1995 Annual Epidemiologic Surveillance Report for **Hanford Site**

DOE/EH--99002127

ERRATUM...

Table 8 in the 1994 Epidemiologic Surveillance Report for Hanford Site is incorrect. The correct version of this table appears below. If you have a copy of the 1994 Annual Report for Hanford, please attach this corrected version of Table 8 to the report.

Table 8. Diagnoses by Occupational Category – Men

	Occupational Category	Number of Workers in 1994	Number of Diagnoses†	Age-Adjusted Rate per 1,000*	Lower 95% Confidence Limit per 1,000	Upper 95% Confidence Limit per 1,000
Salaried	Administrative	3,185	222	65.2	54.7	77.7
	Professional	4,328	240	55.6	48.4	63.8
	Technical	1,446	114	82.6	68.2	100.0
	Other/Unknown	423	21	40.9	26.5	63.2
	Subtotal	**9,382**	**597**	**62.8**	**57.4**	**68.7**
Hourly	Service	876	113	115.8	93.9	142.8
	Crafts and Manual Labor	1,279	174	115.9	97.2	138.3
	Nuclear	401	73	219.6	162.0	297.6
	Other/Unknown	1,190	141	128.1	108.5	151.3
	Subtotal	**3,746**	**501**	**127.7**	**116.5**	**140.0**
	TOTAL	**13,128**	**1,098**	**79.3**	**74.5**	**84.5**

† Includes all diagnoses reported with an absence of 5 or more days, including absences for pregnancy and delivery.
*Standardized to the age distribution of 1970 U.S. population.

This report is issued by the Office of Epidemiologic Studies, U.S. Department of Energy. Questions or comments may be directed to:

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

http://tis-nt.eh.doe.gov/epi

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. A number of DOE sites participate in the Epidemiologic Surveillance Program. This program monitors illnesses and health conditions that result in an absence of five or more consecutive workdays, occupational injuries and illnesses, and disabilities and deaths among current workers.

This report provides a summary of epidemiologic surveillance data collected from the Hanford Site from January 1, 1995 through December 31, 1995. 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 annual report for 1995 has been redesigned from reports for previous years. Most of the information in the previous reports is also in this report, but some material now appears in the appendices instead of the main body of the report. The main sections of the report are the same as in previous years, namely work force characteristics and absences that lasted at least five consecutive workdays (health events). This 1995 report provides additional information describing the work force by age and occupational groups.

The information in the main body of the report provides a descriptive analysis of the data collected from the site, and the appendices provides additional detail. The report also contains an expanded Glossary and an Explanation of Diagnostic Categories which gives examples of health conditions in each of the diagnostic categories.

The data presented here apply only to Hanford. The DOE sites are varied, so comparisons of Hanford with other DOE sites should be made with caution. It is important to keep in mind that many factors can affect the completeness and accuracy of health information collected at the sites as well as affect patterns of illness and injury observed.

Hanford AT A GLANCE — 1995:

- We observed few changes in patterns of illness and injury from those observed in 1994. As in past years, rates were lower in administrative, professional, and technical occupations than among service, crafts and manual laborers, and workers in the nuclear trades.
- 6.8% of the Hanford work force had at least one absence in 1995, essentially unchanged from the 1994 percentage. Occupational injuries resulted in 4,504 lost workdays and 5,566 restricted workdays in 1995.
- Technical workers, who comprise about 9% of the work force, had the highest percentage of lost and restricted workdays of any occupational group (29%).
- Both men and women had lower occupational injury rates in workers aged 40 or older than in younger workers, a pattern also noted frequently at other epidemiologic surveillance sites.
- The highest rates of injury and poisoning occurred among women in the nuclear group and men in the service group.
- Although there was no evidence of an overall change in the occurrence of cancer among women, 8 of 9 breast cancers reported by female Hanford workers in 1995 were among women younger than 50; only one breast cancer was reported among women aged 50 or older. This pattern was not observed in 1993 or 1994. The age distribution is noteworthy because breast cancer rates generally increase with age in women.
- Hanford reported the service and security job categories separately for the first time in 1995. Subsequent reports will continue to distinguish between these groups.

Site Overview

The Hanford Site covers 560 square miles in southeastern Washington State near the city of Richland. Construction of the site began in March 1943 by the Army Corps of Engineers and the DuPont Corporation. Hanford's original mission was to produce plutonium for the world's first atomic bombs.

Construction of the world's first large-scale nuclear reactor, the B Reactor, began in August 1943 and was completed in 13 months. The 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 and resulted in the end of World War II.

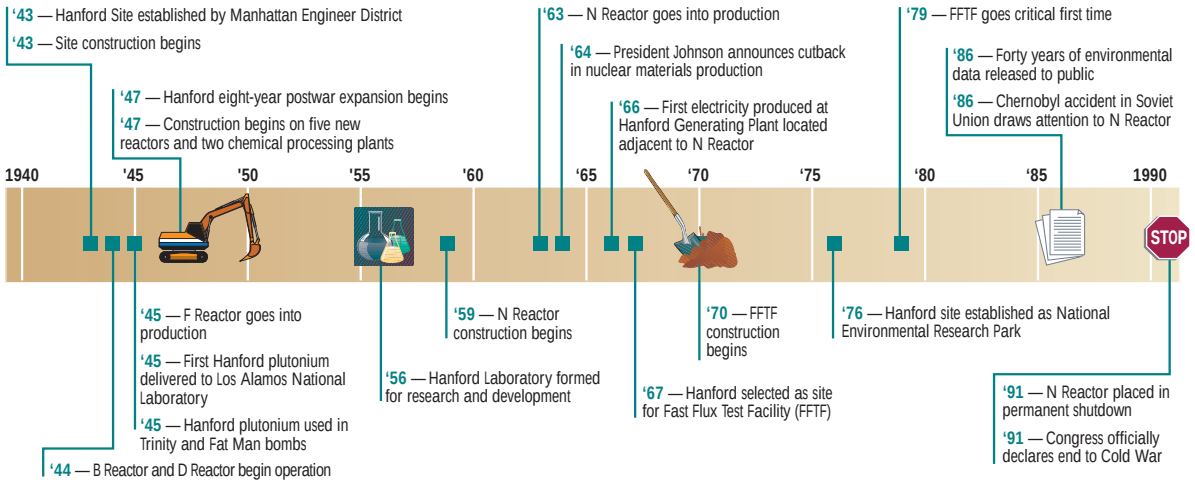
After World War II, a gigantic nuclear arms race between the United States and the Soviet Union developed resulting in what is known as the Cold War. The increased tensions between the two countries eventually lead to the addition of eight reactors to the Hanford Site. Defense production at the site peaked during 1956 to 1963.

The Johnson Administration determined in 1964 that the United States had a decreased need for special nuclear materials. As a result, all of the defense reactors at Hanford were shut down with the exception of the N Reactor. The N Reactor was the newest reactor at Hanford that produced electricity. From 1964 to 1971, the reactors deemed unnecessary were shut down and prepared for decontamination and decommissioning.

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, and construction of the facility began in December 1970. Initial startup occurred in February 1980 to test oxide fuels and address other fuel performance issues.

From 1980 to 1989, defense production was increased at Hanford's N Reactor as a result of the Reagan Administration's pledge 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.

Changing world conditions in the 1990s eventually halted defense production at Hanford. Congress officially declared the end of the Cold War on September 27, 1991. Today, Hanford's mission includes the safe clean up and management of the site's legacy wastes and the development and deployment of science and technology.



Timeline of Major Activities at the Hanford Site

The Hanford Work Force

A total of 18,719 Hanford employees were included in epidemiologic surveillance in 1995, 936 fewer workers than in 1994. There were almost twice as many men (12,448) as women (6,271). The Hanford work force was relatively young compared with the general population. The average age of Hanford workers was 42 years among men and 38 years among women (figure 1). Men and women were not represented equally among the various occupational groups (figure 2 and Appendix A). The professional, technical, crafts and manual labor, and nuclear occupational categories contained many more men than women, while the administrative category had slightly more women than men.

This report evaluates worker health by examining illness and injury rates for various occupational groups. Not all occupations pose equal risks for illness or injury, so comparisons of rates among several occupational categories are made to determine whether some occupational groups are at greater risk than others for these health events. The number of illnesses or injuries reported in any specific occupation may be very small in a given year or the number of workers in a given occupation may be small. These small numbers limit the certainty with which illness and injury rates can be calculated and compared and in some cases are too few in number to analyze separately. The analyses presented in this report use broad occupational categories (figure 2) because there were not enough health events in many specific occupations to permit more detailed analyses, but you can find which occupational category you are in by referring to figure 3. This figure lists many of the job titles that are grouped into each of the categories used for the analyses.

Figure 1. The Work Force by Gender and Age

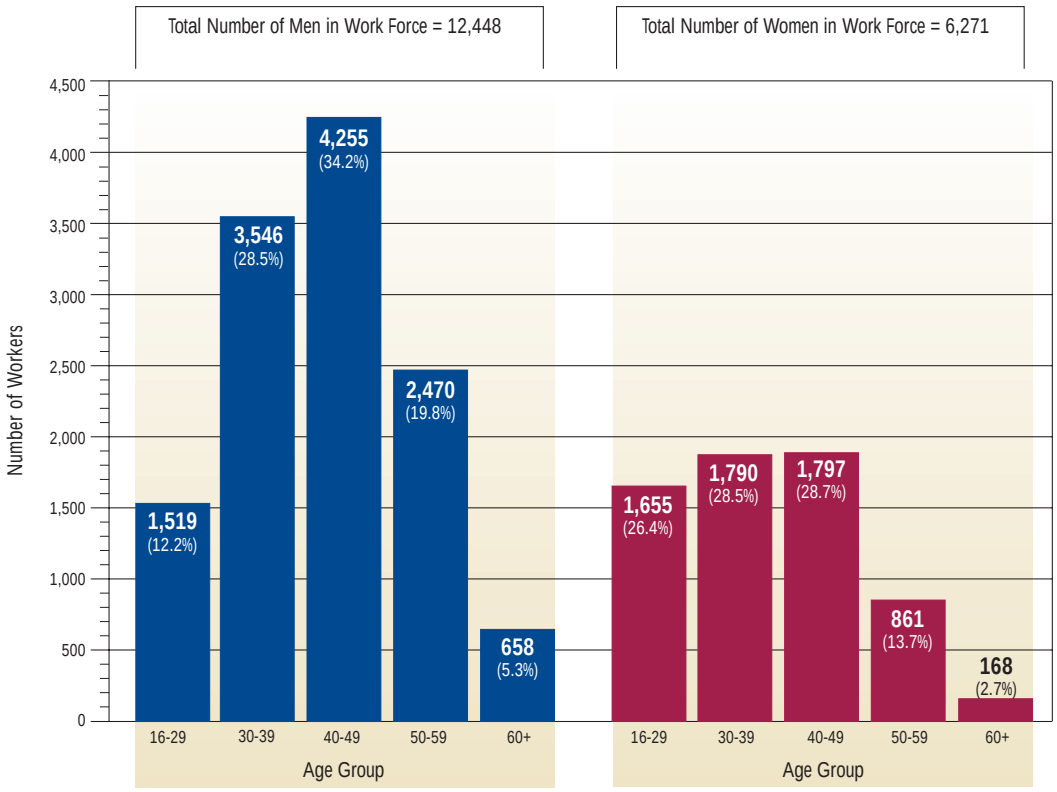


Figure 2. Percentage of Workers by Gender and Occupation

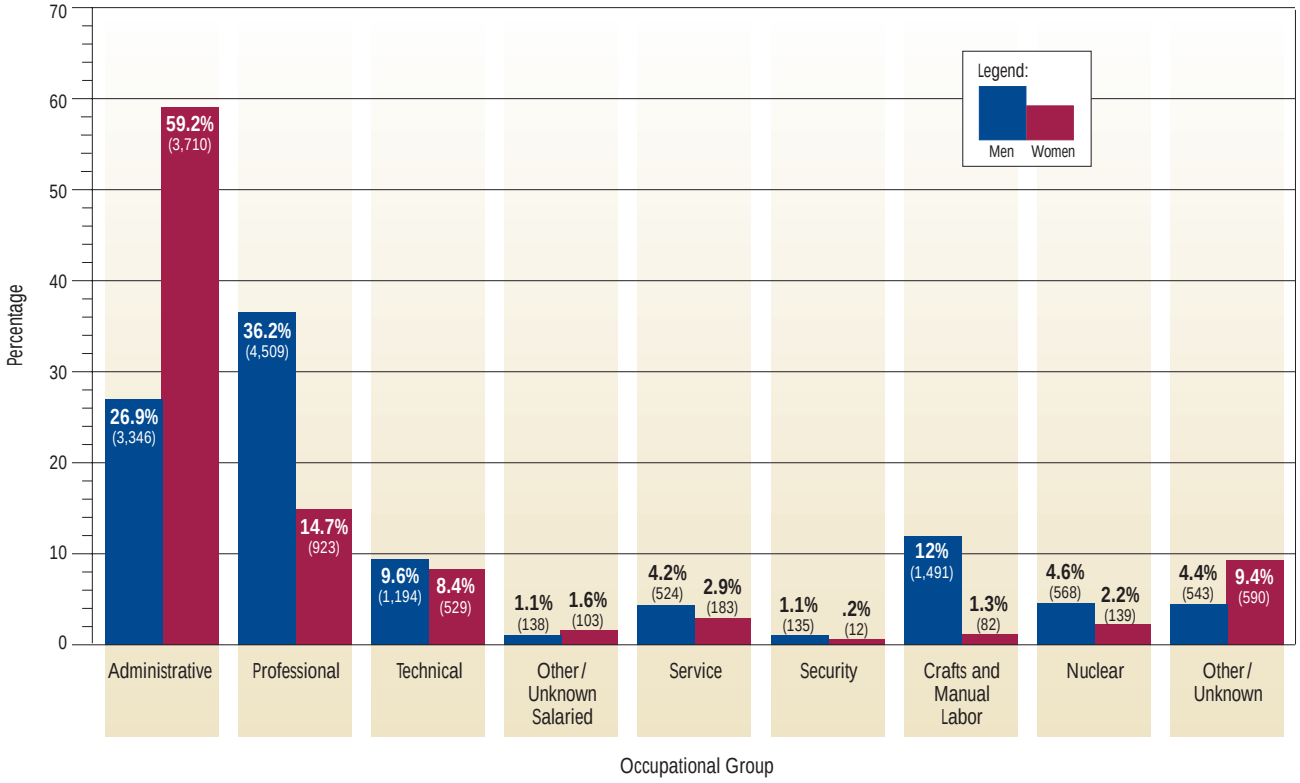


Figure 3. Most Common Job Titles in Each Occupational Group

ADMINISTRATIVE
ACCOUNTANT
ADMINISTRATIVE ANALYST
ADMINISTRATIVE ASSISTANT
ADMINISTRATIVE SPECIALIST
ADMINISTRATOR
ADVISOR
AGENT
AIDE
ANALYST
ASSISTANT
ASSISTANT ADMINISTRATOR
ASSISTANT MANAGER
ASSOC. DIRECTOR
ASSOC. MANAGER
ASSOCIATE
ATTORNEY
AUDITOR
BUYER
CLERK
CONSULTANT
CONTRACTOR
CONTROLLER
COORDINATOR
COUNSELOR
DATA ENTRY ASSISTANT
DATA ENTRY OPERATOR
DECLASSIFIER
DEPARTMENT ADMINISTRATOR
DEPARTMENT COORDINATOR
DEPARTMENT DIRECTOR
DEPARTMENT MANAGER
DEPUTY CHIEF
DEPUTY DIRECTOR
DEPUTY MANAGER
DIRECTOR
DIRECTOR ADMINISTRATOR
DIRECTOR ASSISTANT
DISPATCHER
DOE MENTOR
DUTY OFFICER
EDITOR
ESCORT
ESTIMATOR
EVALUATOR
EXECUTIVE
EXECUTIVE ASSISTANT
EXECUTIVE DIRECTOR
EXECUTIVE SECRETARY
EXECUTIVE VICE PRESIDENT
EXPEDITER
GENERAL COUNSEL
GENERAL MANAGER
GENERAL SUPERINTENDENT
GROUP LEADER
GROUP MANAGER
HISTORIAN
INSPECTOR
INSTRUCTOR
INTERN
LANDLORD
LEADER
LIAISON
LIBRARIAN
LOGISTICS OFFICER
MANAGER
OFFICE ADMINISTRATOR
OFFICE ASSISTANT
OFFICE MANAGER
OFFICER CLASSIFICATION
OPERATOR TELEPHONE
PARALEGAL
PATENT AGENT
PAYMASTER
PAYROLL ASSISTANT
PLANNER
PRESIDENT
PROGRAM ADMINISTRATOR
PROGRAM ANALYST
PROGRAM ASSISTANT
PROGRAM MANAGER
PROGRAM PLANNER
PROGRAM SPECIALIST
PROJECT ANALYST
PROJECT ASSISTANT
ROJECT COORDINATOR
PROJECT MANAGER
PROJECT SPECIALIST
PROJECT SUPERINTENDENT
RECEPTIONIST
RECRUITER
REPRESENTATIVE
SAFETY OFFICER
SCHEDULER
SECRETARY
SECTION ADMINISTRATOR
SECTION ANALYST
SECTION MANAGER
SPECIALIST
SUPERINTENDENT
SUPERVISOR
SWITCHBOARD OPERATOR
TEAM LEADER
TRAINER
VICE PRESIDENT
WORD PROCESSOR
WRITER

(continued)

Figure 3. Most Common Job Titles in Each Occupational Group (continued)

PROFESSIONAL
ADVISOR
ANALYST
ARCHITECT
CHEMIST
COMPUTER CONSULTANT
COMPUTER PROGRAMMER
COMPUTER SCIENTIST
DATA BASE ADMIN.
DOSIMETRY SPECIALIST
ECONOMIST
ENGINEER
EPIDEMIOLOGIST
FIREFIGHTER EMT
FIREFIGHTER PARAMEDIC
FITNESS COORDINATOR
GEOLOGIST
HEALTH PHYSICIST
HYDROGEOLOGIST
HYDROLOGIST
HYGIENIST
INDUSTRIAL HYGIENIST
MEDICAL ASSISTANT
NETWORK DESIGNER
NURSE
OPERATIONS PERSONNEL
PARAMEDIC
PATHOLOGIST
PHYSICIAN
PHYSICIST
PHYSIOLOGY DIRECTOR
PROGRAMMER
PROGRAMMER ANALYST
PSYCHOLOGIST
RADIOCHEMIST
RESPIRATORY PROTECTION
SAFETY & HEALTH REP
SCIENTIST
SOFTWARE ANALYST
STATISTICIAN
TOXICOLOGIST

TECHNICAL
ACCEPTANCE INSPECTOR
ANIMAL CARE TECH
ANIMAL RESEARCH TECH
BHS TECHNICIAN
BIOLOGY TECHNICIAN
BUILDING TECHNICIAN
CAD SPEC
CHEMICAL TECHNOLOGIST
CINEMATOGRAPHER
CLINICAL TECH
COLOR TECHNICIAN
COMMUNICATION TECH
COMPUTER OPERATOR
COMPUTER PROGRAMMER
COMPUTER SPECIALIST
COMPUTER TECHNICIAN
DATA TECH
DESIGNER
DOSIMETRY TECH
DRAFTER
EHS TECHNICIAN
ELECTRONIC TECH
ENGINEER AIDE
ENGINEER INTERN
ENGINEER SPECIALIST
ENGINEER STUDENT
ENGINEER TECH
ENVIRONMENTAL TECH
FFTF TECH
FTF REACTOR TECH
HEALTH CARE CTR SPEC
HEALTH INFORMATION TECH
HEALTH PHYSICS TECHNICIAN
IEM CELL TECH
ILLUSTRATOR
INDUSTRIAL HYGIENE TECH
INVENTORY TECH
ISOTOPE PWR TECH
LAB AIDE
LAB INSTRUMENT SPEC
LAB TECHNICIAN
LASER TECH
MEDIA TECHNICIAN
MEDICAL/CHEMICAL TECH
NDE TECHNICIAN
NON DESTRUCTIVE TEST TECHNICIAN
PRIN TECH EDITOR
PROJECT TECH
QA INSPECTOR
QA TECHNICIAN
QC INSPECTOR
QC TECHNICIAN
RADIATION MONITOR
RADIATION PROTECTION TECH
RECORDS TECH
REPRODUCTION LEADER
RESEARCH ASSISTANT
RESEARCH TECHNICIAN
RESOURCE TECH
RESPIRATORY TECH
SAFETY TECHNICIAN
SCHEDULING TECHNICIAN
SCIENCE SPECIALIST
SCIENTIFIC TECHNICIAN
STUDENT TECH
SUMMER TECH
TECH ANALYST
TECH ASST.
TECH CONSULTANT
TECH DIRECTOR
TECHNICAL SPECIALIST
TECHNICAL SUPPORT
TECHNICIAN
TELECOM TECH
WEAPONS TECHNICIAN

OTHER/UNKNOWN SALARIED
ASSISTANT
ASSOCIATE
CONSULTANT
CONTRACTOR
ENVIRONMENTAL GENERALIST
JOB TITLE UNKNOWN
POSTDOCTORAL FELLOW
STAFF
STUDENT
SUB CONTRACTOR
SUMMER HIRE
TRAINEE
UNDERGRADUATE INTERN
VENDOR
VISITOR
WATER TREATMENT WIT

SERVICE
BLASTER
BUS DRIVER
CAPTAIN
CHIEF HANFORD FIRE DEPT.
CHIEF OPERATOR
CHIEF SYS ELEC. DIS
CONDUCTOR
COPY CAMERA OPERATOR
CRANE INSPECTOR
DRIVER
DRIVER TRUCK HEAVY
DRIVER TRUCK LIGHT
DUPLICATING OPERATOR
ELEVATOR INSPECTOR
FIRE MARSHALL
FIREFIGHTER
FLOOR SERVICEMAN
FUELS OPERATOR
FUELS PROCESS OPERATOR
GROUNDS MAINTENANCE
GROUNDSKEEPER
HALON INSPECTOR
SERVICE (CONT.)
HOURLY SECURITY ESCORT
HVAC TECHNICAL
IP OPERATOR
JANITOR
LAUNDRY WORKER
LEAD OPERATOR
LEADER DUPLICATING
LEADER ENGINEER REPRO
MAIL MESSENGER
MASK PROC OPERATOR
OFFICER FIRE TRAINING
OFFICER IN CHARGE
OPERATOR
OPERATOR APPRENTICE
OPERATOR FAC SUP
OPERATOR REPRODUCTION
OPERATOR TECH
OPERATOR TERMINAL SENIOR
OPERATOR TRAINEE
PATROL CHIEF
PHOTOGRAPHER
POWER OPERATOR
POWER TRAINER
PRESSURE VESSEL INSPECTOR
PRIN. SURVEYOR
PROCESS OPERATOR
REPRODUCTION OPERATOR
RES EQUIPMENT MAN
SAMPLE CUSTODIAN
SENIOR ILLUSTRATOR
SENIOR MATERIAL CHECKER
SENIOR MATERIAL COORD
SENIOR PHOTO TECH
SENIOR SURVEYOR
SERVICEPERSON
STOREKEEPER
SUBSTATION OPERATOR
SURVEYOR
SWITCHMAN
TECH INSTRUCTOR
TECH ILLUSTRATOR
TELCOM WORKER
TELEPHONE ENGINEER
TRACK EQUIPMENT OPERATOR
TRACK INSPECTOR
TRACKMAN

SECURITY
CAPT AMS
CAPT FIRE PROTECT
CAPT PATROL AREA
CAPT PLATOON
CAPTAIN
CAPTAIN HM LDR
CHIEF BATTALION
CHIEF HANFORD PATROL
CMDR PATROL
CMDR PLATOON
CMDR SHIFT
CMDR SPO
GUARD
GUARD PATROL
INSPECTOR SECURITY
LT CENTRAL ALARM
LT COORD ALARM MON SYSTEM
LT RELIEF PLATOON
LT SPECIAL RESPONSE
LT TESTING AND SERVICES
OFFICER ALARM MON SYSTEM
OFFICER PATROL
PATROL SRT
PATROL TRN
PATROLMAN
SEC INSPEC CAPT
SEC INSPECTOR SRT
SEC SERVICES
SECURITY GUARD
SECURITY INSPECTOR
SECURITY POLICE OFFICER
SECURITY WATCHMAN
SHFT LT
SHIFT COMMANDER
SR SAFRGUARDS
SRT LIEUTENANT

CRAFTS AND MANUAL LABOR
ASBESTOS ABATEMENT
AUTOBODY REPAIR & PAINT
AUTOMOTIVE PARTS HANDLER
BOILERMAKER
BUILDING TRADES
CARPENTER
CEMENT FINISHER
CEMENT MASON
CONSTRUCTION
CRANE OPERATOR
CRANE RIGGING
DRILLER
ELECTRICIAN
EQUIPMENT OPERATOR
GENERAL LABORER
GLAZIER GLASSMAKER
INSTRUMENT OPTICIAN
INSTRUMENT SPECIALIST
INSTRUMENT TECHNICIAN
INSTRUMENT WORKER
INSULATOR

(continued)

Figure 3. Most Common Job Titles in Each Occupational Group (continued)

IRONWORKER
LAB MACHINIST
LABORER
LINEMAN
LOCKSMITH
LOCOMOTIVE ENGINEER
LUBE AND TIREMAN
MACHINIST
MASTER CRAFTSMAN
MECHANIC
MECHANICAL DESIGNER
METAL OPERATOR
METER RELAY TECHNICIAN
MILLWRIGHT
OILIER
OPERATING ENGINEER
PAINTER
PAINTER CARPET INSTALLER
PAINTER SIGN
PIPEFITTER
PLUMBER STEAMFITTER
RIGGER
SHEETMETAL WORKER
SIGN WRITER
SPRINKLER FITTER
STOCK & TOOL ATTENDANT
STOCK BINDERY OPERATOR
TEAMSTER
WELDER
WELL DRILLER
WIREMAN

NUCLEAR
DECONTAM DECOMM WORKER
FFTF OPS REACT
HAZ WASTE TECH
HOT CELL TECH
NUCLEAR OPERATOR
NUCLEAR REACTOR OPERATOR
NUCLEAR CHEMICAL OPERATOR
NUCLEAR CONTROL POWER OPER CHIEF
NUCLEAR FUELS OPERA
NUCLEAR POWER OPERATOR
NUCLEAR PROCESS OPERATOR
NUCLEAR REACTOR CONT. OPR
POWER OPERATOR
REACTOR CONT RM OPR
REACTOR FUELS OPERATOR
REACTOR OPERATOR
REACTOR OPERATOR TECH

OTHER / UNKNOWN
COM SERV ASST.
CONSULTANT
CONTRACTOR
FOREIGN NATIONAL
JOB TITLE UNKNOWN
OPER PERS
OWNER
POSTDOCTORAL APPT
RESEARCH FELLOW
STUDENT
SUB CONTRACTOR
SUMMER INTERN
SUPPORT
TEMP
UNDERGRADUATE INTERN
VENDOR
VISITING CONSULTANT
VISITOR
WIT

Work Force Demographics

Hanford reported the job categories service and security separately for the first time in 1995. To look at time trends for 1993 to 1995, it was necessary to combine these two categories.

The Hanford work force increased from 17,807 workers in 1993 to 19,655 workers in 1994 and then declined to 18,719 workers in 1995. There was a slight shift in the age of the workers. For men (figure 4) there was a decrease in workers under 40 years of age and an increase in workers aged 40 to 49. The percentage of women (figure 5) under 30 years of age decreased from 1994 to 1995 and women aged 30 to 49 increased. Over the three years, there was also an increase among both men and women administrative workers and a decrease in technical workers (figures 6 and 7). These changes may indicate a real shift in the type of work being done at Hanford or reflect changes in the way that workers are classified.

Figure 4. Percentage of Men in Different Age Groups, 1993 to 1995

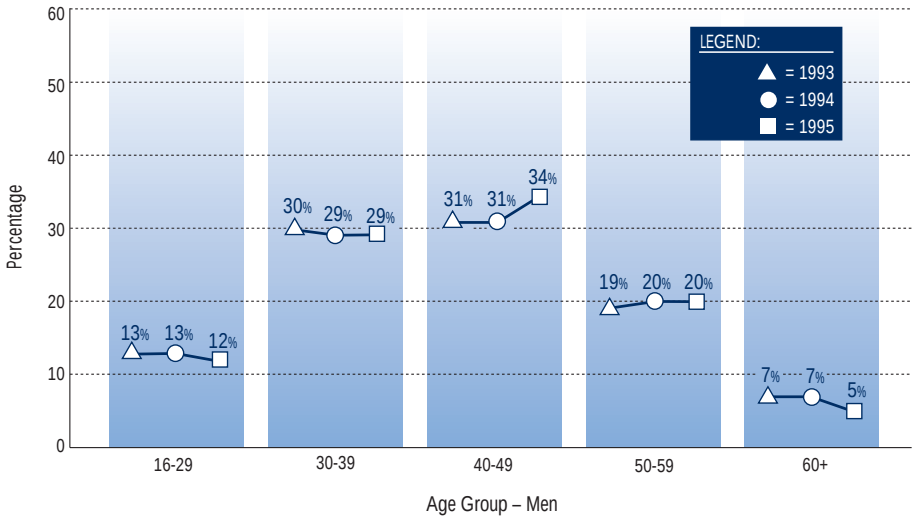


Figure 5. Percentage of Women in Different Age Groups, 1993 to 1995

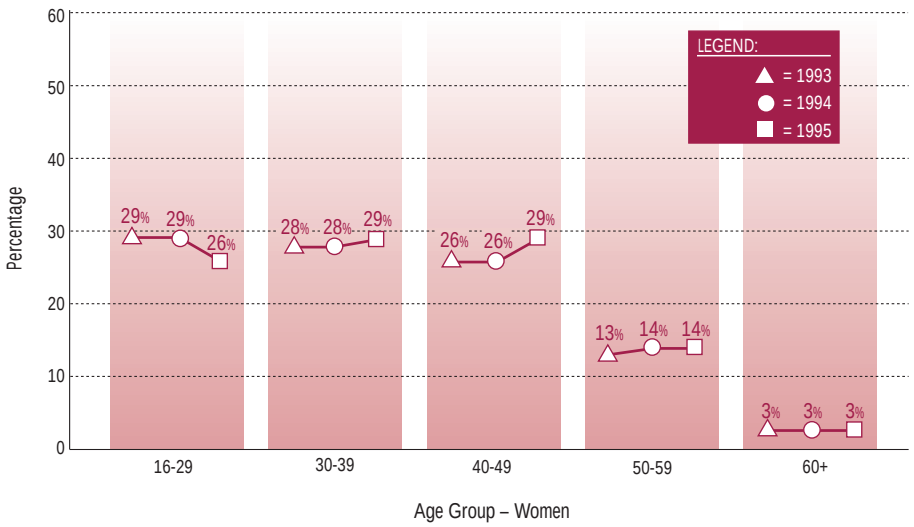


Figure 6. Percentage of Men in Different Occupational Groups, 1993 to 1995

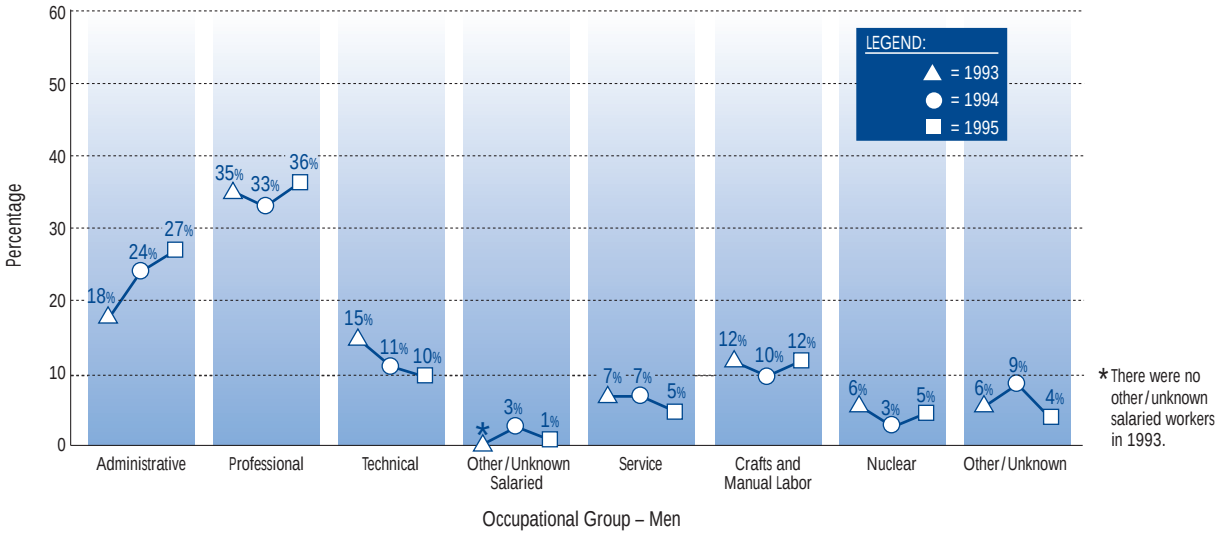
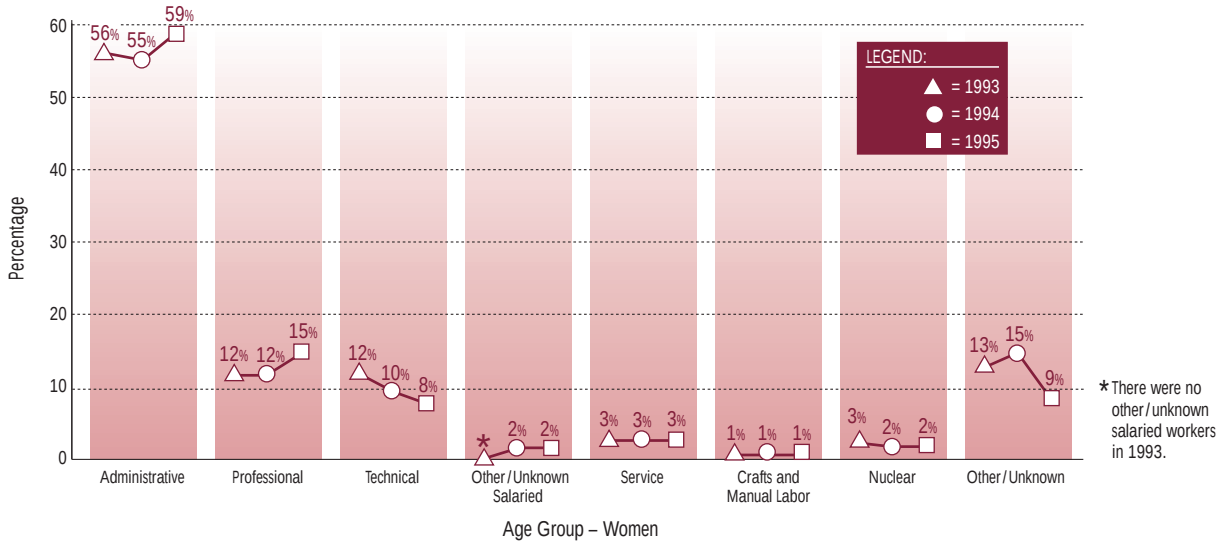


Figure 7. Percentage of Women in Different Occupational Groups, 1993 to 1995



Number and Length of Absences

As in the 1994 report, this report includes illness absences that lasted at least five consecutive workdays. The five-day length of absence is used because DOE Order 440.1 requires contractor management to notify Occupational Medicine when a worker has been absent for five or more consecutive workdays. Epidemiologic surveillance refers to these absences as "health events." Throughout this report, worker health is examined in terms of gender, age, and occupation because the risk of illness and injury varies by these factors. When the number of days absent is reported, it includes weekends unless otherwise stated.

Among women, the age group with the highest percentage of health events was 30 to 39 years (12%). Among men the highest percentage (6%) occurred in the 40 to 49 and 50 to 59 age groups (figure 8). Men and women had about the same number of health events during 1995; since the work force contained almost twice as many men as women, the percentage of women (10%) with at least one health event was greater than men (5%). This gender difference in health events was also seen in 1994, as the percentage of both men (5%) and women (9%) with one or more absences was approximately the same as in 1995. The shaded box explains how these percentages were calculated. Overall, the average length of absence for a health event was 65% longer for women (45.8 days) than for men (27.8 days) (figure 10).

When the length of absences of men and women were compared, women aged 16 to 39 had longer absences than men. The longer absences among women aged 16 to 39 may reflect maternity leave, as pregnancy/childbirth was the diagnostic category most frequently reported for women in these age groups (figure 14; appendix F). Among workers aged 60 years or older, men had longer absences than women. Each of five men experienced an absence of over 90 days. These absences involved diagnoses of cancer, heart disease, hernia, arthritis, and a shoulder problem.

The nuclear group had the highest percentage of workers with a health event; 13% of the men and 26% of the women (figure 9) reported at least one absence. Although the percentage of nuclear workers with at least one absence was elevated, the average length of their absences (35.6 days) was not very different from those of other occupational groups. Workers in the other/unknown (43.9 days) and service (43.2 days) groups had the highest average number of days absent for each health event (figure 11). Appendixes B-E provide more detail about the number and length of absences for men and women in different age and occupational groups. The diagnoses underlying these absences are examined in the Rates of Disease Occurrence section of this report.

How Are Percentages Calculated?

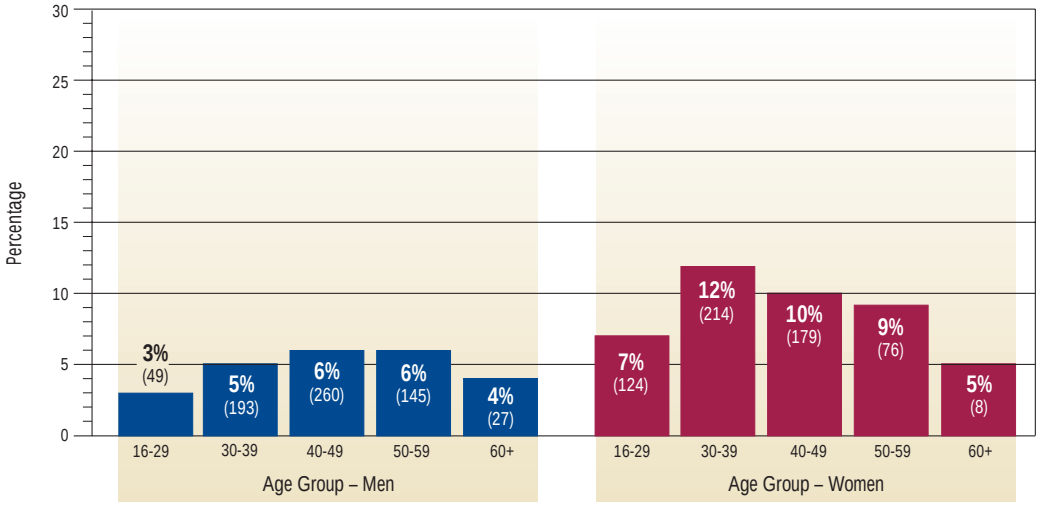
The percentages are calculated by dividing the number of workers with at least one health event in a given age and gender group by the number of employees in the same group. This number is multiplied by 100 to give a percent. The number of employees in each group is shown in figure 1. An example is given below:

49 (number of men aged 16-29 with at least one health event from figure 8)

÷1,519 (number of men aged 16-29 in the work force from figure 1)

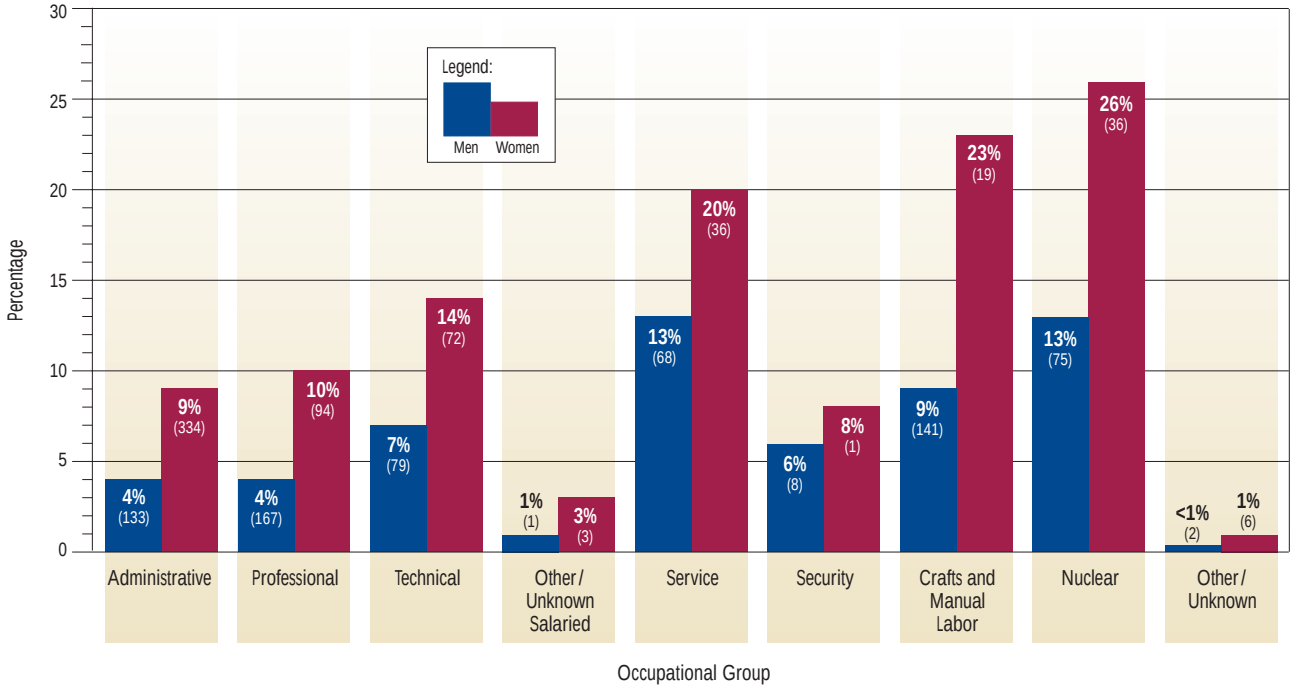
= .032 x 100 = 3%

Figure 8. Percentage of Workers with at Least One Health Event by Gender and Age*



*Numbers in parentheses represent the number of workers with at least one event.

Figure 9. Percentage of Workers with at Least One Health Event by Gender and Occupation*



*Numbers in parentheses represent the number of workers with at least one event.

Figure 10. Number of Days Absent by Gender and Age

Figure 11. Number of Days Absent by Gender and Occupation

Men

Occupation	Total Number of Days Absent	Total Number of Health Events	Average Number of Days Absent
Administrative	4,030	147	27.4
Professional	4,721	182	25.9
Technical	1,626	91	17.9
Other/Unknown Salaried	30	2	15.0
Service	3,823	78	49.0
Security	215	9	23.9
Crafts and Manual Labor	4,154	150	27.7
Nuclear	2,216	93	23.8
Other/Unknown	124	2	62.0
Total	**20,939**	**754**	**27.8**

Women

Occupation	Total Number of Days Absent	Total Number of Health Events	Average Number of Days Absent
Administrative	16,796	385	43.6
Professional	5,464	111	49.2
Technical	4,174	86	48.5
Other/Unknown Salaried	131	3	43.7
Service	1,620	48	33.8
Security	115	1	115.0
Crafts and Manual Labor	1,275	25	51.0
Nuclear	2,513	40	62.8
Other/Unknown	271	7	38.7
Total	**32,359**	**706**	**45.8**

Diagnostic Categories

Epidemiologic surveillance monitors both occupational and nonoccupational illnesses and injuries among active workers. For many health conditions it is not possible to say with certainty what caused the condition, so epidemiologic surveillance assesses the health of the work force in a very broad way. Most of the diagnoses analyzed in epidemiologic surveillance are reported by the workers when they visit their site's occupational medicine clinic and receive a return-to-work clearance following an absence.

This report organizes diagnostic categories by type of disease or condition (e.g., cancer) or body system (e.g., lung/respiratory). Categories can be broken down into specific health conditions. For example, rheumatism is one health condition under the diagnostic category of muscles and skeleton. Bronchitis is a condition under lung/respiratory. You can find the specific health conditions in each diagnostic category in the Explanation of Diagnostic Categories in this report. A health event can involve more than one diagnosis, and epidemiologic surveillance includes all diagnoses reported. If a worker reported more than one health condition for a single absence, all of them were counted.

The categories of health conditions reported most often by men and women changed little during 1993-1995. Among men, respiratory conditions, injuries, and problems involving the digestive system showed the highest rates during those three years. For the same period, respiratory conditions, pregnancy and childbirth, and injuries reflected the highest diagnosis rates among women (figures 12 and 13).

The most frequently reported health conditions varied with gender and age (figure 14 and appendix F). Lung/respiratory conditions ranked among the top three diagnosis categories for men in all age groups. Approximately one-fourth of these ailments were upper respiratory infections. Sinusitis, pneumonia, bronchitis, flu, deviated septum, and asthma accounted for the remainder. Digestive disorders were among the more commonly reported diagnoses by men aged 30 to 39 and 50 and older. Hernias accounted for one-third of these diagnoses. Appendicitis, colitis, and gallbladder disease were also commonly reported.

Diagnoses associated with pregnancy/childbirth were the most common reasons for absence among 16 to 39 year old women (figure 14). Lung/respiratory diagnoses were among the top three conditions reported for women aged 30 and older. Diagnoses involving the muscles and skeleton were prominent among women over 40 years old, with rheumatism being the most common diagnosis. Back problems were also common and included degenerated and herniated discs and back pain. Arthritis and other joint disorders were responsible for 20% of the muscles and skeleton diagnoses.

Heart/circulatory problems were among the more common health problems for men aged 50 and older and women aged 60 and older. Over half of the diagnoses for men were for ischemic heart disease (restricted blood flow through an artery). The more common diagnoses among women were ischemic heart disease, hemorrhoids, and other circulatory problems in the legs. Only two women in the 60+ age group reported heart/circulatory diagnoses; these were ischemic heart disease and a heart valve problem.

Diagnoses for injury and poisoning occurred relatively frequently in this work force. While poisoning is included in this diagnostic category, only nine (2.7%) of the 328 diagnoses were related to poisoning; one was a reaction to a toxic vapor and the remainder involved allergic reactions to medicine. Complications of medical care are also included in the injury and poisoning category; nine such diagnoses were reported. Injury and poisoning was among the three most common diagnostic categories for men in the professional, technical, service, security, crafts and manual labor, and nuclear groups (figure 15). The predominant type of injury was sprains and strains followed by fractures and dislocations (appendix H). For women, these diagnoses were

among the top three for professional, technical, service, crafts and manual labor, nuclear, and other/unknown workers. With the addition of bruises, the most common types of injuries among women were the same as among men. Injuries, including both occupational and nonoccupational injuries, affect many occupational groups and are not confined to a narrow age range (figures 14 and 15).

Figure 12. Total Number of Health Conditions Reported and Total Number of Days Absent from Work by Gender and Diagnostic Category

Diagnostic Category	Men		Women	
	Total Number of Health Conditions Reported	Total Number of Days Absent	Total Number of Health Conditions Reported	Total Number of Days Absent
Benign Growths	15	370	18	612
Blood	5	184	3	33
Cancer	21	827	18	1,163
Digestive	3 127	3 2,954	89	2,439
Endocrine/Metabolic	9	320	11	417
Existing Birth Condition	2	110	3	222
Genitourinary	15	450	78	2,597
Heart/Circulatory	78	2,842	22	833
Infections/Parasites	37	541	22	324
Injury and Poisoning	1 197	1 5,420	1 131	3 3,635
Lung/Respiratory	2 182	2,651	2 129	1,647
Mental	31	1,010	56	3,115
Muscles and Skeleton	120	2 4,759	3 125	2 5,249
Nervous System	38	949	41	1,501
Pregnancy/Childbirth	NA	NA	121	1 11,966
Skin	17	324	8	211
Unspecified Symptoms	28	462	27	1,423

Figure 13. Health Conditions Reported Under Selected Diagnostic Categories by Gender

Men

Cancer
- Brain
- Chest
- Colon
- Gallbladder
- Kidney
- Liver
- Lymph Nodes
- Male Reproductive System
- Other Lymphomas
- Prostate
- Tonsils

Injury and Poisoning
- Dislocations
- Fractures
- Late Effects of an Injury
- Sprains and Strains
- Toxic Effects

Lung/Respiratory
- Asthma
- Bronchitis
- Deviated Septum
- Flu
- Pneumonia
- Sinusitis
- Upper Respiratory Infection

Digestive
- Appendicitis
- Colitis
- Gallbladder Disease
- Hernias

Women

Cancer
- Brain
- Colon
- Lymph Nodes
- Malignant Melanoma
- Ovary
- Uterus

Injury and Poisoning
- Bruises
- Dislocations
- Fractures
- Late Effects of an Injury
- Sprains and Strains

Lung/Respiratory
- Asthma
- Bronchitis
- Flu
- Pneumonia
- Sinusitis
- Upper Respiratory Infection

Muscles and Skeleton
- Acquired Toe Deformities
- Arthritis
- Back Pain
- Bunions
- Disc Disorders
- Joint Disorders
- Lumbago
- Rheumatism

Figure 14. Three Diagnostic Categories Reported Most Often by Gender and Age

		16-29	30-39	40-49	50-59	60+
Men	Most Common Diagnostic Category	Injury and Poisoning	Injury and Poisoning	Injury and Poisoning	Heart/Circulatory; Lung/Respiratory	Cancer; Digestive
	Second Most Common Diagnostic Category	Lung/Respiratory	Lung/Respiratory	Lung/Respiratory	Digestive; Injury and Poisoning	Heart/Circulatory (1)
	Third Most Common Diagnostic Category	Muscles and Skeleton	Digestive	Muscles and Skeleton	Muscles and Skeleton	Lung/Respiratory
Women	Most Common Diagnostic Category	Pregnancy/Childbirth	Pregnancy/Childbirth	Muscles and Skelton	Muscles and Skeleton	Heart/Circulatory
	Second Most Common Diagnostic Category	Injury and Poisoning	Lung/Respiratory	Lung/Respiratory	Lung/Respiratory	Lung/Respiratory (1)
	Third Most Common Diagnostic Category	Genitourinary	Injury and Poisoning	Injury and Poisoning	Digestive; Injury and Poisoning	Muscles and Skelton

(1) This diagnostic category was reported the same number of times as the one above it.

Figure 15. Three Diagnostic Categories Reported Most Often by Gender and Occupation

		Administrative	Professional	Technical	Other/Unknown Salaried	Service
Men	Most Common Diagnostic Category	Digestive	Injury and Poisoning	Lung/Respiratory; Muscles and Skeleton	Lung/Respiratory	Injury and Poisoning
	Second Most Common Diagnostic Category	Lung/Respiratory	Lung/Respiratory	Injury and Poisoning	None	Lung/Respiratory (1)
	Third Most Common Diagnostic Category	Heart/Circulatory	Digestive	Digestive	None	Digestive
Women	Most Common Diagnostic Category	Lung/Respiratory	Injury and Poisoning	Injury and Poisoning	Pregnancy/Childbirth	Lung/Respiratory
	Second Most Common Diagnostic Category	Pregnancy/Childbirth	Pregnancy/Childbirth	Muscles and Skeleton	Genitourinary	Injury and Poisoning; Mental
	Third Most Common Diagnostic Category	Muscles and Skeleton	Lung/Respiratory	Pregnancy/Childbirth	None	Muscles and Skeleton (1)

		Security	Crafts and Manual Labor	Nuclear	Other/Unknown
Men	Most Common Diagnostic Category	Injury and Poisoning	Injury and Poisoning	Lung/Respiratory	Cancer
	Second Most Common Diagnostic Category	Muscles and Skeleton	Lung/Respiratory	Injury and Poisoning	Heart/Circulatory (1)
	Third Most Common Diagnostic Category	(2)	Muscles and Skeleton	Muscles and Skeleton	None
Women	Most Common Diagnostic Category	Pregnancy/Childbirth	Muscles and Skeleton	Lung/Respiratory; Muscles and Skeleton	Injury and Poisoning
	Second Most Common Diagnostic Category	None	Injury and Poisoning; Lung/Respiratory	Digestive; Injury and Poisoning	Pregnancy/Childbirth
	Third Most Common Diagnostic Category	None	Nervous System (1)	Mental	(2)

(1) This diagnostic category was reported the same number of times as the one above it.
(2) More than two diagnostic categories tied.

Rates of Disease Occurrence

Some occupational groups had only a small number of workers who reported very few health events in 1995 (appendix H). Because rates based on health eventa among a small number of workers can vary widely just by chance, the nine occupational groups were combined into eight groups. Other/Unkown Salaried and Other/Unknown were combined into one occupational group. Figure 16 shows the rates of disease by broad job category in two age categories, under 40 years of age and those aged 40 and older. These age groups were chosen because the rates of many illnesses begin to change more rapidly among persons over 40 years of age.

The risk of getting cancer increases with age, and most cancer diagnoses were reported among workers aged 40 or older (figure 17). Overall, 14 women reported 18 cancer-related absences and 14 men reported 21 cancer-related absences in 1995. Three men and one woman under the age of 40 reported cancer. Two of these men reported 3 diagnoses of testicular cancer; the third man had a diagnosis of cancer involving the chest wall. The one cancer in a female worker under age 40 was a breast cancer.

We observed no excess of any specific type of cancer among men working at Hanford in 1995. Among men aged 40 and older, one brain cancer, two prostate, two bladder, and three colon cancers were reported. Three diagnoses of secondary cancer of the lymph nodes were reported by two men.

Nine diagnoses of breast cancer were reported by nine women in 1995. Seven of the nine women were in the 40-49 age group. In general, rates of breast cancer tend to be higher among women aged 50 or older than they are among those in their 40s. The age distribution of women reporting cancer may reflect the age distribution of women in the work force as a whole (figure 1). An examination of the occupations of the women reporting breast cancer did not suggest a pattern; secretarial, clerical, engineering, and administrative positions were reflected in their job titles. A comparison of breast cancer rates among Hanford women with those of the National Cancer Institute's Surveillance, Epidemiology, and

A Word about Rates...

The previous section considered the **number** of health events among various groups, but comparing these numbers may be misleading. For example, figure 12 shows that during 1995 men reported 197 diagnoses involving injuries; women reported 131. You can honestly say that men reported almost 50% more injuries as women. Does this mean that men were at greater risk of injury in 1995? Comparing the number of injuries among men versus women will not answer this question. To answer the question, the number of men and women in the work force must be considered (figure 1). Since there are almost twice as many men as women working at Hanford, it is reasonable to expect more injuries among men than women. A more accurate way to compare men and women is to calculate the injury rate for each group. The rates are calculated by dividing the number of injuries in a given group by the number of employees in the same group. This number is multiplied by 1,000 to give a rate per 1,000 workers. For example:

(197 injuries ÷ among 12,448 men) = .0158 x 1,000 = 15.8 injuries per 1,000 men

(131 injuries ÷ among 6,271 women) = .0209 x 1,000 = 20.9 injuries per 1,000 women

These rates account for differences in the number of men and women in the work force, and comparing them suggests that the rate of reported injuries among women is higher than among men. They are called **crude rates** because they do not account for possible differences between men and women with regard to age, occupation, and other factors that might affect the individual's risk of getting an injury. Not all age groups are equally susceptible to various diseases and injuries, so epidemiologists often take age into account when calculating rates. For example, figure 17 of this report shows that injury rates vary not only by occupation, but by both age and gender. Among men, injury and poisoning rates are relatively similar for men under age 40 compared with older men, but the difference in injury and poisoning rates are different for women under age 40 compared with older women. Because these differences can be dramatic, age-specific rates for workers under age 40 and those age 40 or older are presented in this section of the report. Definitions of diagnostic rates and age-specific rates also appear in the Glossary of this report.

End Results cancer registry covering western Washington State showed breast cancer rates among women in the Hanford work force age 40-49 to be about twice the rate in western Washington. However, the rate among Hanford women aged 50-59 was about one-third the rate in the western Washington registry. This age distribution for women with breast cancer was not observed in 1993 or 1994, nor was there any indication of an overall trend toward increased cancer rates among women over the three-year period (figure 21).

Men 40+ years of age had higher rates of heart/circulatory diagnoses than women and younger men. Only 17 of the 122 diagnoses for heart/circulatory conditions occurred in workers less than 40 years old; 6 diagnoses in men and 11 in women. The diagnoses observed in workers under age 40 were different and less serious than those observed among older workers. Among older workers, the most common diagnosis was for ischemic disease (e.g., heart attacks) in contrast to younger workers who were more likely to have diseases of the veins (e.g., varicose veins and hemorrhoids). In women, heart/circulatory diagnoses were less likely related to heart disease and more related to other problems with the circulatory system, including diseases of the veins and arteries.

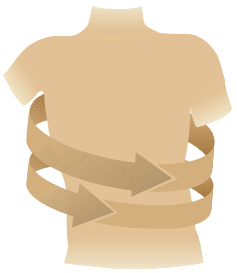
The lung/respiratory category contains many different kinds of diseases: acute infectious diseases such as colds, influenza, and pneumonia; allergies, sinusitis, and bronchitis; and chronic diseases like asthma and emphysema. Seventy percent of the diagnoses in this category involved acute infections or sinusitis. For both men and women, rates were similar in younger and older workers. Respiratory disease rates were higher among service, crafts and manual labor, and nuclear workers. The respiratory disease risk among nuclear workers was 4.8 times higher, among service workers 3.4 times higher, and among crafts and manual labor workers 1.6 times higher than other workers (appendix J).

In the injury and poisoning category, only 9 of the 326 diagnoses involved poisoning, so this category really focuses on injuries. Injury rates did not change consistently with age, but did vary by gender and occupational group. In most job categories, women had a higher injury rate than men at both younger and older ages. This was particularly true for women in the crafts and manual labor, service, and technical job categories. Overall, the highest rates were seen in women aged 40 or older in the crafts and manual labor category, followed by women in the service and nuclear categories. Men in the service and nuclear job categories experienced higher rates of injury than did men in other job categories. The high rates among workers in the service, crafts and manual labor, and nuclear groups were based on 127 diagnoses of which 60 were sprains and strains, 17 were dislocations, 12 were fractures, and 11 were late effects of injuries (figure 17 and appendix H). These groups were at least 2.6 times more likely to sustain an injury than other groups (appendix J). Service workers made up 3.8% of the work force but sustained 12.8% of the injuries and poisonings. They were 5.1 times more likely to experience dislocations, 5.8 times more likely to have back sprains or strains, and 6.7 times more likely to report other types of sprains and strains than other groups of workers. Nuclear workers made up 3.8% of the work force but reported 10.4% of the injuries and poisonings. Nuclear workers were 4.1 times more likely to fracture lower limbs, 3.9 times more likely to experience dislocations, and 4.3 times more likely to report sprains and strains other than of the back. Although crafts and manual labor workers made up 8.4% of the work force, they had 15.5% of the injuries and poisonings. Their risk of sprains and strains of areas other than the back was 3.5 times greater and late effects of an injury was 4.2 times greater than for other workers (appendix J).

A total of 9,055 days were lost in 1995 due to injury and poisoning diagnoses. The service, crafts and manual labor, and nuclear groups combined accounted for half of these days (50.2%). These same three groups were responsible for 38.7% of the injury and poisoning diagnoses even though they represented only 16% of the total Hanford work force in 1995 (Figure 18).

Figure 16. Rates for All Diagnostic Categories Combined by Gender, Age, and Occupation

All Diagnostic Categories

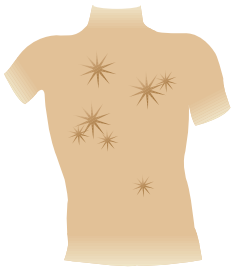


Occupational Group	Age	Rate per 1,000 Men	Rate per 1,000 Women
Administrative	<40	52	139
	40+	52	117
Professional	<40	51	157
	40+	54	157
Technical	<40	76	260
	40+	111	211
Service	<40	139	306
	40+	229	342
Security	<40	83	167
	40+	79	0
Crafts and Manual Labor	<40	71	214
	40+	139	625
Nuclear	<40	196	333
	40+	199	406
Other / Unknown	<40	2	17
	40+	14	11

Figure 17. Rates for Selected Diagnostic Categories by Gender, Age, and Occupation

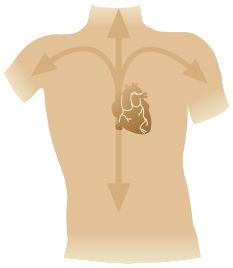
Diagnostic Category

Cancer



Occupational Group	Age	Rate per 1,000 Men	Rate per 1,000 Women
Administrative	<40	2	0
	40+	2	6
Professional	<40	2	4
	40+	3	11
Technical	<40	2	0
	40+	0	5
Service	<40	0	0
	40+	4	0
Security	<40	0	0
	40+	0	0
Crafts and Manual Labor	<40	0	0
	40+	0	0
Nuclear	<40	0	0
	40+	0	0
Other/Unknown	<40	0	0
	40+	5	0

Heart/Circulatory



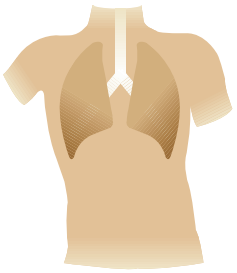
Occupational Group	Age	Rate per 1,000 Men	Rate per 1,000 Women
Administrative	<40	0	5
	40+	11	4
Professional	<40	1	0
	40+	9	3
Technical	<40	0	10
	40+	7	5
Service	<40	0	0
	40+	14	9
Security	<40	0	0
	40+	0	0
Crafts and Manual Labor	<40	0	0
	40+	12	0
Nuclear	<40	9	0
	40+	5	0
Other/Unknown	<40	2	0
	40+	0	0

(continued)

Figure 17. Rates for Selected Diagnostic Categories by Gender, Age, and Occupation (continued)

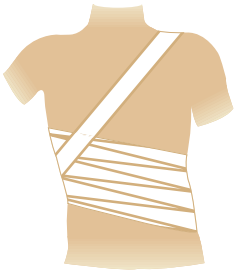
Diagnostic Category

Lung/Respiratory



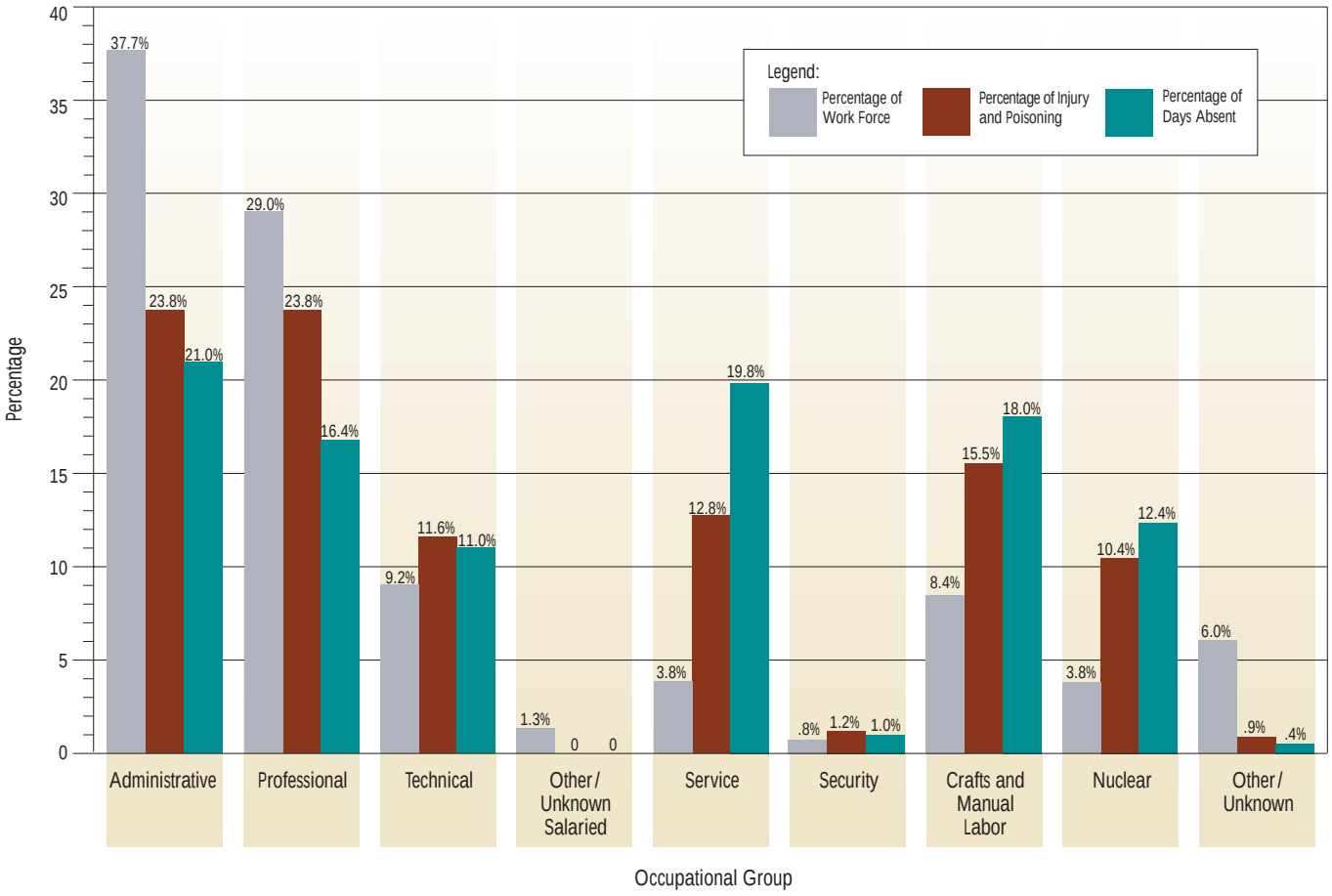
Occupational Group	Age	Rate per 1,000 Men	Rate per 1,000 Women
Administrative	<40	10	21
	40+	8	18
Professional	<40	11	16
	40+	7	22
Technical	<40	14	19
	40+	24	23
Service	<40	20	56
	40+	54	90
Security	<40	14	0
	40+	0	0
Crafts and Manual Labor	<40	17	48
	40+	23	50
Nuclear	<40	68	40
	40+	65	125
Other/Unknown	<40	0	0
	40+	9	0

Injury and Poisoning



Occupational Group	Age	Rate per 1,000 Men	Rate per 1,000 Women
Administrative	<40	7	17
	40+	7	13
Professional	<40	11	28
	40+	10	39
Technical	<40	12	39
	40+	17	41
Service	<40	53	83
	40+	68	36
Security	<40	56	0
	40+	0	0
Crafts and Manual Labor	<40	29	0
	40+	33	100
Nuclear	<40	54	80
	40+	32	31
Other/Unknown	<40	0	5
	40+	0	0

Figure 18. Distribution of Occupations and Injuries



Time Trends

Over the three-year period, the rates for all diagnostic categories combined remained fairly stable for most occupational groups. Overall, rates remained lower among both men and women in administrative, professional, and technical occupations than among service, crafts and manual labor, and nuclear workers. Men in the crafts and manual labor group had a slight decrease in disease rates while women in the same group showed a steady increase in rates. In the nuclear group, the elevation in disease rates among men was greater in the past two years, but disease rates among women were high during all three years (figures 19 and 20). Nuclear workers had the highest overall disease rates of any occupational group for the three-year period, and rates were higher for women than for men in this group. The changes we observed over the three-year period may reflect true changes in the occurrence of illness, changes in absence reporting requirements, or administration of sick leave, heightened awareness of medical clearance requirements, or the combined effects of these and other factors.

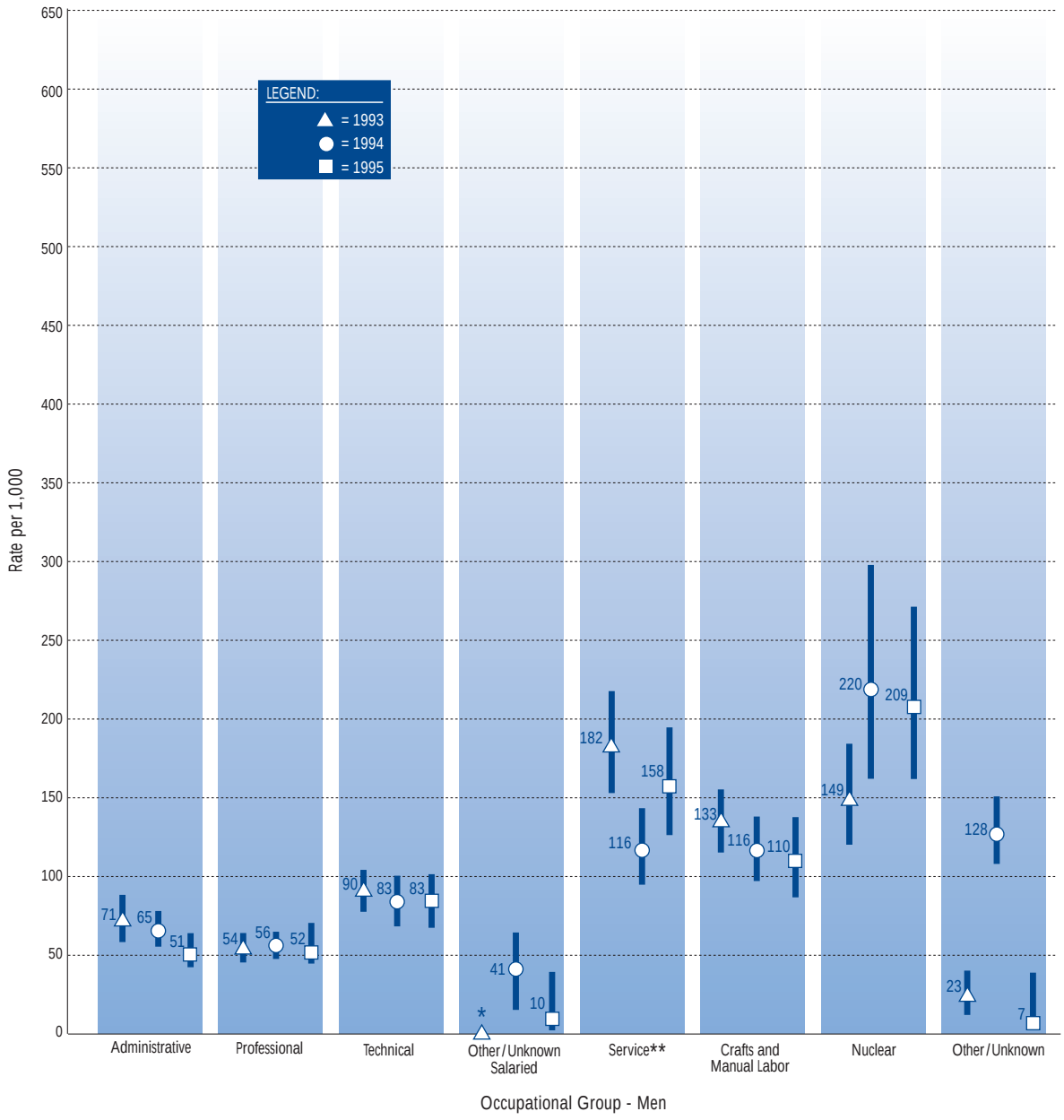
Cancer rates among Hanford workers showed little evidence of systematic change from 1993 to 1995 (figure 21). Rates for most types of cancer were stable over the three-year period. An exception was the diagnosis rate for breast cancer among women, which dropped from 2.2 per 1,000 women in 1993 to 0.4 per 1,000 in 1994 and then increased to 1.5 per 1,000 in 1995. A change of this magnitude over such a brief period is unlikely to reflect a true change in breast cancer rates. The reporting of only two diagnoses in 1994 suggests that the fluctuation could be related to completeness of reporting. Breast cancer rates in 1993 and 1995 were similar to those reported by the National Cancer Institute's Surveillance, Epidemiology, and End Results (SEER) Program. SEER's cancer registry for the Seattle/Puget Sound area is closest geographically to Hanford, and in 1995, reported an age-adjusted breast cancer rate of 192.6 per 100,000 (or approximately 1.93 per 1,000) for Caucasian women in western Washington aged 20-69.

Heart and circulatory system disease rates appeared to decrease consistently among men over the three years but remained stable among women. The decrease among men reflected a 50% decline in the rate of ischemia (obstructed flow of blood through arteries). Rates of other forms of circulatory system disease remained stable for both men and women.

Overall, respiratory disease rates declined about 28% for both men and women from 1993 to 1995. A reduction in pneumonia and bronchitis diagnoses was the primary reason for the decline. Other types of respiratory disease did not show a consistent change over time. Respiratory disease rates among women were higher than among men, a gender difference that has been noted with some consistency at sites participating in epidemiologic surveillance. At Hanford, higher respiratory disease rates among women in 1993-1995 were observed across the major categories of respiratory disease other than cancer, but the difference was very small for pneumonia and bronchitis. Rates of upper respiratory conditions such as colds and sinusitis decreased among women and increased among men over the three years. In 1993, the rate of upper respiratory conditions among women was twice that of men, but by 1995 the rates for men and women were quite similar (7.5 per 1,000 in men and 8.4 per 1,000 in women).

We saw no systematic changes in the rate of injuries among Hanford workers between 1993 and 1995 (figure 21). Most of the injuries reflected in this analysis were nonoccupational. Occupational injuries recorded for Occupational Safety and Health Administration reporting were not included in Hanford epidemiologic surveillance prior to 1995. They are considered separately in this report following the discussion of occupational sentinel health events

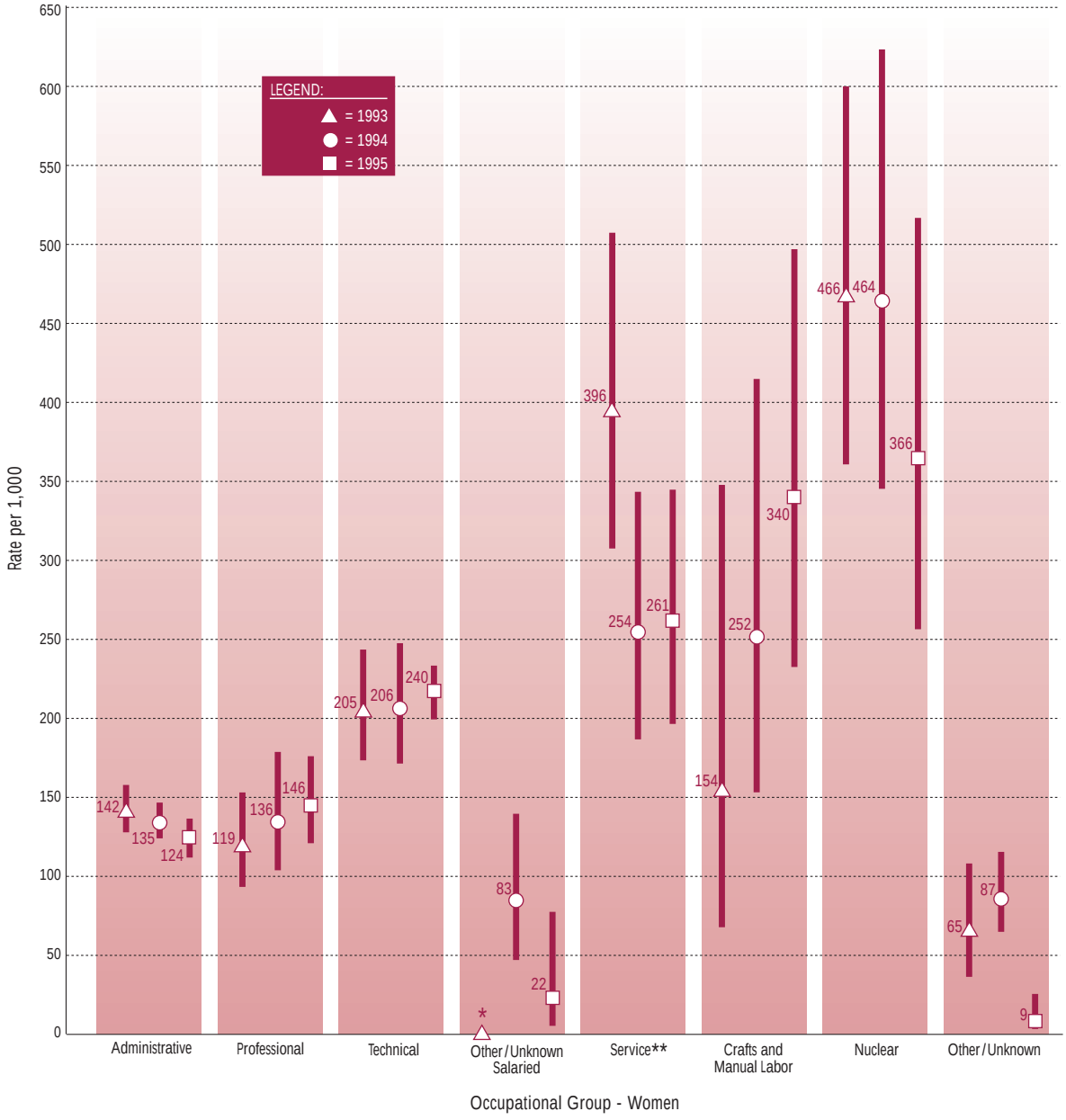
Figure 19. Age-Adjusted Rates for All Diagnostic Categories Combined for Men by Occupation, 1993 to 1995



*There were no other/unknown salaried workers in 1993.

**For 1993 to 1995 time trends, service and security categories are combined. Separate data for two categories not available prior to 1995.

Figure 20. Age-Adjusted Rates for All Diagnostic Categories Combined for Women by Occupation, 1993 to 1995



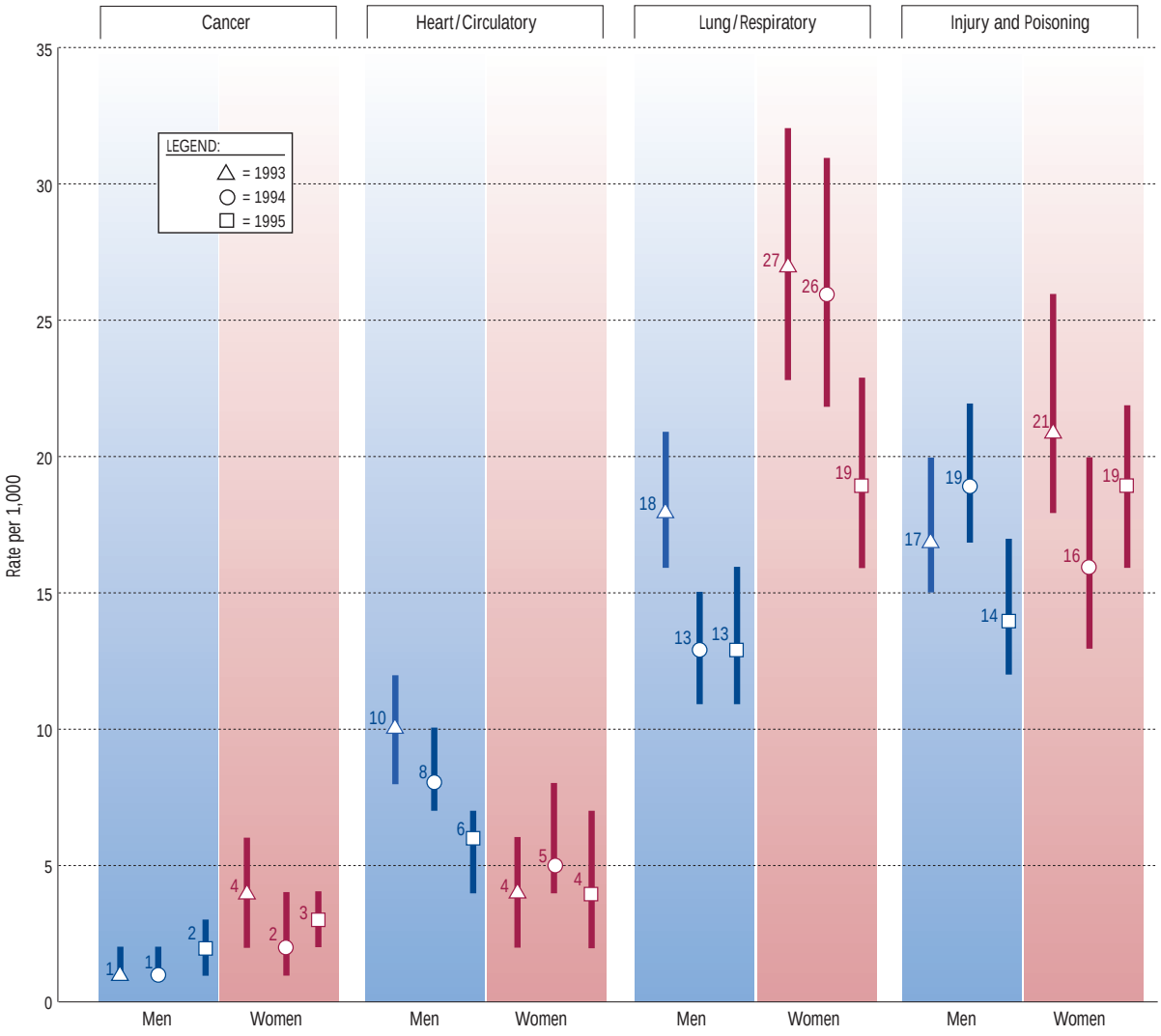
*There were no other/unknown salaried workers in 1993.

**For 1993 to 1995 time trends, service and security categories are combined. Separate data for two categories not available prior to 1995.

Why Are Rates Age-Adjusted?

The injury and illness rates compared for 1993 through 1995 are **age-adjusted**; they take into account differences in the age distribution of the workers over the three years. Age-adjustment which results in one rate calculated for the whole group of workers removes the influence of age differences in the disease and injury rates calculated for various groups of workers. The difference between an age-adjusted rate and an age-specific rate (discussed on page 17) is that an age-adjusted rate is a rate for all ages combined and the age-specific rate is a rate for workers in a particular age group. Comparisons of age-adjusted rates can be made between different occupational groups but not between age groups within the same occupational group. Age-specific rates allow these latter types of comparisons. In figures 19 through 21, the bars around each symbol are the upper and lower bounds on the rate, which indicate the confidence that can be placed in the value of the age-adjusted rate. As the length of the bar increases, the confidence decreases. Long bar lengths are usually the result of having very small numbers for the rate calculation. For example, 1 event among 50 workers will have a longer bar than 10 events among 500 workers even though the rate per 1,000 is the same. When two rates are compared, bars that do not overlap indicate that the values of the rates are significantly different from each other. If the bars around rates overlap, the rates are not considered to be different even though the values of the two rates may appear quite different.

Figure 21. Age-Adjusted Rates for Selected Diagnostic Categories by Gender, 1993 to 1995



Occupational Sentinel Health Events

An occupational sentinel health event (SHEO) is a disease, disability, or injury whose occurrence may serve as a warning signal that workplace conditions may need to be changed or additional attention may be required to reduce its occurrence. Injuries and poisonings resulting from accidents in the workplace as well as 64 disease conditions have been identified as SHEOs from studies of workplace exposures and disease in many different industries. These disease conditions can be considered in the following three categories (appendix K has additional information about what diseases and conditions are included in each SHEO group).

Definitely SHEOs: Consists of diseases that are unlikely to occur in the absence of an occupational exposure. Asbestosis, a lung condition resulting from exposure to asbestos, is an example of this group.

Possibly SHEOs: Includes such conditions as lung cancer and carpal tunnel syndrome, which may or may not be related to occupation. Additional information about the person's hobbies, personal habits, and work history is required to establish a link between disease and occupation. For example, lung cancer can result from asbestos exposure as well as smoking. Carpal tunnel syndrome may result from a job requiring typing or from a hobby such as playing piano.

Accidents: Includes all types of on-the-job accidents and resulting health conditions. Accidents specifically identified as occurring in the home, on the farm, or during recreation are excluded.

In 1995, 170 (11.6%) of the 1,460 health events reported were identified as SHEOs. One hundred forty-one involved accidents, one of which occurred in the workplace and therefore is listed as a "definite" SHEO in figure 22. Among the 29 possible SHEOs, 22 were carpal tunnel syndrome reported by 18 workers. Fifteen of these workers were 40 years of age and older. Eleven of the events were reported by nine women in the administrative group. The 22 carpal tunnel absences accounted for 728 days or 9% of the total number of days absent from SHEOs (figures 22 and 23).

Figure 22. Characteristics of Health Events for SHEOs and Days Absent by Gender

		Total Number of Workers	Total Number of Health Events	Total Number of Health Conditions	Total Number of Days Absent
Men	Definite	1	1	1	13
	Possible	13	14	14	401
	Accident	80	84	143	4,139
	Total	**94**	**99**	**158**	**4,553**
Women	Definite	0	0	0	0
	Possible	12	15	15	440
	Accident	50	56	103	2,755
	Total	**62**	**71**	**118**	**3,195**

Figure 23. Number of Accidents by Gender, Age, and Occupation

	Age Group - Men					Age Group - Women				
Occupation	16-29	30-39	40-49	50-59	60+	16-29	30-39	40-49	50-59	All Ages
Administrative	0	2	0	4	0	5	9	9	1	30
Professional	2	8	6	2	0	1	5	3	1	28
Technical	0	5	1	0	1	1	3	5	1	17
Other/Unknown Salaried	0	0	0	0	0	0	0	0	0	0
Service	1	8	9	3	0	0	3	0	0	24
Security	0	2	0	0	0	0	0	0	0	2
Crafts and Manual Labor	0	3	11	1	0	0	1	2	1	19
Nuclear	3	8	5	0	0	1	0	2	1	20
Other/Unknown	0	0	0	0	0	1	0	0	0	1
All Occupations	**6**	**36**	**32**	**10**	**1**	**9**	**21**	**21**	**5**	**141**

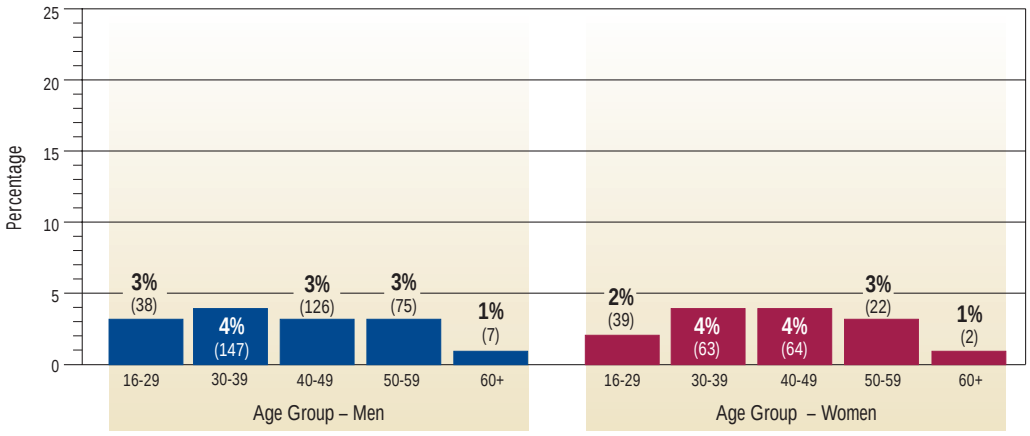
OSHA-Recordable Events

The Occupational Safety and Health Administration (OSHA) requires employers to maintain a record of occupational injuries and illnesses occurring among employees and to make that information available to OSHA on request. Employers maintain the information from these OSHA-recordable events in the OSHA 200 Log. OSHA-recordable events differ from health events captured through return-to-work clearances in at least two important respects: 1) they do not necessarily result in days lost from work, and 2) they are usually accompanied by a specific determination that they are work-related.

The percentage of workers with an OSHA event was 3%, well within the range observed for epidemiologic surveillance sites in 1995. The percentage was the same for men and women and was not strongly related to age (figure 24). As at other sites, the percentage of workers in service, crafts and manual labor, nuclear, and technical occupations had a relatively high percentage of workers with at least one OSHA-recordable event; professionals and administrative staff had a much lower percentage (figure 25).

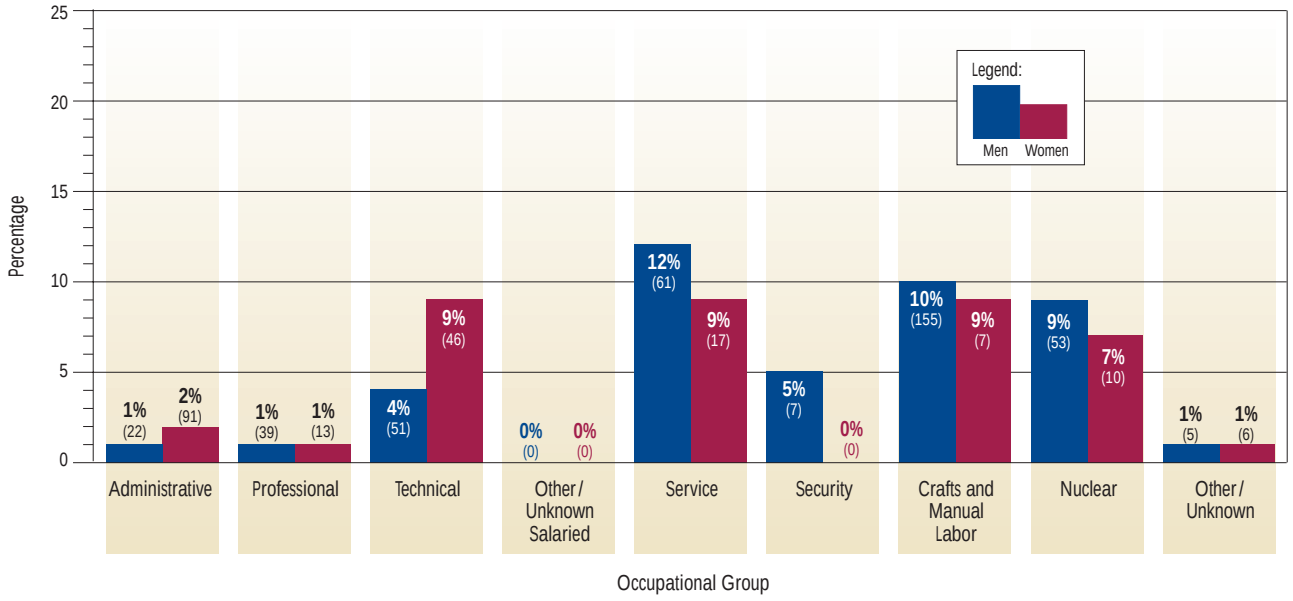
The average number of workdays lost or with restricted activity varied for men and women. On average for each OSHA event, women had 25 days lost or restricted and men had 12 days lost or restricted (figures 26 and 27). Comparing men and women within occupational groups, the average number of days lost or with restricted activities was highest for women in the nuclear (47 days), service (44 days), and technical (42 days) groups and men in the service group (19 days) (figure 27). Appendices L-N contain more detailed data about the number of OSHA events and days of work lost or with restricted activity for Hanford workers.

Figure 24. Percentage of Workers with at Least One OSHA Event by Gender and Age*



*Numbers in parentheses represent the number of workers with at least one event.

Figure 25. Percentage of Workers with at Least One OSHA Event by Gender and Occupation*



*Numbers in parentheses represent the number of workers with at least one event.

Figure 26. Lost and Restricted Workdays by Gender and Age

Men

Age Group	Total Number of Days Lost/Restricted	Total Number of OSHA Events	Average Number of Days Lost/Restricted
16-29	392	40	9.8
30-39	1,885	161	11.7
40-49	1,269	132	9.6
50-59	1,463	78	18.8
60+	22	7	3.1
Total	**5,031**	**418**	**12.0**

Women

Age Group	Total Number of Days Lost/Restricted	Total Number of OSHA Events	Average Number of Days Lost/Restricted
16-29	636	47	13.5
30-39	1,632	65	25.1
40-49	1,858	66	28.2
50-59	913	22	41.5
60+	0	2	0
Total	**5,039**	**202**	**24.9**

Figure 27. Lost and Restricted Workdays by Gender and Occupation

Men

Occupation	Total Number of Days Lost/Restricted	Total Number of OSHA Events	Average Number of Days Lost/Restricted
Administrative	66	22	3.0
Professional	300	39	7.7
Technical	684	52	13.2
Other/Unknown Salaried	0	0	0.0
Service	1,334	69	19.3
Security	82	7	11.7
Crafts and Manual Labor	1,799	165	10.9
Nuclear	678	58	11.7
Other/Unknown	88	6	14.7
Total	**5,031**	**418**	**12.0**

Women

Occupation	Total Number of Days Lost/Restricted	Total Number of OSHA Events	Average Number of Days Lost/Restricted
Administrative	1,023	93	11.0
Professional	315	13	24.2
Technical	2,239	54	41.5
Other/Unknown Salaried	0	0	0.0
Service	755	17	44.4
Security	0	0	0.0
Crafts and Manual Labor	10	7	1.4
Nuclear	517	11	47.0
Other/Unknown	180	7	25.7
Total	**5,039**	**202**	**24.9**

Diagnostic and Accident Categories for OSHA-Recordable Events

Sprains and strains were the most common OSHA-recordable injuries (36%) among men and women (figures 28, 32, and 34). Men reported open wounds (18%) and bruises (10%) relatively frequently, and bruises also accounted for 21% of the OSHA-recordable injuries among women. Unspecified injuries (14%) were the third most frequently occurring type of event for women workers. Seventy-two percent of the unspecified injuries were pain, numbness, and tingling of the arms, hands, wrists, and fingers caused by overuse while performing computer tasks. Most of the thirty-eight OSHA events that were not the result of a specific accident involved skin problems (18) or nervous system disorders (4 carpal tunnel syndrome, 3 eye problems, and 3 hearing loss).

Overexertion accounted for 29% of the accidents recorded in 1995, the most common cause of occupational injuries. Falls caused an additional 13%. Overexertion injuries were responsible for 4,271 lost or restricted workdays, with an average of 25 days per injury (figures 29, 30, 33, and 35). The injuries reported most often by men and women were sprains and strains, followed by open wounds for men and bruises for women (figures 31a and 31b).

Diagnostic Category	Total Number of OSHA Events Reported	
	Men	Women
Endocrine / Metabolic	1	0
Mental	2	2
Nervous System	18	20
Lung / Respiratory	5	4
Digestive	4	1
Genitourinary	1	1
Skin	12	9
Muscles and Skeleton	93	99
Unspecified Symptoms	63	50
Injury and Poisoning	387	130
• Skull Fractures	0	1
• Neck and Trunk Fractures	5	0
• Upper Limb Fractures	6	1
• Lower Limb Fractures	5	2
• Dislocations	8	4
• Back Sprains and Strains	81	30
• Other Sprains and Strains	61	12
• Intracranial Injuries	1	0
• Open Wounds – Head, Neck, Trunk	18	3
• Open Wounds – Upper Limb	44	7
• Open Wounds – Lower Limb	6	0
• Late Effects	1	0
• Superficial Injuries	13	2
• Bruises	39	27
• Crushing Injuries	2	0
• Foreign Bodies Entering Orifice	30	5
• Burns	9	2
• Injuries to Nerves and Spinal Cord	2	0
• Unspecified Injuries	15	18
• Poisoning by Drugs	1	0
• Adverse Reaction to Nonmedical Substances	27	14
• Adverse Reaction to External Causes	13	2

Figure 28. Health Conditions by Gender and Diagnostic Category

Figure 29. Types of Accidents and the Number of Lost or Restricted Workdays by Gender

Accident Category	Men			Women		
	Number of Accidents	Number of Days Restricted	Number of Days Lost	Number of Accidents	Number of Days Restricted	Number of Days Lost
Motor Vehicle Traffic	3	0	251	4	17	8
Motor Vehicle Nontraffic	4	40	3	3	3	681
Air and Space Transport	1	5	0	0	0	0
Accidental Poisoning by Drugs/Medicine	1	0	0	0	0	0
Accidental Poisoning by Other Substances	22	0	28	12	3	0
Falls	54	767	389	20	238	99
Fire	1	0	0	0	0	0
Natural/Environmental Factors	22	23	134	6	251	1
Submersion/Suffocation/Foreign Bodies	28	6	1	4	0	3
Other Accidents	262	2,096	1,264	134	1,837	1,262
Late Effects of Accident	1	0	0	0	0	0

Figure 30. Types and Number of Accidents that Occurred Within the Category of Other Accidents by Gender

Other Accidents Category	Number of Accidents	
	Men	Women
Caught Between Objects	13	5
Cutting/Piercing Instrument/Object	42	6
Exposure to Noise	1	0
Exposure to Visible and Ultraviolet Light	0	1
Hot, Corrosive, or Caustic Material/Steam	11	3
Overexertion and Strenuous Movements	121	48
Repetitive Trauma	34	60
Struck by an Object	40	11
Total	**262**	**134**

Figure 31a. Injuries Associated with Each Type of Accident by Gender

	Type of Accident – Men										
Type of Injury	Motor Vehicle Traffic	Motor Vehicle Nontraffic	Air and Space Transport	Accidental Poisoning by Drugs/ Medicine	Accidental Poisoning by Other Substances	Falls	Fire	Natural/ Environmental Factors	Submersion/ Suffocation/ Foreign Bodies	Other Accidents	Late Effects of Accident
Neck and Trunk Fractures	1	0	0	0	0	3	0	0	0	1	0
Upper Limb Fractures	0	0	0	0	0	2	0	0	0	4	0
Lower Limb Fractures	0	0	0	0	0	2	0	0	0	3	0
Dislocations	0	0	0	0	0	2	0	0	0	6	0
Back Sprains and Strains	3	2	1	0	0	11	0	0	0	65	0
Other Sprains and Strains	0	1	0	0	0	30	0	0	0	30	0
Intracranial Injuries	0	0	0	0	0	0	0	0	0	1	0
Open Wounds – Head, Neck, Trunk	0	0	0	0	0	1	0	0	0	17	0
Open Wounds – Upper Limb	0	0	0	0	0	2	0	0	0	42	0
Open Wounds – Lower Limb	0	0	0	0	0	1	0	0	0	5	0
Late Effects	0	0	0	0	0	0	0	0	0	0	1
Superficial Injuries	0	0	0	0	0	1	0	8	0	4	0
Bruises	0	1	0	0	0	17	0	0	0	21	0
Crushing Injuries	0	0	0	0	0	0	0	0	0	2	0
Foreign Bodies Entering Orifice	0	0	0	0	0	0	0	0	28	2	0
Burns	0	0	0	0	0	0	0	0	0	9	0
Injuries to Nerves and Spinal Cord	0	0	0	0	0	0	0	0	0	2	0
Unspecified Injuries	0	0	0	0	0	1	0	0	0	14	0
Poisoning by Drugs	0	0	0	1	0	0	0	0	0	0	0
Adverse Reaction to Nonmedical Substances	0	0	0	0	22	0	1	4	0	0	0
Adverse Reaction to External Causes	0	0	0	0	1	0	0	12	0	0	0

Figure 31b. Injuries Associated with Each Type of Accident by Gender

	Type of Accident – Women						
Type of Injury	Motor Vehicle Traffic	Motor Vehicle Nontraffic	Accidental Poisoning by Other Substances	Falls	Natural/ Environmental Factors	Submersion/ Suffocation/ Foreign Bodies	Other Accidents
Skull Fractures	0	0	0	0	0	0	1
Upper Limb Fractures	0	0	0	0	0	0	1
Lower Limb Fractures	0	1	0	0	0	0	1
Dislocations	0	0	0	0	0	0	4
Back Sprains and Strains	3	1	0	2	0	0	24
Other Sprains and Strains	0	1	0	5	0	0	6
Open Wounds – Head, Neck, Trunk	1	0	0	2	0	0	0
Open Wounds – Upper Limb	0	0	0	0	0	0	7
Superficial Injuries	0	0	0	2	0	0	
Bruises	4	2	0	12	0	0	9
Foreign Bodies Entering Orifice	0	0	0	0	0	4	1
Burns	0	0	0	0	0	0	2
Unspecified Injuries	1	0	0	1	0	0	15
Adverse Reaction to Nonmedical Substances	0	0	12	0	2	0	0
Adverse Reaction to External Causes	0	0	0	0	2	0	0

Figure 32. Three Diagnostic Categories Reported Most Often by Gender and Age

		16-29	30-39	40-49	50-59	60+
Men	Most Common Diagnostic Category	Sprains and Strains	Sprains and Strains	Sprains and Strains	Muscles and Skeleton	Muscles and Skeleton
	Second Most Common Diagnostic Category	Open Wounds	Muscles and Skeleton	Muscles and Skeleton	Open Wounds	Sprains and Strains
	Third Most Common Diagnostic Category	Unspecified Symptoms; Bruises	Open Wounds	Unspecified Symptoms	Unspecified Symptoms	(2)
Women	Most Common Diagnostic Category	Muscles and Skeleton	Muscles and Skeleton	Muscles and Skeleton	Muscles and Skeleton	Muscles and Skeleton
	Second Most Common Diagnostic Category	Unspecified Symptoms	Sprains and Strains	Sprains and Strains	Unspecified Symptoms	Nervous System
	Third Most Common Diagnostic Category	Sprains and Strains; Bruises	Unspecified Symptoms	Unspecified Symptoms	Sprains and Strains	Skin (1)

(1) This diagnostic category was reported the same number of times as the one above it.
(2) More than two diagnostic categories tied.

Figure 33. Three Accident Categories Reported Most Often by Gender and Age*

		16-29	30-39	40-49	50-59	60+
Men	Most Common Accident Category	Other Accidents	Other Accidents	Other Accidents	Other Accidents	Other Accidents
	Second Most Common Accident Category	Falls	Falls	Falls	Falls	Natural/Environmental Factors
	Third Most Common Accident Category	Accidental Poisoning by Other Substances; Submersion/Suffocation/Foreign Bodies	Submersion/Suffocation/Foreign Bodies	Natural/Environmental Factors; Submersion/Suffocation/Foreign Bodies	Accidental Poisoning by Other Substances	None
Women	Most Common Accident Category	Other Accidents	Other Accidents	Other Accidents	Other Accidents	Other Accidents
	Second Most Common Accident Category	Accidental Poisoning by Other Substances	Falls	Falls	Falls	None
	Third Most Common Accident Category	Falls	Natural/Environmental Factors	Motor Vehicle	Accidental Poisoning by Other Substances	None

*Type of accident was not reported for 20 OSHA events among men and 19 OSHA events among women.

Figure 34. Three Diagnostic Categories Reported Most Often by Gender and Occupation

		Administrative	Professional	Technical	Other/Unknown Salaried	Service
Men	Most Common Diagnostic Category	Muscles and Skeleton	Muscles and Skeleton	Sprains and Strains	None	Sprains and Strains
	Second Most Common Diagnostic Category	Open Wounds; Bruises	Sprains and Strains	Unspecified Symptoms	None	Muscles and Skeleton
	Third Most Common Diagnostic Category	Sprains and Strains	Unspecified Symptoms; Unspecified Injuries	Muscles and Skeleton	None	Bruises
Women	Most Common Diagnostic Category	Muscles and Skeleton	Bruises	Muscles and Skeleton	None	Muscles and Skeleton
	Second Most Common Diagnostic Category	Unspecified Symptoms	Muscles and Skeleton; Sprains and Strains	Unspecified Symptoms	None	Sprains and Strains
	Third Most Common Diagnostic Category	Sprains and Strains	Nervous System; Open Wounds	Sprains and Strains	None	Bruises

		Security	Crafts and Manual Labor	Nuclear	Other/Unknown
Men	Most Common Diagnostic Category	Sprains and Strains	Sprains and Strains	Sprains and Strains	Sprains and Strains
	Second Most Common Diagnostic Category	Fractures	Open Wounds	Unspecified Symptoms	Dislocations; Bruises
	Third Most Common Diagnostic Category	(2)	Muscles and Skeleton	Bruises	Foreign Bodies Entering Orifice (1)
Women	Most Common Diagnostic Category	None	Muscles and Skeleton	Sprains and Strains	Muscles and Skeleton
	Second Most Common Diagnostic Category	None	Foreign Bodies Entering Orifice (1)	Muscles and Skeleton	Bruises; Foreign Bodies Entering Orifice
	Third Most Common Diagnostic Category	None	(2)	Dislocations	(2)

(1) This diagnostic category was reported the same number of times as the one above it.
(2) More than two diagnostic categories tied.

Figure 35. Three Accident Categories Reported Most Often by Gender and Occupation (1)

		Administrative	Professional	Technical	Other/Unknown Salaried	Service
Men	Most Common Accident Category	Other Accidents	Other Accidents	Other Accidents	None	Other Accidents
	Second Most Common Accident Category	Falls	Motor Vehicle; Falls	Accidental Poisoning by Other Substances	None	Falls
	Third Most Common Accident Category	Natural/Environmental Factors	(3)	Natural/Environmental Factors	None	Submersion/Suffocation/ Foreign Bodies
Women	Most Common Accident Category	Other Accidents	Other Accidents	Other Accidents	None	Other Accidents
	Second Most Common Accident Category	Accidental Poisoning by Other Substances; Falls	Motor Vehicle; Falls	Falls	None	Falls
	Third Most Common Accident Category	Motor Vehicle	Natural/Environmental Factors	Accidental Poisoning by Other Substances	None	None

		Security	Crafts and Manual Labor	Nuclear	Other/Unknown
Men	Most Common Accident Category	Other Accidents	Other Accidents	Other Accidents	Other Accidents
	Second Most Common Accident Category	Falls	Falls	Falls	Submersion/Suffocation/ Foreign Bodies
	Third Most Common Accident Category	Submersion/Suffocation/ Foreign Bodies	Submersion/Suffocation/ Foreign Bodies	Natural/Environmental Factors	None
Women	Most Common Accident Category	None	Other Accidents	Other Accidents	Other Accidents
	Second Most Common Accident Category	None	Submersion/Suffocation/ Foreign Bodies	Motor Vehicle; Accidental Poisoning by Other Substances	Submersion/Suffocation/ Foreign Bodies
	Third Most Common Accident Category	None	None	Natural/Environmental Factors (2)	Falls

(1) Type of accident was not reported for 20 OSHA events among men and 19 OSHA events among women.
(2) This accident category was reported the same number of times as the one above it.
(3) More than two accident categories tied.

Rates of OSHA-Recordable Events

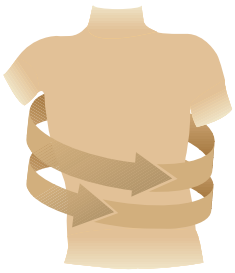
Women in the technical and nuclear groups and men in the service, crafts and manual labor, and nuclear groups had relatively high rates for all occupational diagnoses combined. Among men, younger workers tended to have higher diagnosis rates, but there was no clear age pattern among women (figure 36). Most of the OSHA diagnoses involved occupational injury and poisoning. When these diagnoses were considered separately, both men and women had lower rates in workers aged 40 or older. The highest rates of injury and poisoning occurred among women in the nuclear group and men in the service group (figure 37).

Hanford workers missed 4,504 days of work and had 5,566 restricted workdays as a result of occupational injuries. Technical workers, who comprise about 9% of the work force, had the highest percentage of lost and restricted workdays of any occupational group (26% of the restricted workdays and 33% of the lost workdays). Service workers, 4% of the work force, experienced 29% of the lost workdays and 14% of the restricted workdays (appendix N). The proportion of lost versus restricted workdays varied with occupation. Among security, crafts and manual labor, and nuclear workers, the proportion of restricted workdays was much higher than lost workdays. Service workers and professionals had a much larger percentage of lost workdays. Lost and restricted workdays were equally divided among technical workers (appendix N).

Compared with the work force as a whole, crafts and manual labor, service, technical, and nuclear workers were at higher risk for occupational injury (appendix W). The risks for various types of injuries varied by occupational group. Reports of toxic effects of nonmedical substances were prominent among technical workers. Service workers were at relatively higher risk for sprains and strains, dislocations, bruises, and conditions affecting the muscles and skeleton. Crafts and manual laborers were at highest risk for open wounds and were also at high risk for sprains and strains, bruises, burns, and foreign bodies entering a body opening. The risks for burns, toxic effects of nonmedical substances, and various symptoms and ill-defined conditions were higher among nuclear workers (appendix W). The 433 OSHA events in these four occupational groups resulted in 4,556 days of restricted activity and 3,460 lost workdays—a substantial loss of productivity (appendix N).

Figure 36. Rate per 1,000 for All Diagnostic Categories Combined by Gender, Age, and Occupation

All Diagnostic Categories

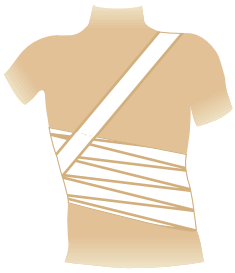


Occupational Group	Age	Rate per 1,000 Men	Rate per 1,000 Women
Administrative	<40	13	38
	40+	9	41
Professional	<40	10	5
	40+	17	50
Technical	<40	73	180
	40+	48	138
Service	<40	204	194
	40+	143	63
Security	<40	83	0
	40+	63	0
Crafts and Manual Labor	<40	161	95
	40+	138	100
Nuclear	<40	202	147
	40+	102	172
Other/Unknown	<40	6	17
	40+	19	11

Figure 37. Rate per 1,000 for Selected Diagnostic Categories by Gender, Age, and Occupation

Diagnostic Category

Injury and Poisoning



Occupational Group	Age	Rate per 1,000 Men	Rate per 1,000 Women
Administrative	<40	10	16
	40+	5	12
Professional	<40	5	5
	40+	6	31
Technical	<40	40	55
	40+	33	64
Service	<40	155	83
	40+	108	36
Security	<40	56	0
	40+	48	0
Crafts and Manual Labor	<40	143	71
	40+	89	50
Nuclear	<40	134	107
	40+	51	94
Other/Unknown	<40	6	8
	40+	19	0

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. This allows one rate per group to be compared.

Age-Specific Rate: A rate that is calculated for a group that is a specific age (e.g., 16 to 29 years old). Only people in the specific age group are included in the calculation of the rate. The purpose of calculating age-specific rates is to identify differences in the rate that occur as the age changes. Any differences that are related to age can be seen by comparing age-specific rates for the different age groups.

Confidence Interval: A mathematical procedure used to determine in what range the true value of an event is likely to be. The width of the confidence interval (i.e., how wide the range is) 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% confidence level, indicates the percentage (e.g., 95%) 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, distribution, and health.

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

Diagnosis Rate: The number of occurrences of a given disease or health condition observed among DOE workers during a given time period per 1,000 DOE workers at risk of getting that disease during the time period. It is calculated as follows (using 1995 as the time period):

$$\text{Diagnosis rate for a disease during 1995 (per 1,000 DOE workers)} = \frac{\text{Number of occurrences of the disease reported during 1995}}{\text{Number of DOE workers at risk for the disease during 1995}} \times 1{,}000$$

Diagnostic Category: A particular type of disease, a group of related health conditions, or diseases that all affect the same organ system. Cancer is an example of a diagnostic category that contains a particular type of disease, and pregnancy/childbirth is an example of one that contains a group of related health conditions. Lung/respiratory is an example of a diagnostic category that contains 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 occurrence and distribution of diseases and health conditions in human populations.

Health Condition: A specific disease or medical condition. Health conditions are grouped together to form diagnostic categories. Tuberculosis is a specific disease that is part of the diagnostic category of infections/parasites. A fractured arm is a specific health condition included in the diagnostic category of injury and poisoning.

Health Event: An absence from work that lasted at least five consecutive workdays.

ICD-9-CM Code: An abbreviation for the *International Classification of Diseases, Ninth Revision, Clinical Modification*. It is internationally accepted as a standardized system for the classification of disease and health data collected from medical records and is useful to describe the disease and health characteristics of a population.

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

OSHA Event: An abbreviation used throughout this report for an OSHA-recordable event.

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

Person-Year: A unit of measurement combining the number of people being studied with the time that each was observed equivalent to one person followed for one year. For example, 5 persons followed for one year contribute five person-years, as do 10 people each followed for half a year. In the epidemiologic surveillance reports, rates are often expressed as the number of events per 1,000 person-years.

Relative Risk: The rate of 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* (ICD-9-CM). For the text of this report the categories are abbreviated to make the report easier to read. In the appendixes a different set of abbreviations was used for the categories. These names are the same as the ones used in previous annual reports. The table that begins on the next page lists the categories in numeric order according to ICD-9-CM and gives examples of common diseases included in each category. The last column of the table below links the category names in the reports and the appendixes to the table that begins on the next page.

Diagnostic Categories Used in This Report	Diagnostic Categories Used in the Appendix and Previous Annual Reports	ICD-9-CM Codes
Benign Growths	Benign and Other Neoplasms	210-229,235-239
Blood	Blood and Blood Forming Organs	280-289
Cancer	Malignant Neoplasms	140-208,230-234
Digestive	Digestive System	520-579
Endocrine/Metabolic	Endocrine and Metabolic Diseases	240-279
Existing Birth Condition	Congenital Anomalies	740-759
Genitourinary	Genitourinary System	580-629
Heart/Circulatory	Circulatory System	390-459
Infections/Parasites	Infectious and Parasitic Diseases	001-139
Injury and Poisoning	Injury and Poisoning	800-999
Lung/Respiratory	Respiratory System	460-519
Mental	Mental Disorders	290-319
Muscles and Skeleton	Musculoskeletal System	710-739
Nervous System	Nervous System and Sense Organs	320-389
Pregnancy/Childbirth	Pregnancy and Childbirth	630-676
Skin	Skin and Subcutaneous Tissue	680-709
Unspecified Symptoms	Symptoms, Signs and Ill-Defined Conditions	780-799

Categories and Subcategories of Diagnoses	ICD-9-CM Codes	Diseases
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 nonarthropod diseases of 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, 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	Cancers of the 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, and skin	170-173	Bone, muscle, ligament, tendon, blood vessels, fat, and skin
• Genitourinary organs	179-189	Cervix, uterus, prostate, kidney, and bladder
• 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 - Nonpsychotic 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

(continued)

Categories and Subcategories of Diagnoses	ICD-9-CM Codes	Diseases
• 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	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	451-459	Phlebitis (swelling of a vein) and thrombophlebitis (swelling of a vein which has a blood clot)
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 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)
• Noninfectious 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 digestive system	570-579	Diseases of the liver, gallbladder, and pancreas; hepatitis; blood in stool; and bleeding in the stomach and intestine

(continued)

Categories and Subcategories of Diagnoses	ICD-9-CM Codes	Diseases
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 interverte-bral disc ("slipped disc"), lumbago, sciatica, rheumatism, tendonitis, and osteoporosis
• Arthropathies and related disorders	710-719	Arthritis; joint pain and stiffness; and other diseases of the connective tissue which supports and connects internal organs, forms bones and blood vessel walls, and attaches to bones
• Dorsopathies	720-724	Swelling of the spine; 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
• Nonspecific abnormal findings	790-796	Abnormal x-ray, blood, stool, and urine test results

(continued)

Categories and Subcategories of Diagnoses	ICD-9-CM Codes	Diseases
• 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

Reader Response

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1) Overall, the information in this report was (circle one...)

Too detailed About right Not detailed enough

2) Are there additional topics you would like to see covered in future reports?

Yes No

If yes, please list additional topics:

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3) Please list suggestions for improving the Epidemiologic Surveillance reports:

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4) Which of the following occupational categories best describes the type of work you do? (check one...)

_____ Management/Administrative
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_____ Crafts/Trades
_____ Clerical

5) I am employed by (check one...)

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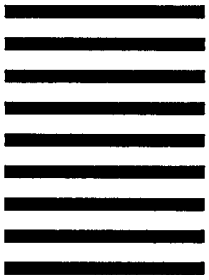

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