all at the same site as reported in a previous year.

Among women, breast cancer made up 53 percent of the 19 cancer diagnoses reported in 2002. Nine women reported 10 diagnoses for breast cancer, as opposed to 12 women in 2001. This resulted in a rate decrease

from 2001 to 2002 (Figure 10b). Among the 9 women reporting breast cancer in 2002, 44 percent were in the Administration group, which made up 37 percent of the women in the Hanford work force. Among the 9 women, 5 were at least 50 years old and 2 had previously reported cancer. Nine women reported the remaining 9 cancer diagnoses, each for a different site. Three of these women reported cancer prior to 2002; 2 were at the same site as reported in 2002. Security workers were 4 times more likely than other workers to report a cancer diagnosis in 2002.

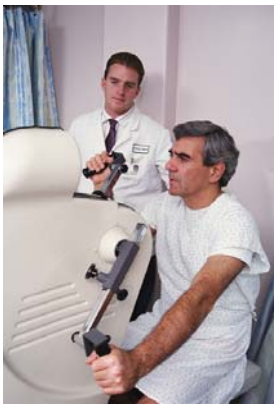
Figure 10b. Breast Cancer Among Female Hanford Workers from 1992 to 2002



Women reported 30 heart/ circulatory diagnoses, half of which occurred in women under 50 years of age. High blood pressure and ischemic heart disease (restricted blood flow through an artery) accounted for 20 percent of the heart/circulatory diagnoses among younger women and 47 percent of the diagnoses among older women. Five of the 8 women who reported high blood pressure or ischemic heart disease in 2002 were aged 50 years or older. Four of the 30 diagnoses reported in 2002 were for absences fewer than 5 days.

Among men, workers aged 50 or older had the highest rates of heart/ circulatory problems. Seventy-five of the 113 diagnoses among men occurred in workers aged 50 or older. Age had no effect on the reporting of high blood pressure and ischemic heart disease among men; 47 percent for younger men and 52 percent for older men. Twenty-two of the 113 diagnoses reported in 2002 were for absences fewer than 5 days.

Respiratory disease rates for women and men tended to be higher among older workers. Among women, 41 of the 80 diagnoses (51 percent) for respiratory disease were upper respiratory infections, 9 (11 percent) diagnoses were for influenza and pneumonia, and 21 (26 percent) were for bronchitis and asthma. The portion of diagnoses for absences lasting fewer than 5 days rose from 8 percent (5/61) in 2001 to 15 percent (12/80) in 2002. This increase suggests that the workers are reporting more brief respiratory absences or the site has improved the ways that these absences are captured. Women in the Service group had the highest rates of respiratory disease in 2002, a trend that has existed since 1998.



Among men, 59 of the 125 respiratory diagnoses (47 percent) were for upper respiratory infections, 27 (22 percent) were for influenza and

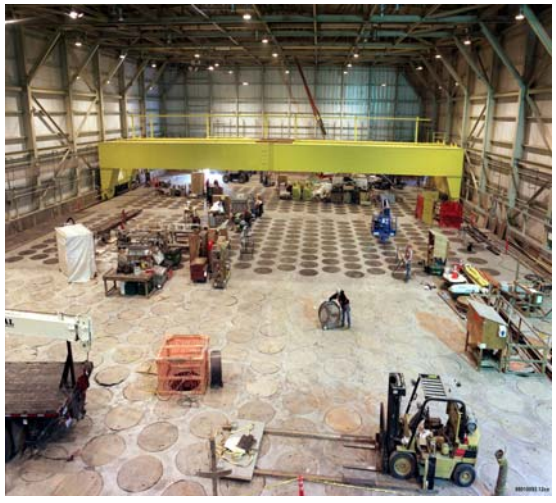
pneumonia, and 17 (14 percent) were for bronchitis and asthma. Eleven diagnoses for lung disease resulting from external agents were reported by 7 men; 4 men reported 8 diagnoses for chronic beryllium disease and the other 3 men reported exposure to sulfur, solvents, and dust. Eighteen of the 125 diagnoses (14 percent) were for absences shorter than 5 days. Respiratory disease rates among men of all ages combined were highest among workers in the Service and Crafts and Manual Labor groups. Respiratory disease was over 4 times more common among Service workers and 2 to 3 times more common among Technical, Crafts and Manual Labor, and Nuclear 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. Women in the Crafts and Manual Labor group and men in the Service group were 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 more than twice as likely as other workers to report an injury.

The risk of specific injuries varied by job category (Supporting Tables, Appendix N). Service workers were at almost 9 times the risk of reporting an open wound to the arm, almost 8 times the risk of a fracture to the neck or trunk, over 6 times the risk of reporting a back sprain or strain, and over 3 times the risk of a dislocation compared with other workers. Security workers were over 10 times more likely to report an open wound of the leg and over 7 times more likely to report an open wound of the arm. Crafts and Manual Labor workers were at increased risk for many types of injuries, including 9 times greater risk of unspecified effects from external causes, an open wound of the leg, and late effects of an accident; 7 times greater risk of a toxic effect from a non-medicinal substance; 6 times greater risk of a bruise; and 2 to 4 times greater risk of an arm or leg fracture, a dislocation, sprain or strain other than to the back, and an open wound of the arm. Among Nuclear workers, the risk of complications and unspecified injuries was 17 times greater, toxic effect of a non-medicinal substance and late effect of an accident 9 times greater, a back sprain or strain almost 6 times greater, and a broken arm, a dislocation, and a sprain or strain to other than the back 2 to 3 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 and Security workers were at almost twice the risk, and Service, Crafts and Manual Labor, and Nuclear workers were at 2 to 3 times the risk of all illnesses and injuries compared with workers in other groups. These increased risks were also observed in 2001. Technical workers were at almost twice the risk of other job categories for digestive

disorders and 2 to 3 times the risk of psychological disorders, genitourinary diseases, and unspecified conditions. Compared with other workers, Service workers had over 6 times the risk of infections, 5 times the risk of endocrine disorders, and twice the risk for conditions of the muscles and skeleton and unspecified conditions. Conditions of the digestive system and unspecified conditions were 2 to 3 times as likely to be reported by Security workers compared with other workers. The risk of infections and nervous system, skin, and unspecified conditions was at least 3 times greater and of digestive and muscles and skeleton disorders about twice as great as other workers for those in the Crafts and Manual Labor group. Nuclear workers were at 2 to 3 times greater risk of disorders of the nervous, digestive, and genitourinary systems and skin, and at 3 to 5 times the risk of benign growths and disorders of the endocrine system, muscles and skeleton, and unspecified conditions 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 11 and 12. 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 have increased since 2001 (Figure 11). 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 have increased since 2001 (Figure 12). These included injuries among men and women and muscles and skeleton conditions among men. The addition of absences lasting

fewer than 5 days noticeably increased the rates of all illnesses and injuries, above all, injuries and muscles and skeleton conditions (Figure 12).

Figure 13 shows the age-adjusted rates for all illnesses and injuries combined for the various job categories. 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 several job categories in the period 2000 to 2002. A portion of the increase was the result of adding the diagnoses for absences lasting fewer than 5 days. 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.

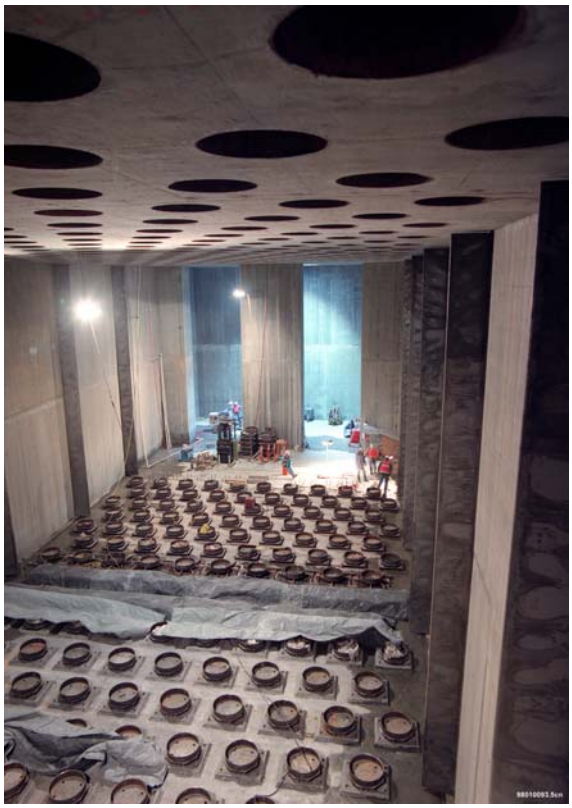


Figure 11. Age-Adjusted Rates for All Diagnoses Combined Among Women and Men from 1993 to 2002

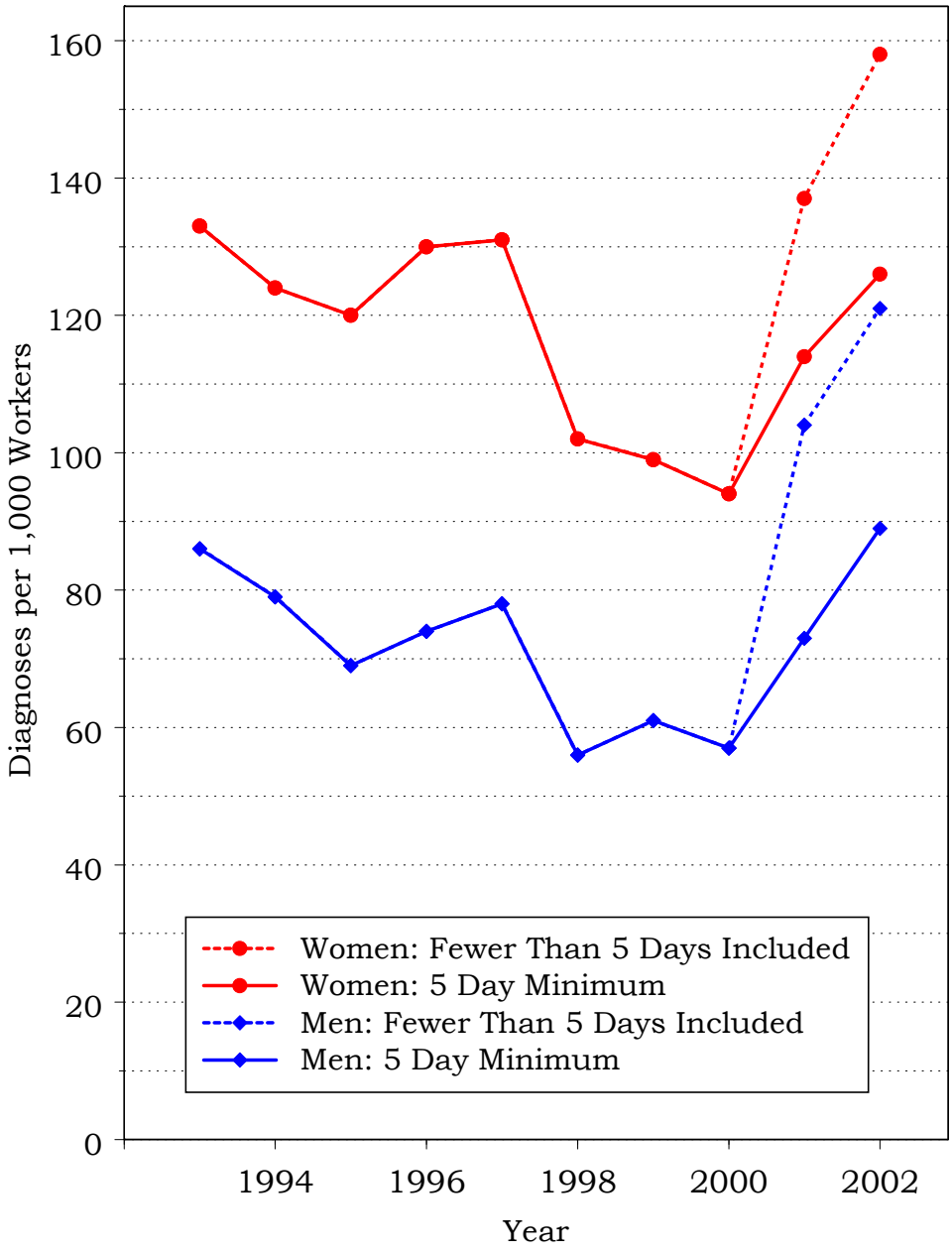
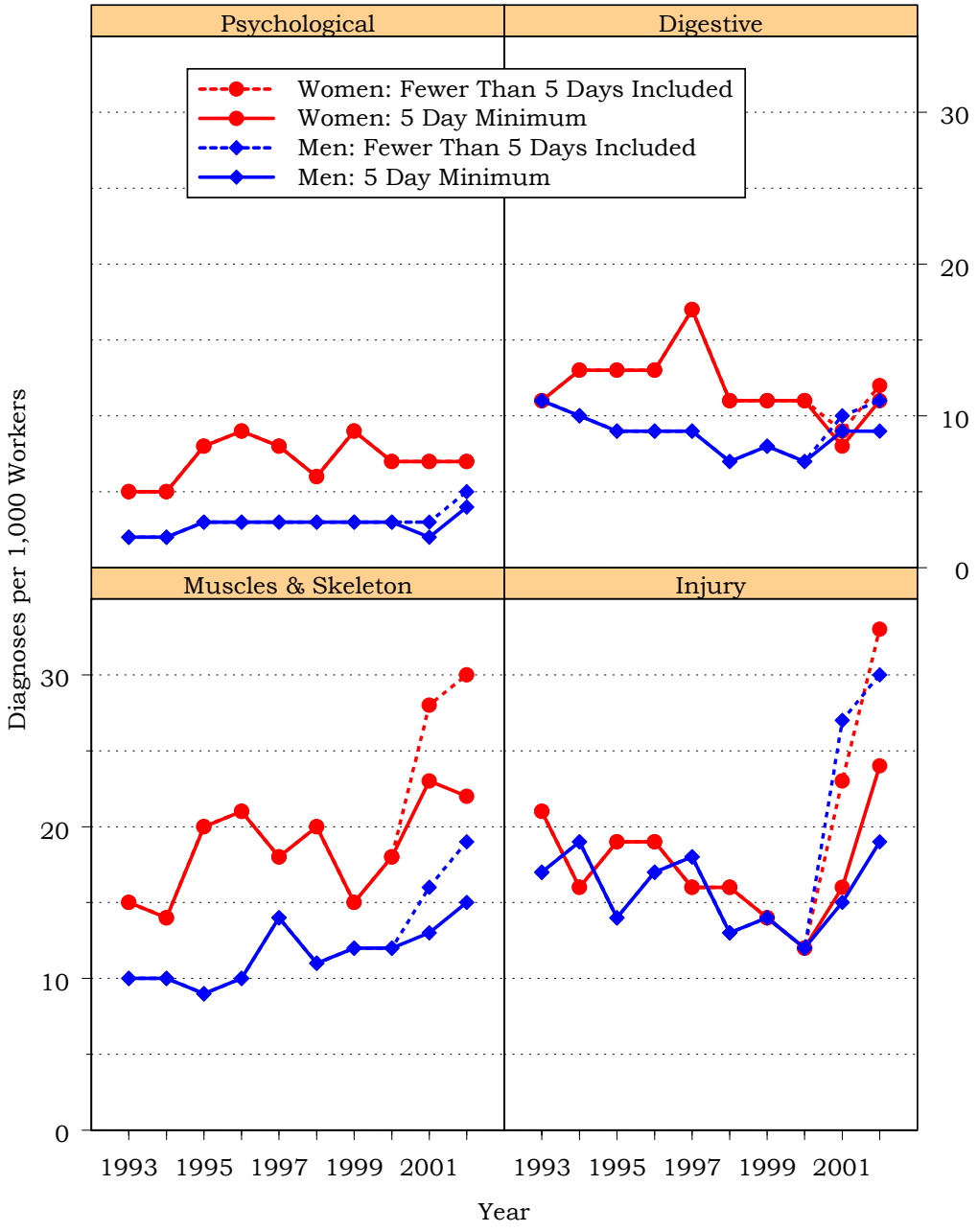
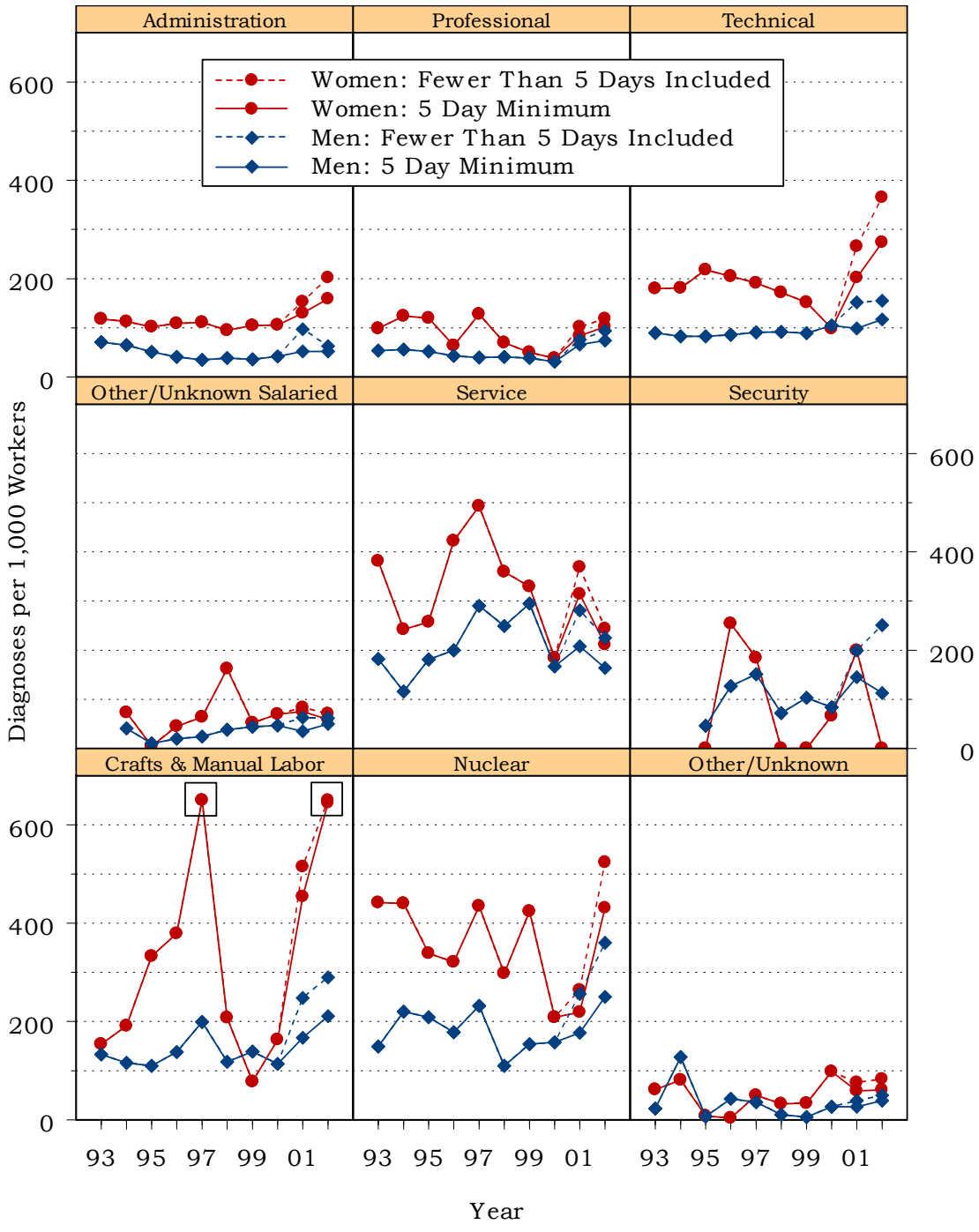


Figure 12. Age-Adjusted Rates for Selected Diagnostic Categories Among Women and Men from 1993 to 2002



Note: For 1993, the injury rate is based on external causes of injury data; for 1994 through 2002, 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 13. Age-Adjusted Rates for All Diagnoses Combined Among Women and Men by Job Category from 1993 to 2002



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 and 2002 Crafts & Manual Labor rates for women were truncated to 650 (☐) for graphical presentation. The actual rate for 1997 was 1,037. In 2002, there were 2 actual rates: 769 (absences lasting fewer than 5 days included) and 716 (absences of 5 days or greater duration).

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 305 definite sentinel health event diagnoses affecting 115 males and 50 females in 2002 (Figure 14). This is a significant increase from 2001 when only 10 definite sentinel health event diagnoses were reported. This 2002 increase was impacted by the inclusion of more in-depth medical information in the event reporting. Seventy-seven percent of the definite sentinel health events occurred among workers 40 years and older. Among women, Administration workers reported 33 percent of the events. Crafts and Manual Labor and Nuclear workers reported the majority of the events among men (38 and 29 percent, respectively). These diagnoses included back and disk conditions, joint disorders, carpal tunnel syndrome, and symptoms of the head and neck area. Thirty of 2,239 diagnoses (1 percent) were identified as possible sentinel health events. Twenty-one of the 30 diagnoses reported by 19 workers were carpal tunnel syndrome and resulted in 860 lost calendar days. Eleven men reported 13 of these diagnoses; 8 women reported the remaining 8 diagnoses.

Figure 14. Characteristics of SHEOs by Gender

	Total Number of SHEO Diagnoses		Total Number of Days Absent	
	Men	Women	Men	Women
Definite	209	96	5,403	1563
Possible	20	10	1,158	408
Total	229	106	6,561	1,971

Disabilities Among Active Workers

No disability data were reported in 2002.

Deaths Among Active Workers

No death data were reported in 2002.

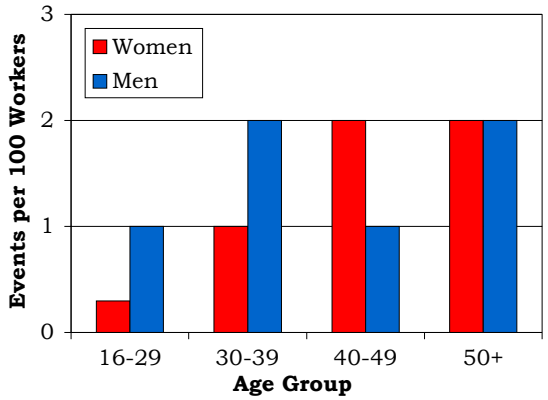
OSHA-Recordable Events

The Occupational Safety and Health Administration (OSHA) requires that employers maintain a record of occupational illnesses and injuries 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 is shown in Figure 15. Men under age 40 had higher OSHA-recordable rates than women of the same age groups**.** Occupational illnesses and injuries resulted in a total of 4,679 lost or restricted workdays reported by 60 women and 143 men at Hanford in 2002. There were 60 women and 134 men who had 1 recordable OSHA event and 9 men with 2 or more OSHA events. Men experienced 72 percent of all reported OSHA events, but the rate of workers with an OSHA event was similar for men (2 per 100 workers) and women (1 per 100 workers). The average number of workdays lost or with restricted activity for women was 27 days and for men was 20 days. For men less than 50 years old, the average number of workdays lost or with restricted activity increased with age.

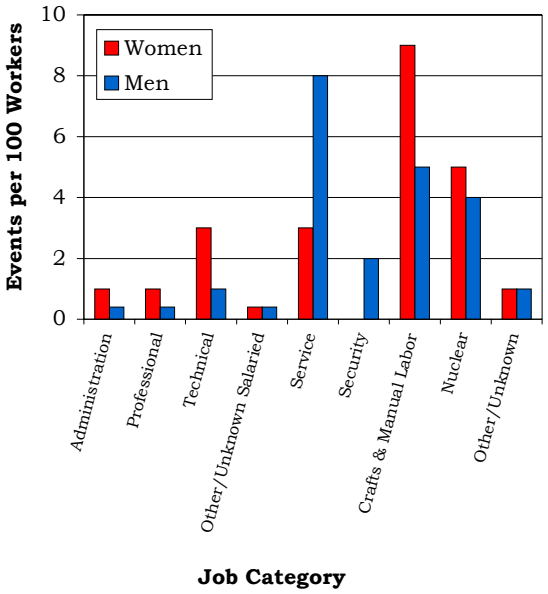
Figure 15. OSHA-Recordable Events by Gender and Age



The decrease in the number of OSHA-recordable events from 2000 (251) to 2001 (244) continued in 2002 (212). During this 3-year period, the OSHA-recordable events decreased 16 percent. 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 16. Overall, Service workers had the highest rate of OSHA events (7 per 100 workers) in 2002. They also had the highest rates of OSHA events in 2001 (9 per 100 workers). Among women, those in the Crafts and Manual Labor job category had the highest rates of OSHA events (9 per 100 workers). Workers in the Professional job category reported the highest average number of lost or restricted workdays among women (47 days). Among men, the highest rate of OSHA events was among Service workers (8 per 100 workers). They also had the highest rates of OSHA events in 2001 (9 per 100 workers). Workers in the Security job category reported the highest average number of lost or restricted workdays among men (32 days). The Supporting Tables contain more detailed data about the number of OSHA events and the number of days of work lost or with restricted activity.

Figure 16. OSHA-Recordable Events by Job Category and Gender



Diagnostic and Accident Categories for OSHA-Recordable Events

A total of 212 OSHA events were recorded in the OSHA 200 Logs, which included 108 diagnoses among women and 221 diagnoses among men, as shown in Figure 17. Fifty-three percent of the health conditions reported involved injuries. Sprains and strains were the most common type of OSHA-recordable injury among both men and women, followed by open wounds for men and superficial injuries and bruises for women. Sprains and strains accounted for 47 percent of all OSHA-recordable injuries in 2002 (37 percent in 2001). Conditions related to the muscles and skeleton also occurred frequently (104/329; 32 percent of health conditions).

Figure 17. OSHA-Recordable Diagnoses by Diagnostic Category and Gender

Diagnostic Category	Gender	
	Women	Men
Genitourinary	1	0
Heart/Circulatory	0	1
Muscles & Skeleton	42	62
Nervous System	0	11
Psychological	1	0
Respiratory	3	1
Skin	3	5
Unspecified Symptoms	12	12
Injury	46	129
Fractures – Neck, Trunk	0	3
Fractures – Upper Limb	4	5
Fractures – Lower Limb	1	3
Dislocations	1	3
Back Sprains & Strains	9	33
Other Sprains & Strains	13	28
Intracranial Injuries	0	1
Open Wounds – Head, Neck, Trunk	1	5
Open Wounds – Upper Limb	0	15
Superficial Injuries	6	10
Bruises	6	9
Foreign Bodies Entering Orifice	1	5
Burns	0	2
Injuries to Nerves & Spinal Cord	0	2
Unspecified Injuries	1	3
Adverse Reactions to Non-Medical Substances	3	2

Ninety-five percent (201/212) of the OSHA events were the result of an accident (Figure 18). The type of accident reported most often was "other accidents," a broad category that includes being struck by an object or caught between an object, injuries from cutting or piercing objects, overexertion, repetitive trauma, and contact with hot or corrosive material**.** Overexertion and strenuous movements accounted for 66 percent of these accidents. The second most common type of accident overall was caused by falls.

Among the 11 events not attributed to a particular accident, 4 were attributed to skin conditions. In addition, there were 3 unspecified symptoms, 2 nervous system disorders, and 1 each for respiratory and muscles and skeleton conditions.

Figure 18. OSHA-Recordable Accidents by Type and Gender

Accident Category	Gender	
	Women	Men
	Number of Accidents	Number of Accidents
Motor Vehicle Traffic	0	4
Poisoning – Non-Medicinal	3	2
Falls	14	17
Natural/Environmental Factors	0	3
Submersion/Suffocation/ Foreign Bodies	1	6
Other Accidents	38	113
Struck by an Object	3	13
Caught Between Objects	1	8
Cutting/Piercing Instrument/Object	0	9
Hot, Corrosive, or Caustic Material/Steam	0	2
Overexertion/Strenuous Movements	24	75
Repetitive Trauma	10	6
Total	56	145

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 19 and 20. Men and women in the Crafts and Manual Labor and Nuclear groups tended to have higher rates than other job categories for all diagnoses combined. Male Service workers and female Technical workers also had high OSHA-recordable rates compared with workers in other job categories. Men and women 50 years and older tended to have higher OSHA-recordable rates than younger workers. Women had higher rates than men regardless of age, with the exception of Service and Security workers. 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 tended to have the highest rates for injuries among both men and women.

Hanford workers missed 970 workdays and had 3,709 restricted days as a result of occupational illnesses and injuries. Crafts and Manual Labor and Nuclear workers experienced over half of the lost workdays (57 percent) and restricted workdays (51 percent), although they comprised only about 14 percent of the work force. Professional workers, who made up 23 percent of the work force, had 22 percent of the lost workdays. Administration and Professional workers, who together made up 44 percent of the work force, reported 12 percent of the restricted workdays and 23 percent of the workdays lost.

These percentages are similar to prior years. In 2001, Crafts and Manual Labor and Nuclear workers made up 12 percent of the work force but had 52 percent of the restricted workdays and 35 percent of the workdays lost. The two groups comprised only 10 percent of the work force in 2000 and had almost half of the lost (48 percent) and restricted workdays (46 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, Service, and Nuclear workers were more likely to report an injury or illness than other workers (6, 5, and 3 times, respectively). Muscles and skeleton conditions were 8 times more likely to occur among Service workers and 4 times more likely among Crafts and Manual Labor and Nuclear workers than other workers. Crafts and Manual

Labor workers were at 6 times the risk of unspecified symptoms, 6 times more likely to report an injury, and over 3 times more likely to report a sprain and strain. They were at 8 times the risk of incurring an open wound to the upper limb, 13 times the risk for a superficial injury, and 7 times more likely of being bruised. Nuclear and Service workers were over 3 times more likely than other workers to report an injury. Open wounds to the upper limb were 8 times more likely to occur among Service workers. Sprains and strains of the

back were 11 times more likely among Service workers and 3 times more likely among Nuclear workers. Compared with other workers, Nuclear workers were 5 times more likely to incur a superficial injury or a sprain or strain other than the back. As is apparent from these comparisons, workers in a variety of occupations involving hands-on activities, relatively greater physical demands, or more challenging work 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.

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

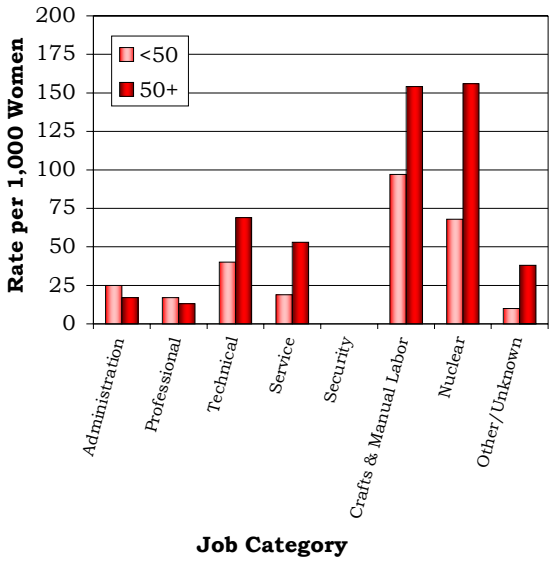
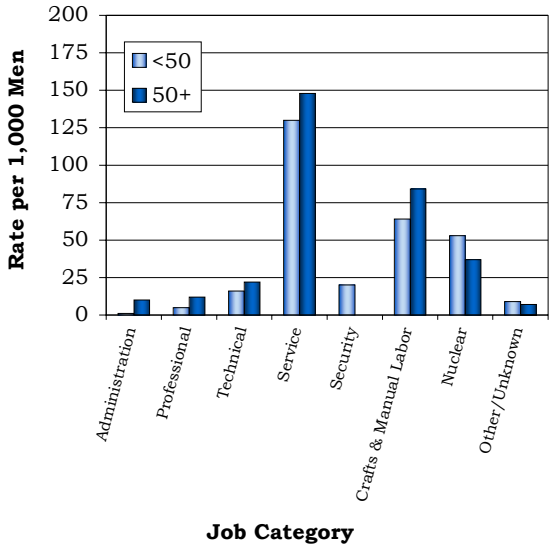
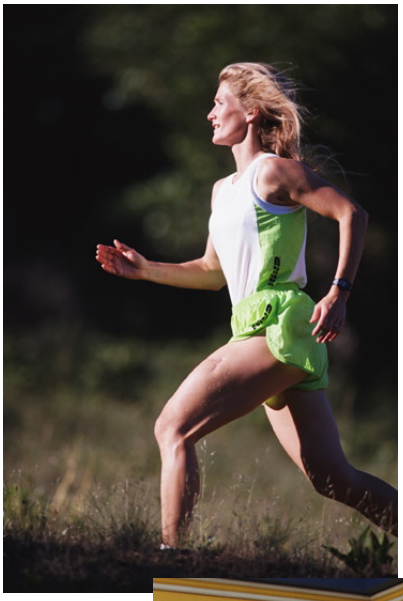


Figure 20. OSHA-Recordable Rates by Age and Job Categories Among Men, All Diagnoses Combined

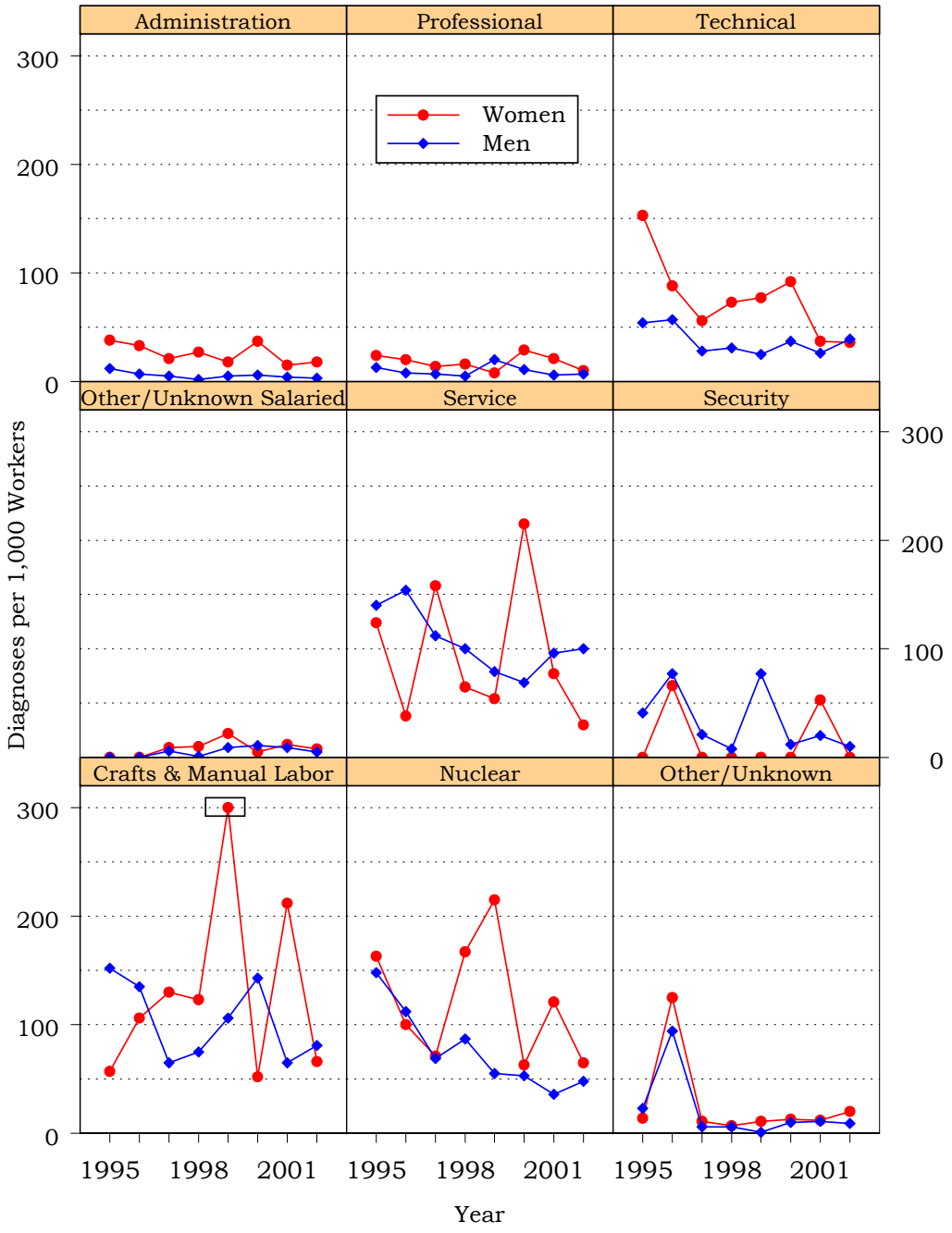


Time Trends for OSHA-Recordable Events



For the work force as a whole, there were no significant changes in injury rates from 2001 to 2002 for either men or women. In 2002, OSHA-recordable rates continued to decrease in several job categories among both men and women (Figure 21). Slight decreases were seen for men in Administration, Other/Unknown Salaried, and Other/Unknown job categories. The slight increase noted in 2001 among male Security workers did not continue in 2002. Their rate decreased to a rate similar to what was seen in 2000. Rates decreased sharply for women in the Crafts and Manual Labor and Nuclear job categories. The noticeable decrease in rates from 2000 to 2001 among female Service workers continued in 2002. For female Security workers, the trend of no OSHA events returned in 2002. OSHA events have been reported among these workers for only 2 of the 8 years recorded. In 2002, an increase in rates was seen in some job categories. Rates increased among men in the Professional, Technical, Service, Crafts and Manual Labor, and Nuclear job categories. Women's rates increased for Administration and Other/Unknown workers.

Figure 21. Age-Adjusted Rates for All OSHA-Recordable Diagnoses Combined Among Women and Men by Job Category from 1995 to 2002



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.

Abbreviated Categories Used in the Annual Report	ICD-9-CM Codes
Benign Growths	210-229 235-239
Blood	280-289
Cancer	140-208 230-234
Digestive	520-579
Endocrine / Metabolic	240-279
Existing Birth Conditions	740-759
Genitourinary	580-629
Heart / Circulatory	390-459
Infections / Parasites	001-139
Injury	800-999
Miscarriage	630-676
Muscles and Skeleton	710-739
Nervous System	320-389
Psychological	290-319
Respiratory	460-519
Skin	680-709
Unspecified Symptoms	780-799

ICD-9-CM Codes

All conditions	001-V82	All reported health events
Infectious and parasitic diseases	001-139	Diseases caused by bacteria, viruses, and parasites
• Intestinal infections	001-009	Infections of the bowel or gut
• Tuberculosis	010-018	TB in the lungs and other organs
• Zoonotic bacterial diseases	020-027	Bacterial diseases that animals transmit to humans
• Other bacterial diseases	030-041	Whooping cough, diphtheria, strep throat, and gangrene
• Human Immunodeficiency Virus (HIV) infection	042	AIDS
• Poliomyelitis and other non-arthropod diseases of the central nervous system	045-049	Viral meningitis (swelling of the layers covering the brain and spinal cord); viral encephalitis (swelling of the brain); and polio
• Viral diseases accompanied by exanthem	050-057	Diseases accompanied by rashes or blisters like chickenpox, measles, shingles, and herpes
• Arthropod-borne viral diseases	060-066	Encephalitis (swelling of the brain) caused by bites from virus-carrying ticks or mosquitoes
• Other diseases caused by viruses and chlamydiae	070-079	Viral hepatitis, mumps, rabies, and mononucleosis
• Rickettsioses and other arthropod-borne diseases	080-088	Rocky Mountain spotted fever, malaria, and lyme disease
• Other spirochetal diseases	100-104	Trench mouth and Weil's disease (jaundice caused by coil-shaped bacteria)
• Mycoses	110-118	Athlete's foot; fungal infections of fingernails and toenails; and thrush
• Helminthiases	120-129	Pinworms, tapeworms, roundworms, and whipworms

• Other infectious and parasitic diseases	130-136	Lice, chiggers, scabies, and mites
• Late effects of infectious or parasitic diseases	137-139	Side effects of TB, chickenpox, or polio even though the disease is no longer active
Malignant neoplasms	140-208, 230-234	All cancers, regardless of the part of the body affected
• Lip, oral cavity, and pharynx	140-149	Lip, mouth, throat, and tongue
• Digestive organs and peritoneum	150-159	Stomach, esophagus (tube that transports food to the stomach), intestines, colon, rectum, anus, liver, pancreas, and gallbladder
• Respiratory system and intrathoracic organs	160-165	Sinuses, throat, voice box, lungs, and heart
• Bone, connective tissue, skin, and breast	170-176	Bone, muscle, ligament, tendon, blood vessels, fat, skin, and breast
• Genitourinary organs	179-189	Kidney, bladder, and cervix, ovary, uterus, and prostate
• Other and unspecified sites	190-199	Eye, brain, and thyroid
• Lymphatic and hematopoietic tissue	200-208	Leukemia, lymphoma, Hodgkin's disease, multiple myeloma, lymphosarcoma, and reticulum cell sarcoma
• Carcinoma in situ	230-234	A cancer that is confined to the site of origin (has not spread to neighboring tissue)
Benign neoplasms and neoplasms of uncertain behavior and unspecified nature	210-229 235-239	Tumors that are not cancerous or do not exhibit cancerous behavior, regardless of the part of the body affected
Endocrine, nutritional, and metabolic diseases and disorders of the immune system	240-279	Diseases affecting the hormone secreting glands and organs. Overactive thyroid; underactive thyroid; vitamin deficiency; diabetes; gout; and problems affecting the antibody producing system

Disorders of the blood and blood forming organs	280-289	Anemia and hemophilia (excludes leukemia)
Mental disorders	290-319	Psychiatric diagnoses - Non-psychotic disorders: depression; anxiety, fear, and stress disorders; alcoholism; drug dependence; and eating disorders, such as anorexia; Psychotic disorders: dementia, schizophrenia, and manic depression
Diseases of the nervous system and sense organs	320-389	Huntington's chorea; Alzheimer's and Parkinson's disease; epilepsy; multiple sclerosis; migraine; diseases of the eye, such as cataract and glaucoma
• Inflammatory diseases of the central nervous system	320-326	Bacterial meningitis (swelling of the layers covering the brain and spine); bacterial encephalitis (swelling of the brain); and brain and spinal abscesses
• Hereditary and degenerative diseases of the central nervous system	330-337	Alzheimer's and Parkinson's disease, tremors, and Huntington's chorea
• Other disorders of the central nervous system	340-349	Multiple sclerosis (MS), cerebral palsy, epilepsy, and migraine
• Disorders of the peripheral nervous system	350-359	Nerve disorders of the face, carpal tunnel syndrome, muscular dystrophy
• Disorders of the eye	360-379	Inflammation and ulcers of the eye and eyelid; detached retina; pink eye; problems with tear ducts; glaucoma; and cataracts
• Diseases of the ear and mastoid process	380-389	Infections of the outer, middle, or inner ear; ringing of the ears; hearing loss

Diseases of the circulatory system	390-459	Rheumatic fever, heart murmurs, heart attacks, angina, hardening of the arteries, varicose veins, hemorrhoids, and phlebitis
• Acute rheumatic fever	390-392	High fever and joint pain with possible heart damage
• Chronic rheumatic heart disease	393-398	Long lasting swelling and damage to the heart which results from rheumatic fever
• Hypertensive disease	401-405	High blood pressure
• Ischemic heart disease (Restricted blood flow to the heart)	410-414	Heart attack and angina
• Diseases of pulmonary circulation	415-417	Blood clots in the lung and pulmonary aneurysm (bulge that develops in the wall of the pulmonary artery, which is the artery that carries blood to the lungs)
• Other forms of heart disease	420-429	Swelling of the inner lining, middle lining, or sac enclosing the heart; heart failure; and irregular heartbeat
• Cerebrovascular disease	430-438	Stroke, bleeding in the brain, and blockage or low blood flow in blood vessels of the brain
• Diseases of the arteries and capillaries	440-448	Hardening of the arteries; aneurysm (bulge that develops in the walls of arteries); and blood clots
• Diseases of the veins, lymphatics, and other circulatory system diseases	451-459	Phlebitis (swelling of a vein), thrombophlebitis (swelling of a vein which has a blood clot), varicose veins, and hemorrhoids

Diseases of the respiratory system	460-519	Colds, sinusitis, laryngitis, pneumonia, influenza, chronic bronchitis, asthma, and emphysema
• Acute respiratory infections	460-466	Colds, sore throat, sinus infections, swollen tonsils, and bronchitis
• Other diseases of the upper respiratory tract	470-478	Allergies, hay fever, sinus infections, bronchitis, and sore throat that continue for a long time
• Pneumonia and influenza	480-487	"The flu" and pneumonia caused by a bacteria or virus
• Chronic obstructive pulmonary diseases and allied conditions	490-496	Emphysema and asthma
• Pneumoconiosis and other lung diseases caused by external agents	500-508	Black lung; miners' asthma; asbestosis; silicosis; berylliosis; and conditions caused by chemical fumes and vapors
• Other diseases of the respiratory system	510-519	Pleurisy (swelling of the lining of the lungs), collapsed lung, and respiratory failure
Diseases of the digestive system	520-579	Diseases affecting the teeth and mouth, salivary glands, digestive tract, and the abdominal cavity. Examples include dental abscess, ulcers, appendicitis, hepatitis (excluding viral hepatitis), cirrhosis of the liver, gallstones, pancreatitis, abdominal hernia, and intestinal polyps
• Diseases of the oral cavity, salivary glands, and jaw	520-529	Tooth problems (too many, too few, abnormal shape or size, cavities, bleeding gums, toothaches), and infections and swelling of the mouth, jaw, and tongue
• Diseases of the esophagus, stomach, and duodenum	530-537	Ulcers of the esophagus (tube that transports food to the stomach), stomach, and small intestine; indigestion; and uncontrollable vomiting

• Appendicitis	540-543	Swelling of the appendix (rupture, surgery, or both may result)
• Hernia of the abdominal cavity	550-553	Ruptures of the groin and diaphragm (muscle which separates the chest area from the lower part of the trunk)
• Non-infectious enteritis and colitis	555-558	Crohn's disease and swelling of the intestine and colon
• Other diseases of the intestines and peritoneum	560-569	Irritable bowel syndrome, blockage of the intestine, constipation, and diarrhea
• Other diseases of the digestive system	570-579	Diseases of the liver, gallbladder, and pancreas; hepatitis; blood in stool; and bleeding in the stomach and intestine
Diseases of the genitourinary system	580-629	Diseases affecting the kidneys, the prostate, and testes; benign breast diseases; infertility (male and female); diseases of the ovary; pelvic inflammatory disease; and menstrual disorders
• Nephritis, nephrotic syndrome, and nephrosis	580-589	Swelling of the kidney; swelling of the small blood vessels in the kidney; and kidney failure
• Other diseases of the urinary system	590-599	Swelling and infection of the kidney and bladder; kidney stones; and difficulty urinating
• Diseases of the male genital organs	600-608	Enlarged prostate; swelling of the scrotum and prostate; and abscess of the prostate
• Disorders of the breast	610-611	Benign tumors, cysts, and infections of the breast
• Inflammatory disease of the female pelvic organs	614-616	Swelling of the uterus, ovary, fallopian tubes, or cervix
• Other diseases of the female genital tract	617-629	Conditions associated with menopause and postmenopause; PMS; infertility; and cramps

Complications of pregnancy, childbirth, and the puerperium	630-676	Miscarriage; complications of pregnancy, such as hemorrhage; pregnancy-related high blood pressure; preeclampsia; and premature labor or other complications of labor
• Ectopic and molar pregnancy	630-633	Development of fetus outside the uterus and growth of cysts
• Other pregnancy with abortive outcome	634-639	Miscarriage and complications associated with miscarriage
• Complications mainly related to pregnancy	640-648	Abnormal bleeding and possible miscarriage; infections; high blood pressure caused by pregnancy; and premature labor
• Normal delivery, and other indications for care in pregnancy, labor, and delivery	650-659	Delivery requiring little or no assistance; multiple births; breech birth; and problems of the fetus or placenta which affect care of mother
• Complications occurring mainly in the course of labor and delivery	660-669	Long labor; unusually fast delivery; and abnormal bleeding after delivery
• Complications of the puerperium	670-676	Infections of the breast; blood clot in lung; and varicose veins
Diseases of the skin and subcutaneous tissue	680-709	Acne, cellulitis, sunburn, psoriasis, and seborrhea
• Infections of the skin and subcutaneous tissue	680-686	Abscesses, boils, hair-containing cysts, and pus-filled blisters
• Other inflammatory conditions of skin and subcutaneous tissue	690-698	Skin rashes caused by detergents, oils, greases, solvents, sun, food, drugs, or medicine
• Other diseases of the skin and subcutaneous tissue	700-709	Corns, calluses, heat rash, swollen hair follicles, acne, and ingrown fingernails and toenails

Diseases of the musculoskeletal system and connective tissue	710-739	Arthritis, systemic lupus erythematosus, ankylosing spondylitis, herniated intervertebral disk ("slipped disk"), lumbago, sciatica, rheumatism, tendonitis, and osteoporosis
• Arthropathies and related disorders	710-719	Arthritis; joint pain and stiffness; and other diseases of the connective tissue which supports and connects internal organs, forms bones and blood vessel walls, and attaches to bones
• Dorsopathies	720-724	Swelling of the spine; herniated, slipped, and ruptured disk; rheumatoid arthritis of the spine; lumbago; and sciatica
• Rheumatism, excluding the back	725-729	Swelling and degeneration of joints, muscles, tendons; tennis elbow; and bursitis
• Osteopathies, chondropathies, and acquired musculoskeletal deformities	730-739	Fracture caused by bone disease; osteoporosis; curvature of the spine; flat foot; hammer toe; and development of deformities of the nose, toes, feet, legs, arms, and hands
Congenital anomalies	740-759	Spina bifida; cleft palate; harelip; and various chromosomal anomalies, such as Klinefelter's syndrome
Certain conditions originating in the perinatal period	760-779	Maternal high blood pressure; maternal malnutrition; ectopic pregnancy; breech birth; fetal malnutrition or slow growth; injuries related to birth trauma; and perinatal jaundice
Symptoms, signs, and ill-defined conditions	780-799	Blackout, chills, dizziness, fatigue, pallor, abnormal weight loss, undiagnosed chest pain, and heartburn

• Symptoms	780-789	Hallucinations, fainting, convulsions, dizziness, fatigue, fever, sleep disturbance, rash, headache, sore throat, chest pain, nausea, vomiting, and heartburn
• Non-specific abnormal findings	790-796	Abnormal x-ray, blood, stool, and urine test results
• Ill-defined and unknown causes of morbidity and mortality	797-799	Senility; asphyxia; respiratory arrest; nervousness; and unexplained death within 24 hours of onset of symptoms
Injury and poisoning	800-999	Dislocation of joints; sprains and strains of associated muscles; concussions; bruises; cuts; internal injuries from crushing, puncture, tearing, or blunt impact; burns; blisters; poisoning; frostbite; heatstroke; and complications of medical or surgical care
• Fractures, all sites	800-829	Cracks or breaks of any bone
• Dislocations	830-839	Separation of a bone from its normal socket or joint
• Sprains and strains of joints and adjacent muscles	840-848	Strains are injuries to muscle from overuse or stretching the muscle beyond its normal limit; sprains are injuries involving tearing or overextending the ligaments of a joint
• Intracranial injuries excluding those with skull fractures	850-854	Concussions; internal bruises; and bleeding within the head without a fracture of the bones of the skull
• Internal injuries of the thorax, abdomen, and pelvis	860-869	Bruising, crushing, tearing, or rupturing the chest, abdomen, and pelvis and the organs within these areas of the body
• Open wounds	870-897	Animal bites; cuts; lacerations; punctures; and amputations, excluding the arteries and veins

• Other injuries and late effects of external causes	900-999	Miscellaneous injuries, including injuries to the arteries and veins; problems that occur an extended period of time after the injury has taken place (”late effects”); superficial bruises and abrasions; burns; post-injury shock; poisoning; toxic side effects of chemicals; heatstroke; electrocution; and altitude sickness
Supplementary classifications related to personal or family history of disease	V10-V19	Covers situations in which the person is not ill or injured but has a personal or family history of problems, such as cancer, mental illness, allergies, or arthritis that may affect his or her risk of illness
Supplementary classifications related to health care for reproduction and child development	V20-V28	Problems related to pregnancy, postpartum care, contraception, outcome of delivery, and physical development of child
Contact with health services for reasons other than illness or injury	V50-V59	Care for workers who have been treated previously for an illness or injury that is no longer present but who receive care to complete treatment or prevent recurrence

NOTES