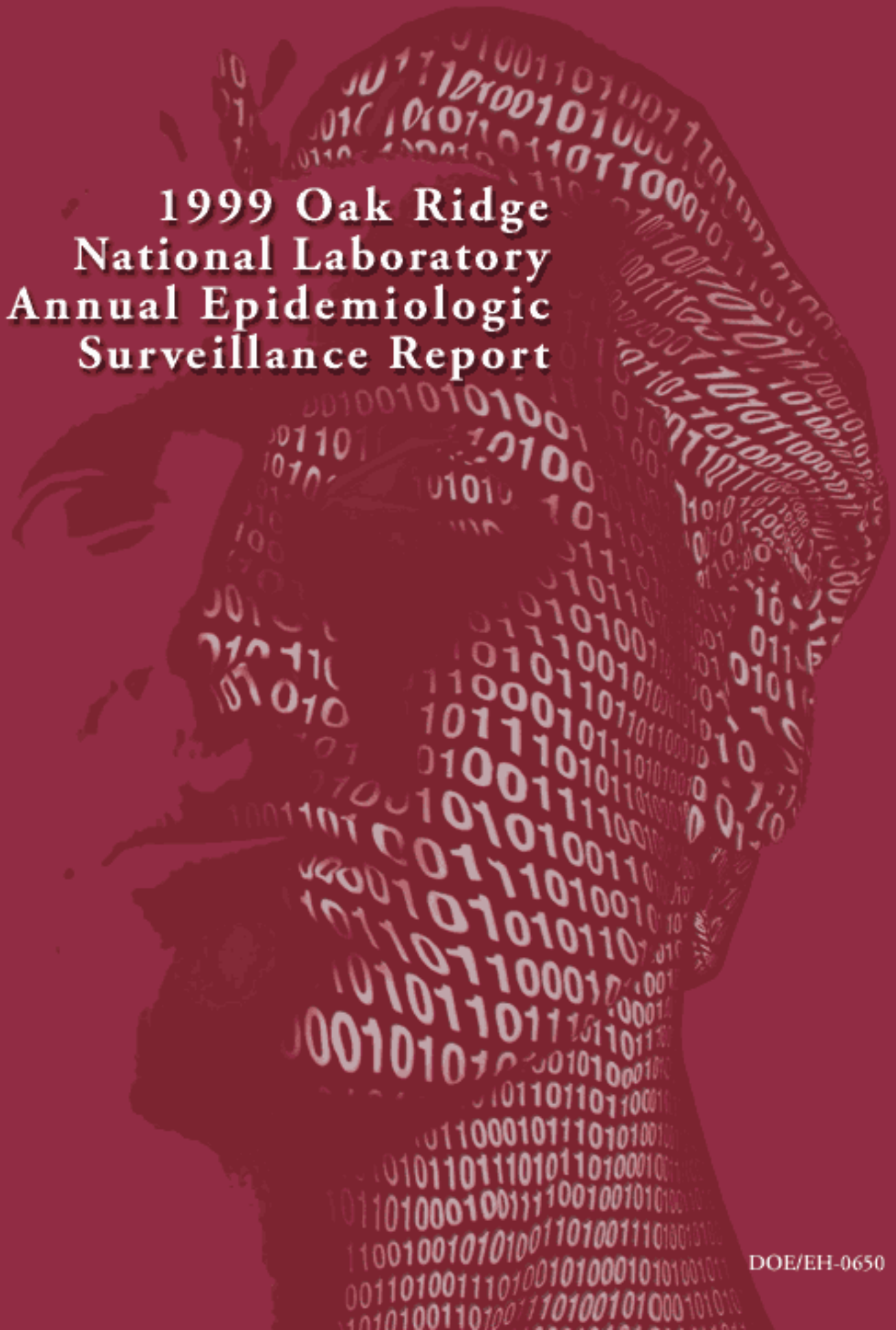
1999 Oak Ridge National Laboratory Annual Epidemiologic Surveillance Report



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Oak Ridge National Laboratory

1999 Epidemiologic Surveillance Report

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

http://tis.eh.doe.gov/health/epi/surv/index.html

Oak Ridge National Laboratory 1999

At a Glance

This is the first Epidemiologic Surveillance Annual Report for Oak Ridge National Laboratory.

The most frequently reported diagnoses varied little by gender. Among both women and men, respiratory conditions and disorders of the muscles and skeleton were among the most frequently reported diagnoses.

Absence rates were highest among workers in the Crafts and Laborers job categories.

Crafts/Laborers workers accounted for 15 percent of the work force but 52 percent of the OSHA-recordable events.

Crafts workers were six times more likely to experience a back sprain or strain and 12 times more likely to suffer a sprain or strain to areas other than the back than were other groups of workers.

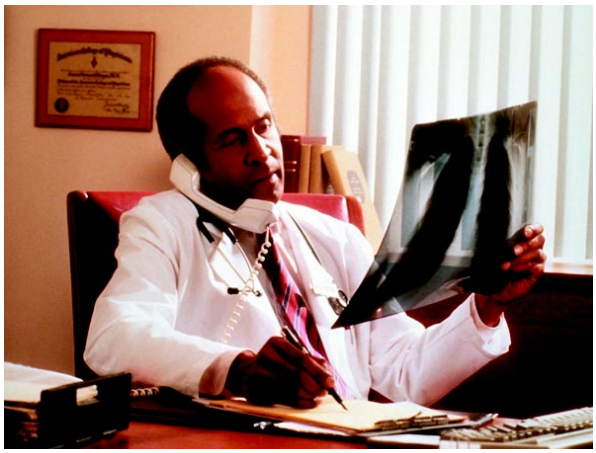
Both the Crafts workers and Laborers were at increased risk for conditions affecting the muscles and skeleton.

Introduction

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

This report provides a summary of epidemiologic surveillance data collected from Oak Ridge National Laboratory (ORNL) from January 1, 1999 through December 31, 1999. The data were collected by a coordinator at ORNL and submitted to DOE's Epidemiologic Surveillance Data Center, located at Oak Ridge Institute for Science and Education, where quality control procedures and data analyses were carried out. This is the first Epidemiologic Surveillance report for ORNL.

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



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

DOE sites vary by mission, function, job classification, and worker exposures. Therefore, comparisons of ORNL with other DOE sites should be made with caution. In addition, many factors can affect the completeness and accuracy of health information reported at the sites, thereby affecting the observed patterns of illness and injury.

Site Overview

Originally known as Clinton Laboratories, the Oak Ridge National Laboratory (ORNL) was established in 1943 to carry out a single, well-defined mission: the pilot-scale production and separation of plutonium for the World War II Manhattan Project. The Clinton Pile, originally designated X-10, the first true plutonium production reactor, began operation in November 1943.

ORNL is about 10 miles southwest of Oak Ridge, Tennessee. Its primary site is approximately 4,250 acres; the National Environmental Research Park (also part

of ORNL) is approximately 20,000 acres; and the additional reservation area for which ORNL currently has contractual responsibility for management (Solway Bend) is approximately 350 acres.

Approximately 531 buildings and other major facilities, totaling about 3.1 million square feet, are located throughout the primary ORNL site. ORNL facilities are also located outside the primary site boundary as well as at the Y-12 site, for a total of about 4 million square feet in facilities.

ORNL is a multiprogram science and technology laboratory. Its mission today is to conduct basic and applied research and development to create scientific knowledge and technological solutions that strengthen the nation's leadership in key areas of science; increase the availability of clean, abundant energy; restore and protect the environment; and contribute to national security. ORNL also performs other work for DOE, including isotope production, information management, and technical program management, and provides research and technical assistance to other organizations. The site continues to evolve to meet DOE's changing needs. In June 1999, it was announced that the Spallation Neutron Source (SNS) would be built at ORNL. The SNS will be an accelerator-based neutron scattering facility to be used for research in broad areas of physical, chemical, materials, biological, and medical sciences. When completed in 2005, it will provide the U.S. scientific community with a neutron source having greater intensity, power, and instrumentation than any other existing neutron source.

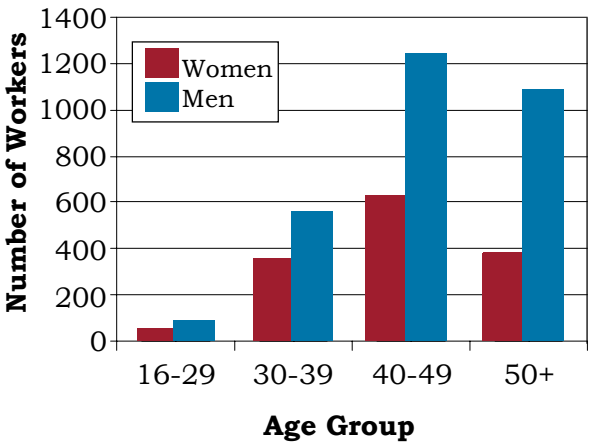
As part of the Oak Ridge Reservation, ORNL was placed on the National Priorities List under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) in December 1989. The CERCLA remediation activities are covered under a 1992 tri-party Federal Facility Agreement among the Environmental Protection Agency, DOE, and the Tennessee Department of Environment and Conservation.

In October 1999, DOE awarded a contract to the University of Tennessee-Battelle team to replace Lockheed Martin Energy Research and to manage the site effective April 1, 2000. Bechtel Jacobs Company was selected as the new management and integration contractor for Oak Ridge Environmental Management activities for the period of April 1, 1998 to September 30, 2003.

The ORNL Work Force - 1999

A total of 4,335 Oak Ridge National Laboratory (ORNL) employees were included in epidemiologic surveillance in 1999. The gender and age distribution of the 1999 work force is shown in Figure 1. There were 1,390 (32 percent) women and 2,945 (68 percent) men in the work force. The average age of male ORNL workers was 46 years and 44 years for females.

Figure 1. The Work Force by Gender and Age



The distribution of workers by job category and gender is shown in Figure 2. Individual job titles reported by ORNL were grouped together into 10 job categories because there were either too few workers or too few health events within a particular job title, thereby limiting the type of analyses that could be conducted. Men and women were not distributed equally among the various job categories. Almost 40 percent of female workers were in the Administrative category, while the largest percentage of male workers (23 percent) was in the Engineering group.

Figure 2. The Work Force by Job Category and Gender

Job Category	Women	Men
Administrative	537 39%	14 < 1%
Management	64 5%	370 13%
Professional	295 21%	373 13%
Engineering	59 4%	683 23%
Scientists	111 8%	554 19%
Technicians	118 8%	236 8%
Crafts	14 1%	386 13%
Laborers	71 5%	159 5%
Operators	4 < 1%	67 2%
Unknown	117 8%	103 3%

Number and Length of Absences

Epidemiologic surveillance examines absences of 5 or more consecutive workdays (also referred to as "5-day absences"). This absence threshold is based on DOE Order 440.1, which requires contractor management to notify Occupational Medicine when a

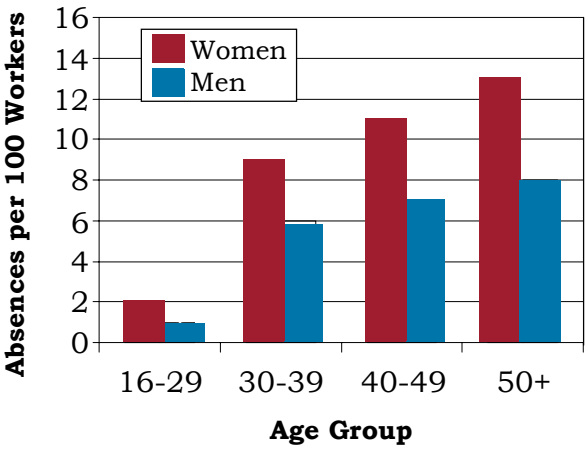
worker has been absent for 5 or more consecutive workdays. If an absence on a Friday continues through Tuesday, the length of that absence includes the weekend. All injuries and illnesses due to a work-related incident also must be reported. Non-occupational illnesses and injuries that involve absences of fewer than 5 days do not routinely require a medical clearance for return to work and are therefore excluded from these analyses.

Specific absences of 5 or more consecutive workdays that were not the result of an injury or illness were excluded. These included 13 women with reported absences due to maternity leave and 1 male worker with a reported absence due to an elective surgical procedure not related to the treatment of an illness or injury.

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

The rate of 5-day absences due to injury or illness varied by gender and age as shown in Figure 3. The 5-day absence rate among women was 11 per 100 workers (146/1,390) and 7 per 100 workers (204/2,945) among men. The 5-day absence rate increased with age among both men and women.

Figure 3. Absence Rate by Gender and Age



The average length of absence by gender and age was 30 days for men and 25 days for women (Figure 4). The average duration of absence increased with age among women. Among men, the average length of absence increased with age for workers under 50 years old.

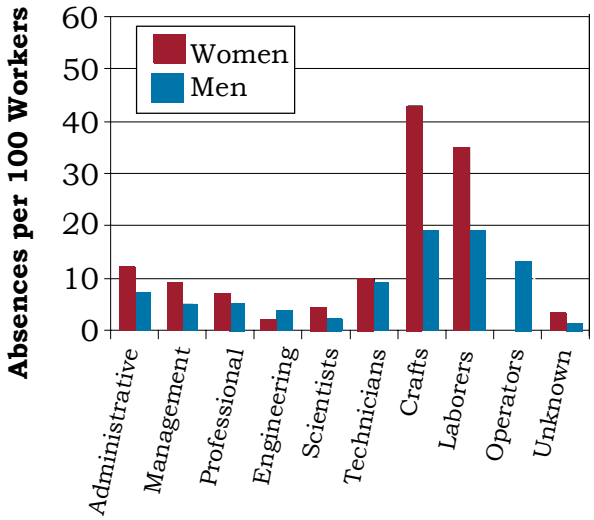
Figure 4. Number of Days Absent by Gender and Age

Gender	Age	Number of Absences	Number of Days Absent	Average Number of Days Absent
Women	16 - 29	1	7	7
	30 - 39	31	549	18
	40 - 49	66	1,790	27
	50 +	48	1,324	28
	Total	146	3,670	25
Men	16 - 29	1	15	15
	30 - 39	33	1,012	31
	40 - 49	83	2,590	31
	50 +	87	2,429	28
	Total	204	6,046	30

The rate of 5-day absences due to illness or injury varied by job category for both men and women (Figure 5). Women had a higher rate of absence than did men within the same job category, except for those in the Engineering and Operators categories. Workers in the Crafts and Laborers groups had the highest absence rates among male workers; men in the Unknown and Scientists groups had the lowest absence rates. The same job categories had the highest rates among women. The four female Operators did not report any absences in 1999.

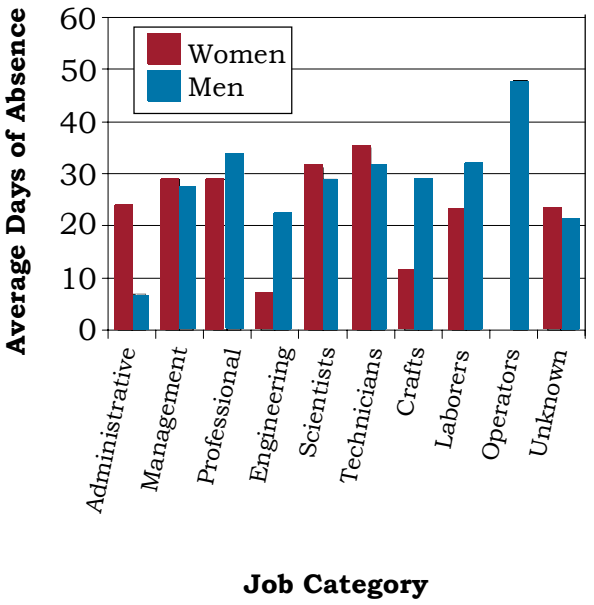
We saw no consistent pattern for average absence duration among men and women within a job category (Figure 6). Although Crafts workers and Laborers had the highest absence rate among men, the average duration of their absences was similar to the average for all males in the work force, 30 days.

Figure 5. Absence Rate by Job Category and Gender



Male Administrative workers had the shortest average number of days absent, 7 days. Among women, Engineering workers had the shortest average absence, 7 days. Female Technicians workers averaged the longest absences, 35 days.

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



Diagnostic Categories

Epidemiologic surveillance monitors *all* illnesses and injuries among active workers because it is not always possible to determine which health effects are due to occupational exposures and which ones are due to other causes. Most illness and injury diagnoses were reported to the occupational medicine clinic by workers who required return-to-work clearances. An absence due to illness or injury may involve more than one diagnosis, and epidemiologic surveillance includes all reported diagnoses. In addition, the OSHA 200 Log provides information on recorded occupational injuries and illnesses whether or not they involve absences.

This report organizes illness and injury categories based on a standard reference, the *International Classification of Diseases, 9th Revision, Clinical Modification* (ICD-9-CM). This reference is used to classify health events for statistical purposes. You can find specific health conditions in the Explanation of Diagnostic Categories section of this report.

The number of reported diagnoses categorized according to the ICD-9-CM and the number of lost calendar days are presented in Figure 7. Women reported 175 diagnoses and men reported 241 diagnoses in 1999. The most frequently reported diagnoses varied little by gender. Among both women and men, respiratory conditions and disorders of the muscles and skeleton were among the most frequently reported diagnoses.

Women lost 3,670 calendar days due to injury and illness. Respiratory diseases (23 percent), genitourinary disorders (18 percent), and muscles and skeleton conditions (13 percent) accounted for 54 percent of their reported diagnoses. The majority of the respiratory conditions were due to bronchitis and asthma (39 percent), followed by flu and pneumonia (34 percent). Sixty-three percent of the genitourinary disorders involved female reproductive disorders. Rheumatism made up 57 percent of the muscles and skeleton conditions, followed by disc and back problems (30 percent).

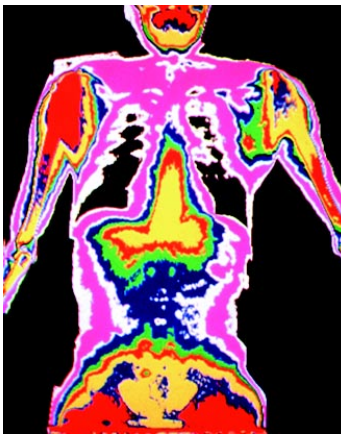
Figure 7. Number of Diagnoses and Lost Calendar Days by Diagnostic Category (Categorized by ICD-9-CM) and Gender

Diagnostic Category	Women		Men	
	Number of Diagnoses	Number of Lost Calendar Days	Number of Diagnoses	Number of Lost Calendar Days
Benign Growths	10	280	1	15
Blood	0	0	0	0
Cancer	2	173	6	356
Digestive	17	322	27	950
Endocrine / Metabolic	1	11	2	18
Existing Birth Condition	0	0	1	7
Genitourinary	32	1,006	9	104
Heart / Circulatory	8	374	23	886
Infections / Parasites	3	49	10	99
Injury	13	413	25	661
Miscarriage	0	0	NA	NA
Muscles & Skeleton	23	593	53	2,067
Nervous System	12	321	12	522
Psychological	4	56	7	145
Respiratory	41	453	56	617
Skin	3	60	1	18
Unspecified Symptoms	6	74	8	130

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

Men lost 6,046 calendar days due to injury and illness. Sixty-six percent of all reported diagnoses among men were due to respiratory conditions (23 percent), muscles and skeleton conditions (22 percent), digestive disorders (11 percent), and injuries (10 percent). Pneumonia and influenza accounted for 39 percent of the respiratory conditions, followed by bronchitis and asthma (32 percent). A closer look at diagnoses affecting the muscles and skeleton showed that about 43 percent were joint disorders and 40 percent were back problems and disc disorders. Thirty-three percent of the digestive diagnoses were hernias, followed by gallbladder disorders (22 percent). Sprains and strains accounted for 60 percent of the reported injuries.

The previously mentioned diagnoses did not vary much by age. Among men and women, workers younger than 30 years old reported only one diagnosis in 1999. Conditions affecting the respiratory system, diagnoses of the muscles and skeleton, and disorders of the digestive system were among the more frequently reported categories for men of all other ages. Among men aged 50 or older, diagnoses of the heart/circulatory system were frequently reported. Thirteen men in this oldest age group reported 14 diagnoses, 43 percent of which were for high blood pressure and ischemic heart disease (restricted blood flow to an artery).



Among women, the most frequently reported diagnoses were consistent among the various age groups. Respiratory conditions, disorders of the muscles and skeleton, and genitourinary disorders were the most frequently reported diagnoses in each age group except the youngest group.

Figure 8 shows the frequency of reported diagnoses by job category for men and women. The types of diagnoses did not vary significantly by job category. Among men, respiratory conditions, muscles and skeleton conditions, and digestive disorders appeared frequently in most job categories. Among men in the Management group, two men reported three diagnoses for cancer. Respiratory conditions, genitourinary disorders, and muscles and skeleton conditions were common across most job categories among women. We saw no indication that any particular diagnoses occurred disproportionately in a specific job category.

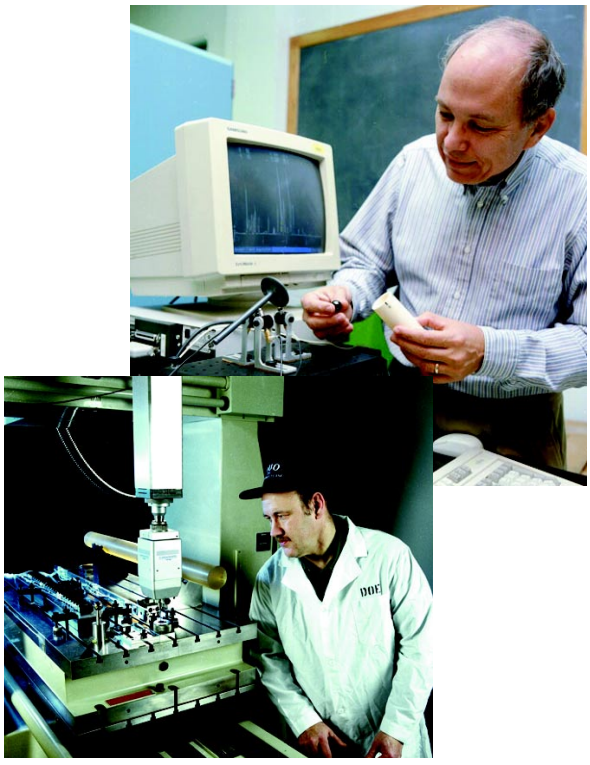


Figure 8. Most Frequently Reported Diagnoses by Job Category and Gender

Job Category	Women	Men
Administrative	Respiratory (20) Muscles & Skeleton (14) Genitourinary (12)	Unspecified Symptoms (1)
Management	Benign Growths (2) Genitourinary (2) Digestive (1) Nervous System (1) Respiratory (1)	Respiratory (6) Cancer (3) Digestive (2) Genitourinary (2) Heart/ Circulatory (2) Muscles & Skeleton (2)
Professional	Genitourinary (6) Respiratory (6) Digestive (5)	Respiratory (8) Heart/ Circulatory (6) Infections/ Parasites (3)
Engineering	Respiratory (1)	Muscles & Skeleton (7) Digestive (3) Heart/ Circulatory (3) Injury (3) Respiratory (3)
Scientists	Genitourinary (2) Infections/ Parasites (1) Muscles & Skeleton (1) Unspecified Symptoms (1)	Respiratory (4) Digestive (3) Heart/ Circulatory (2) Nervous System (2)
Technicians	Genitourinary (5) Respiratory (3) Heart/ Circulatory (2) Psychological (2)	Respiratory (10) Muscles & Skeleton (6) Digestive (4)
Crafts	Benign Growths (1) Digestive (1) Genitourinary (1) Muscles & Skeleton (1) Respiratory (1) Skin (1)	Muscles & Skeleton (22) Respiratory (14) Injury (13) Digestive (7)
Laborers	Respiratory (8) Genitourinary (4) Muscles & Skeleton (4)	Muscles & Skeleton (10) Respiratory (9) Digestive (4) Heart/ Circulatory (4)
Operators	None	Digestive (2) Injury (2) Muscles & Skeleton (2) Respiratory (2)
Unknown	Benign Growths (1) Digestive (1) Muscles & Skeleton (1) Nervous System (1) Respiratory (1)	Muscles & Skeleton (1)

Note: Numbers in parentheses represent the number of diagnoses reported.

Rates of Disease Occurrence

A Word about Rates: The previous section considered the number of absences and health conditions among various worker groups. For example, Figure 7 shows that men reported 25 and women reported 13 diagnoses involving injuries during 1999. Men, therefore, reported almost twice as many injuries as women. As there are more than 2 times as many men than women at ORNL, it seems reasonable to expect more injuries among men than women. Does this mean that men were at greater risk of injuries compared with women in 1999? To correctly answer that question, the total number of men and women in the work force must be considered. To compare risk among men and women, it is necessary to calculate the injury rate for each gender. Rates are calculated by dividing the number of injury diagnoses in a given gender by the total number of employees of that gender. Multiply this number by 1,000 to get the diagnosis rate per 1,000 workers.

For example:

25 injury diagnoses
÷ 2,945 men = .008 x 1,000 =
8 injury diagnoses per 1,000 men

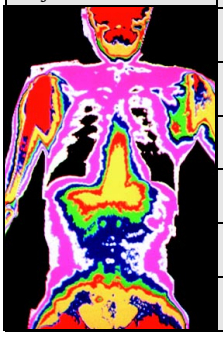
13 injury diagnoses
÷ 1,390 women = .009 x 1,000 =
9 injury diagnoses per 1,000 women

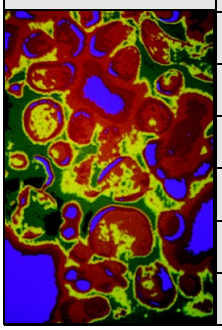
Comparing these rates now correctly suggests that the rate of reported injuries among women is about the same as the rate for men. They are called **crude rates** because they do not account for possible differences between men and women such as age and other factors that might affect the individual's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

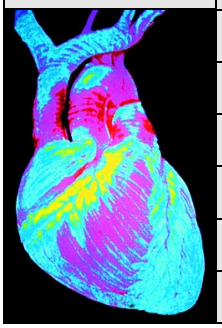
The diagnosis rate, also called the illness and injury rate, is the number of occurrences of a given disease or health condition observed over the course of a year per 1,000 workers at risk of getting that condition (see shaded box). One health condition, arthritis for example, may result in several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

In the following set of analyses, the four age groups previously used were collapsed into two groups: workers younger than 50 years of age and those 50 or older. In addition, the 10 job categories were combined into 6 larger groups. Five groups of diagnoses of particular interest to workers are presented in Figure 9: all illnesses and injuries combined, cancer, heart/circulatory system, respiratory system, and injury. Additional information about eight other disease groups is also analyzed and can be found in the Supporting Tables.

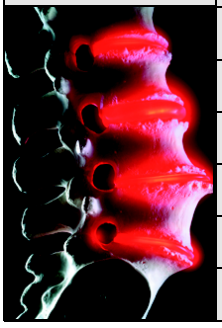
Figure 9. Illness and Injury Rates by Job Category, Gender, and Age

Diagnostic Category	Rate per 1,000			
All Illnesses & Injuries Combined	Job Category	Age	Men	Women
	Administrative/ Management	<50	35	130
		50+	65	191
	Professional	<50	67	78
		50+	50	109
	Scientists/ Engineering	<50	24	48
		50+	37	0
	Technicians/ Operators	<50	101	127
		50+	227	150
	Crafts/Laborers	<50	212	368
		50+	244	429
	Unknown	<50	15	43
		50+	0	40

Diagnostic Category	Rate per 1,000			
Cancer	Job Category	Age	Men	Women
	Administrative/ Management	<50	5	2
		50+	11	0
	Professional	<50	0	0
		50+	0	0
	Scientists/ Engineering	<50	1	0
		50+	2	0
	Technicians/ Operators	<50	0	10
		50+	0	0
	Crafts/Laborers	<50	3	0
		50+	0	0
	Unknown	<50	0	0
		50+	0	0

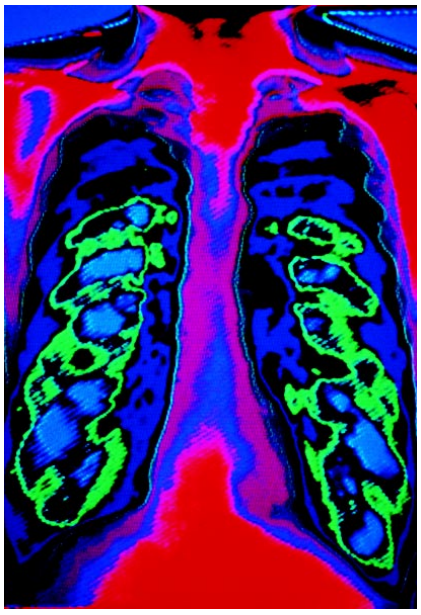
Diagnostic Category	Rate per 1,000			
Heart/Circulatory	Job Category	Age	Men	Women
	Administrative/ Management	<50	5	2
		50+	5	21
	Professional	<50	8	0
		50+	33	0
	Scientists/ Engineering	<50	1	0
		50+	9	0
	Technicians/ Operators	<50	4	20
		50+	0	0
	Crafts/Laborers	<50	12	18
		50+	24	0
	Unknown	<50	0	0
		50+	0	0

Diagnostic Category	Rate per 1,000			
Respiratory	Job Category	Age	Men	Women
	Administrative/ Management	<50	20	29
		50+	11	46
	Professional	<50	28	26
		50+	8	0
	Scientists/ Engineering	<50	1	8
		50+	13	0
	Technicians/ Operators	<50	18	20
		50+	107	50
	Crafts/Laborers	<50	26	70
		50+	68	179
	Unknown	<50	0	11
		50+	0	0

Diagnostic Category	Rate per 1,000			
Injury	Job Category	Age	Men	Women
	Administrative/ Management	<50	0	10
		50+	5	5
	Professional	<50	4	9
		50+	0	31
	Scientists/ Engineering	<50	1	0
		50+	7	0
	Technicians/ Operators	<50	18	10
		50+	13	0
	Crafts/Laborers	<50	21	18
		50+	34	71
	Unknown	<50	0	0
		50+	0	0

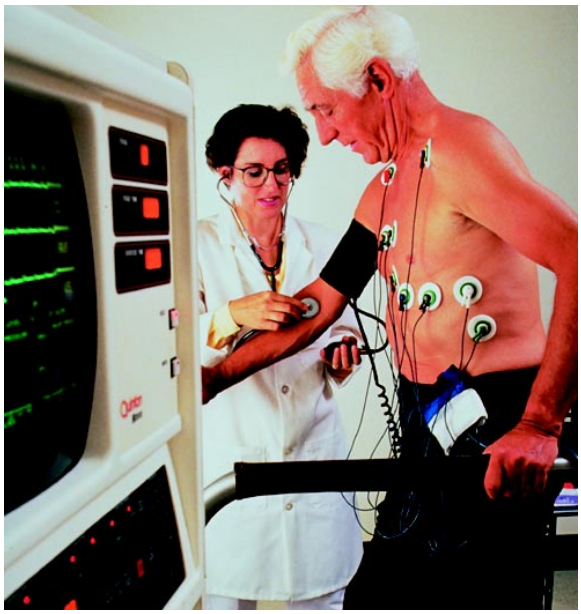
The rates for all illness and injuries combined among men and women tended to be greater for ORNL workers 50 years of age and older compared with younger workers. Women and men classified as Crafts/Laborers had the highest rates.

Cancer rates presented in this report are based on reported 5-day absences during the year. A worker may experience several periods of absence from one cancer diagnosis due to medical complications or treatment regimens. Each absence results in the report of a cancer diagnosis; however, it does not imply that this is a new cancer. The cancer rates in this report are not comparable to the *incidence rates* frequently published in many articles on cancer with which you may be familiar. Incident cancer rates are based on the number of new cancer cases diagnosed within a given time, usually a year.



The likelihood that an individual in the U.S. develops cancer increases with age. Our data did not reflect this pattern. Among the seven workers who reported cancer in 1999, five were less than 50 years old. The cancers reported by the seven workers were five genitourinary cancers, one digestive cancer, and one skin cancer. We found no relationship between the type of cancer and job category.

No relationship was observed between age and heart/circulatory problems. The highest rate was seen among older men in the Professional category, but the rate was based on only 3 reported diagnoses. Thirteen of the 23 absences among men occurred in workers aged 50 or older; 10 of 23 diagnoses involved hypertension or ischemic heart disease (restricted blood flow through an artery). Only 3 of 8 diagnoses for heart/circulatory problems reported among women were for hypertension or ischemic heart disease. Compared with other workers, Laborers were at more than 3 times the risk of reporting heart/circulatory conditions.



Crafts/Laborers had the highest rates of respiratory disease for men and women. Laborers were over 4 times more likely to report a respiratory condition and Crafts workers were twice as likely to report these conditions than were other workers. Among younger workers, women had higher rates of respiratory disease than did men in all

job categories except the Professional group.

Injury rates were not associated with age among men or women. The highest rates of injury were among men and women in the Crafts/Laborers group. Crafts workers were over 6 times more likely to report an injury than were other workers. Compared with other workers, they were at over 23 times higher risk of reporting a back sprain or strain and over 4 times higher risk of reporting a sprain or strain at a site other than the back.

In other analyses, we compared the risk of illness and injury among workers classified in one job category with the risk to workers in the remaining nine job categories. Overall, workers in the Crafts and Laborers categories were at

3 times the risk compared with all other groups for illness or injury. Crafts workers were 6 times more likely to report an infectious disease and Laborers at almost 4 times the risk of reporting a heart/circulatory condition than were other workers.

Sentinel Health Events for Occupations

A sentinel health event for occupation (SHEO) is a disease, disability, or death that is likely to be occupationally related. Its occurrence may serve as a warning signal that materials substitution, engineering control, personal protection, or medical care may be required to reduce the risk of injury or illness among the work force. Sixty-four medical conditions associated with workplace exposures from studies of many different industries have been identified as sentinel health events. Although sentinel health events may indicate an occupational exposure, many may also result from non-occupational exposures. Due to this uncertainty, sentinel health events are assessed in two categories.

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

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

No definite sentinel health events were identified in 1999. Seven of 416 diagnoses (2 percent) were identified as possible sentinel health events (Figure 10). Four of the seven possible sentinel health events were carpal tunnel syndrome reported by four workers (two

women and two men). They resulted in 184 lost calendar days. The two women reporting carpal tunnel syndrome (one Administrative worker and one Laborer) were aged 50+; the two men (one Scientist and one Crafts worker) were aged 40-49.

Figure 10. Characteristics of SHEOs by Gender

	Total Number of SHEO Diagnoses		Total Number of Days Absent	
	Men	Women	Men	Women
Definite	0	0	0	0
Possible	4	3	400	212
Total	4	3	400	212

Disabilities Among Active Workers

Disability data for the 1999 ORNL work force were not available.

Deaths Among Active Workers

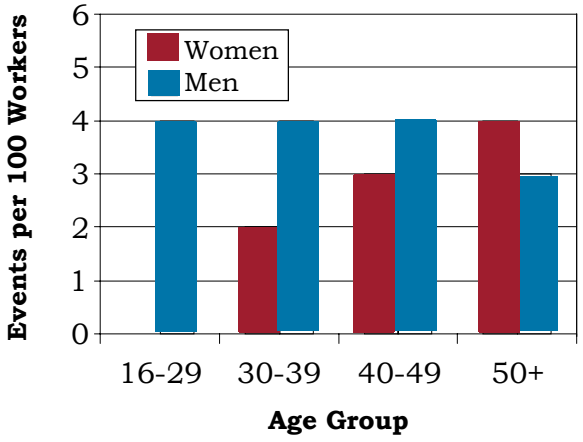
Death data for the 1999 ORNL work force were not available.

OSHA-Recordable Events

The Occupational Safety and Health Administration (OSHA) requires employers to maintain a record of occupational injuries and illnesses that have occurred 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.

Figure 11 shows the distribution of OSHA events by gender and age. There were 38 OSHA-recordable events among women and 107 among men. The rate of OSHA-recordable events was similar for men (4 per 100 workers) and women (3 per 100 workers). The average number of lost or restricted workdays was not related to age for either men or women.

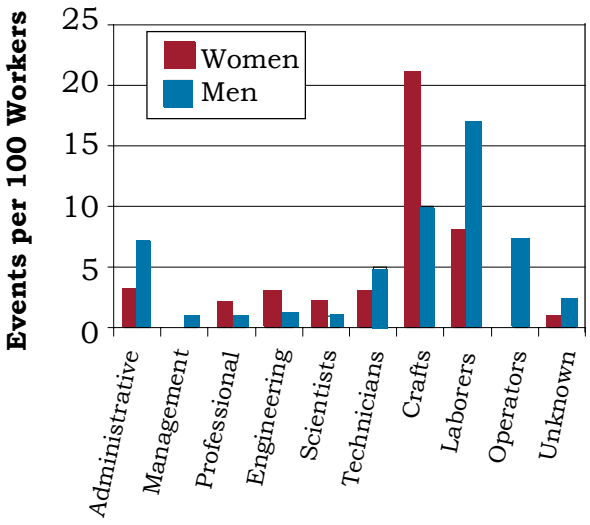
Figure 11. OSHA-Recordable Events by Gender and Age



The distribution of OSHA-recordable events by job category and gender is shown in Figure 12. Women had higher rates of OSHA-recordable events than did men in four job categories: Professional, Engineering, Scientists, and

Crafts. Women in the Management and Operators job categories did not report any OSHA events. The Crafts group had the highest rate of OSHA events (21 per 100 workers) among women. Laborers and Crafts workers had the highest rates of OSHA events among men (17 per 100 workers and 10 per 100 workers, respectively).

Figure 12. OSHA-Recordable Events by Job Category and Gender



The average number of workdays lost or with restricted activity due to an OSHA event was 17 days for men and 13 days for women. Workers in the Engineering and Crafts job categories had the highest average number of lost or restricted workdays (23 days) among male workers. Women in the Laborers category averaged the highest number of lost or restricted workdays (27 days). One event reported by a female Laborer was responsible for all the lost and restricted workdays for this group (163 days); the worker, aged 51, suffered a sprain or strain to the lumbosacral area of the back due to overexertion and strenuous movements.

Diagnostic and Accident Categories for OSHA-Recordable Events

The 145 OSHA events recorded on the OSHA 200 Logs contained 54 diagnoses among women and 159 diagnoses among men (Figure 13).

Figure 13. OSHA-Recordable Diagnoses by Diagnostic Category and Gender

Diagnostic Category	Gender	
	Women	Men
Endocrine/Metabolic	0	1
Muscles & Skeleton	20	39
Nervous System	3	8
Psychological	0	1
Skin	0	2
Unspecified Symptoms	4	9
Injury	27	99
Fractures-Skull	0	2
Fractures-Upper Limb	1	2
Fractures-Lower Limb	0	1
Dislocations	0	3
Back Sprains and Strains	4	20
Other Sprains and Strains	10	26
Open Wounds-Head, Neck, Trunk	1	4
Open Wounds-Upper Limb	4	11
Open Wounds-Lower Limb	1	1
Superficial Injuries	1	2
Bruises	3	15
Foreign Bodies Entering Orifice	0	7
Burns	0	3
Adverse Reactions to Non-Medical Substances	1	1
Adverse Reactions to External Causes	1	1

Injuries accounted for 50 percent of the diagnoses reported among women, the most common of which were sprains and strains (52 percent). Twenty-two percent of the reported injuries among women were open wounds and 11 percent were bruises. Among men, injuries

accounted for 62 percent of the diagnoses reported, again primarily due to sprains and strains (46 percent). Open wounds (16 percent) and bruises (15 percent) were also frequently reported among men. After injuries, the most common type of OSHA-recordable diagnoses among both men and women were conditions involving the muscles and skeleton.

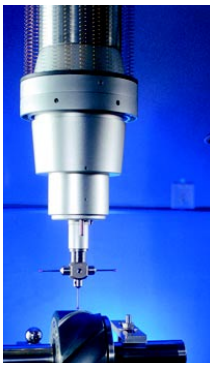
Ninety-six percent (139) of the 145 OSHA events were described as "an accident" in the OSHA logs (Figure 14). The majority of events were described as "other accidents," a broad category including 91 percent of the accidents among women and 82 percent among men. Overexertion and strenuous movements were responsible for 49 percent of the "other accidents," followed by repetitive trauma (18 percent) and being struck by an object (16 percent). After "other accidents," falls were the second most common type of accident (6 percent).

Figure 14. OSHA-Recordable Accidents by Type and Gender

Accident Category	Gender	
	Women	Men
	Number of Accidents	Number of Accidents
Poisoning-Non-Medicinal	1	2
Falls	1	8
Natural/Environmental Factors	1	4
Submersion/ Suffocation/Foreign Bodies	0	5
Other Accidents	32	85
Caught Between Objects	1	4
Cutting/Piercing Instrument/Object	3	7
Hot, Corrosive, or Caustic Material/ Steam	0	4
Machinery	0	1
Overexertion & Strenuous Movements	13	44
Repetitive Trauma	12	9
Struck by an Object	3	16
Total	35	104

Rates of OSHA-Recordable Events

The rates of all OSHA-recordable events by age and job categories and gender are shown in Figures 15 and 16. The rates for women tended to be higher in the Administrative/Management, Professional, and Scientists/Engineering job categories, while men's rates were higher in the Technicians/Operators, Crafts/Laborers, and Unknown categories. The OSHA-recordable rates among both men and women were highest among Crafts/Laborers workers. Most of the OSHA health conditions involved injury. When the rate for OSHA-recordable injuries was considered separately from other OSHA-recordable health conditions, the same job category had the highest rates for both men and women workers. These workers accounted for 15 percent of the work force and 52 percent of the OSHA-recordable events.



Crafts workers were at a 6 times greater risk of a back sprain or strain and 12 times more likely to suffer a sprain or strain to areas other than the back than were other groups of workers. They were also more likely to report an open wound to the upper limb (4 times) and bruises (8 times). Laborers were 8 times more likely to suffer a back sprain or strain and 4 times more likely to report a sprain or strain to areas other than the back. Both the Crafts workers and Laborers were at increased risk for conditions affecting the muscles and skeleon (3 times and 6 times, respectively).

Figure 15. OSHA-Recordable Rates by Age and Job Categories Among Women, All Diagnoses Combined

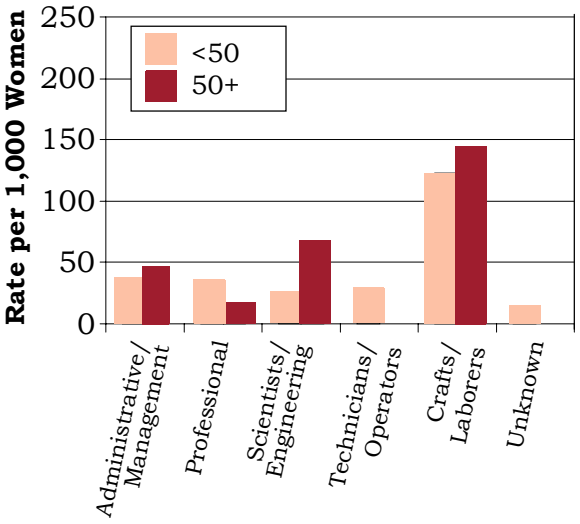
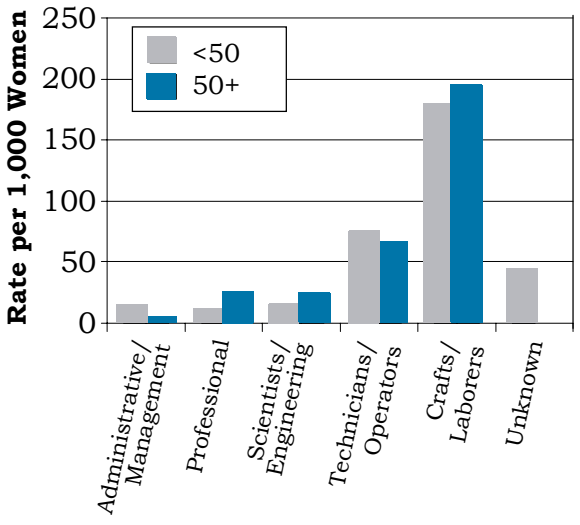


Figure 16. OSHA-Recordable Rates by Age and Job Categories Among Men, All Diagnoses Combined



Glossary

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Person-Year: A unit of measurement combining the number of people being studied with the time that each was observed equivalent to one person followed for one year. For example, 5 persons followed for one year contribute five person-years, as do 10 people each followed for half a year.

Relative Risk: The ratio of the occurrence of a disease or health condition in one group compared to the rate of occurrence of that same disease or health condition in another group.

Explanation of Diagnostic Categories

Throughout this report, health conditions have been grouped into a number of diagnostic categories which come from the *International Classification of Diseases, 9th Revision, Clinical Modification* (ICD-9-CM). For the text of this report, the categories are abbreviated to make the report easier to read. The following table lists the abbreviated categories used throughout the annual report and the corresponding ICD-9-CM codes found in the supporting tables.

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

ICD-9-CM Codes

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

• Other infectious and parasitic diseases	130-136	Lice, chiggers, scabies, and mites
• Late effects of infectious or parasitic diseases	137-139	Side effects of TB, chickenpox, or polio even though the disease is no longer active
Malignant neoplasms	140-208, 230-234	All cancers, regardless of the part of the body affected
• Lip, oral cavity, and pharynx	140-149	Lip, mouth, throat, and tongue
• Digestive organs and peritoneum	150-159	Stomach, esophagus (tube that transports food to the stomach), intestines, colon, rectum, anus, liver, pancreas, and gallbladder
• Respiratory system and intrathoracic organs	160-165	Sinuses, throat, voice box, lungs, and heart
• Bone, connective tissue, skin, and breast	170-176	Bone, muscle, ligament, tendon, blood vessels, fat, skin, and breast
• Genitourinary organs	179-189	Kidney, bladder, and cervix, ovary, uterus, and prostate
• Other and unspecified sites	190-199	Eye, brain, and thyroid
• Lymphatic and hematopoietic tissue	200-208	Leukemia, lymphoma, Hodgkin's disease, multiple myeloma, lymphosarcoma, and reticulum cell sarcoma
• Carcinoma in situ	230-234	A cancer that is confined to the site of origin (has not spread to neighboring tissue)
Benign neoplasms and neoplasms of uncertain behavior and unspecified nature	210-229 235-239	Tumors that are not cancerous or do not exhibit cancerous behavior, regardless of the part of the body affected
Endocrine, nutritional, and metabolic diseases and disorders of the immune system	240-279	Diseases affecting the hormone secreting glands and organs. Overactive thyroid; underactive thyroid; vitamin deficiency; diabetes; gout; and problems affecting the antibody producing system
Disorders of the blood and blood forming organs	280-289	Anemia and hemophilia (excludes leukemia)

Mental disorders	290-319	Psychiatric diagnoses - Non-psychotic disorders: depression; anxiety, fear, and stress disorders; alcoholism; drug dependence; and eating disorders, such as anorexia; Psychotic disorders: dementia, schizophrenia, and manic depression
Diseases of the nervous system and sense organs	320-389	Huntington's chorea; Alzheimer's and Parkinson's disease; epilepsy; multiple sclerosis; migraine; diseases of the eye, such as cataract and glaucoma
• Inflammatory diseases of the central nervous system	320-326	Bacterial meningitis (swelling of the layers covering the brain and spine); bacterial encephalitis (swelling of the brain); and brain and spinal abscesses
• Hereditary and degenerative diseases of the central nervous system	330-337	Alzheimer's and Parkinson's disease, tremors, and Huntington's chorea
• Other disorders of the central nervous system	340-349	Multiple sclerosis (MS), cerebral palsy, epilepsy, and migraine
• Disorders of the peripheral nervous system	350-359	Nerve disorders of the face, carpal tunnel syndrome, muscular dystrophy
• Disorders of the eye	360-379	Inflammation and ulcers of the eye and eyelid; detached retina; pink eye; problems with tear ducts; glaucoma; and cataracts
• Diseases of the ear and mastoid process	380-389	Infections of the outer, middle, or inner ear; ringing of the ears; hearing loss
Diseases of the circulatory system	390-459	Rheumatic fever, heart murmurs, heart attacks, angina, hardening of the arteries, varicose veins, hemorrhoids, and phlebitis
• Acute rheumatic fever	390-392	High fever and joint pain with possible heart damage
• Chronic rheumatic heart disease	393-398	Long lasting swelling and damage to the heart which results from rheumatic fever
• Hypertensive disease	401-405	High blood pressure

• Ischemic heart disease (Restricted blood flow to the heart)	410-414	Heart attack and angina
• Diseases of pulmonary circulation	415-417	Blood clots in the lung and pulmonary aneurysm (bulge that develops in the wall of the pulmonary artery, which is the artery that carries blood to the lungs)
• Other forms of heart disease	420-429	Swelling of the inner lining, middle lining, or sac enclosing the heart; heart failure; and irregular heartbeat
• Cerebrovascular disease	430-438	Stroke, bleeding in the brain, and blockage or low blood flow in blood vessels of the brain
• Diseases of the arteries and capillaries	440-448	Hardening of the arteries; aneurysm (bulge that develops in the walls of arteries); and blood clots
• Diseases of the veins, lymphatics, and other circulatory system diseases	451-459	Phlebitis (swelling of a vein), thrombophlebitis (swelling of a vein which has a blood clot), varicose veins, and hemorrhoids
Diseases of the respiratory system	460-519	Colds, sinusitis, laryngitis, pneumonia, influenza, chronic bronchitis, asthma, and emphysema
• Acute respiratory infections	460-466	Colds, sore throat, sinus infections, swollen tonsils, and bronchitis
• Other diseases of the upper respiratory tract	470-478	Allergies, hay fever, sinus infections, bronchitis, and sore throat that continue for a long time
• Pneumonia and influenza	480-487	"The flu" and pneumonia caused by a bacteria or virus
• Chronic obstructive pulmonary diseases and allied conditions	490-496	Emphysema and asthma
• Pneumoconiosis and other lung diseases caused by external agents	500-508	Black lung; miners' asthma; asbestosis; silicosis; berylliosis; and conditions caused by chemical fumes and vapors

• Other diseases of the respiratory system	510-519	Pleurisy (swelling of the lining of the lungs), collapsed lung, and respiratory failure
Diseases of the digestive system	520-579	Diseases affecting the teeth and mouth, salivary glands, digestive tract, and the abdominal cavity. Examples include dental abscess, ulcers, appendicitis, hepatitis (excluding viral hepatitis), cirrhosis of the liver, gallstones, pancreatitis, abdominal hernia, and intestinal polyps
• Diseases of the oral cavity, salivary glands, and jaw	520-529	Tooth problems (too many, too few, abnormal shape or size, cavities, bleeding gums, toothaches), and infections and swelling of the mouth, jaw, and tongue
• Diseases of the esophagus, stomach, and duodenum	530-537	Ulcers of the esophagus (tube that transports food to the stomach), stomach, and small intestine; indigestion; and uncontrollable vomiting
• Appendicitis	540-543	Swelling of the appendix (rupture, surgery, or both may result)
• Hernia of the abdominal cavity	550-553	Ruptures of the groin and diaphragm (muscle which separates the chest area from the lower part of the trunk)
• Non-infectious enteritis and colitis	555-558	Crohn's disease and swelling of the intestine and colon
• Other diseases of the intestines and peritoneum	560-569	Irritable bowel syndrome, blockage of the intestine, constipation, and diarrhea
• Other diseases of the digestive system	570-579	Diseases of the liver, gallbladder, and pancreas; hepatitis; blood in stool; and bleeding in the stomach and intestine
Diseases of the genitourinary system	580-629	Diseases affecting the kidneys, the prostate, and testes; benign breast diseases; infertility (male and female); diseases of the ovary; pelvic inflammatory disease; and menstrual disorders
• Nephritis, nephrotic syndrome, and nephrosis	580-589	Swelling of the kidney; swelling of the small blood vessels in the kidney; and kidney failure

• Other diseases of the urinary system	590-599	Swelling and infection of the kidney and bladder; kidney stones; and difficulty urinating
• Diseases of the male genital organs	600-608	Enlarged prostate; swelling of the scrotum and prostate; and abscess of the prostate
• Disorders of the breast	610-611	Benign tumors, cysts, and infections of the breast
• Inflammatory disease of the female pelvic organs	614-616	Swelling of the uterus, ovary, fallopian tubes, or cervix
• Other diseases of the female genital tract	617-629	Conditions associated with menopause and postmenopause; PMS; infertility; and cramps
Complications of pregnancy, childbirth, and the puerperium	630-676	Miscarriage; complications of pregnancy, such as hemorrhage; pregnancy-related high blood pressure; preeclampsia; and premature labor or other complications of labor
• Ectopic and molar pregnancy	630-633	Development of fetus outside the uterus and growth of cysts
• Other pregnancy with abortive outcome	634-639	Miscarriage and complications associated with miscarriage
• Complications mainly related to pregnancy	640-648	Abnormal bleeding and possible miscarriage; infections; high blood pressure caused by pregnancy; and premature labor
• Normal delivery, and other indications for care in pregnancy, labor, and delivery	650-659	Delivery requiring little or no assistance; multiple births; breech birth; and problems of the fetus or placenta which affect care of mother
• Complications occurring mainly in the course of labor and delivery	660-669	Long labor; unusually fast delivery; and abnormal bleeding after delivery
• Complications of the puerperium	670-676	Infections of the breast; blood clot in lung; and varicose veins
Diseases of the skin and subcutaneous tissue	680-709	Acne, cellulitis, sunburn, psoriasis, and seborrhea

• Infections of the skin and subcutaneous tissue	680-686	Abscesses, boils, hair-containing cysts, and pus-filled blisters
• Other inflammatory conditions of skin and subcutaneous tissue	690-698	Skin rashes caused by detergents, oils, greases, solvents, sun, food, drugs, or medicine
• Other diseases of the skin and subcutaneous tissue	700-709	Corns, calluses, heat rash, swollen hair follicles, acne, and ingrown fingernails and toenails
Diseases of the musculoskeletal system and connective tissue	710-739	Arthritis, systemic lupus erythematosus, ankylosing spondylitis, herniated intervertebral disc ("slipped disc"), lumbago, sciatica, rheumatism, tendonitis, and osteoporosis
• Arthropathies and related disorders	710-719	Arthritis; joint pain and stiffness; and other diseases of the connective tissue which supports and connects internal organs, forms bones and blood vessel walls, and attaches to bones
• Dorsopathies	720-724	Swelling of the spine; herniated, slipped, and ruptured disc; rheumatoid arthritis of the spine; lumbago; and sciatica
• Rheumatism, excluding the back	725-729	Swelling and degeneration of joints, muscles, tendons; tennis elbow; and bursitis
• Osteopathies, chondropathies, and acquired musculoskeletal deformities	730-739	Fracture caused by bone disease; osteoporosis; curvature of the spine; flat foot; hammer toe; and development of deformities of the nose, toes, feet, legs, arms, and hands
Congenital anomalies	740-759	Spina bifida; cleft palate; harelip; and various chromosomal anomalies, such as Klinefelter's syndrome
Certain conditions originating in the perinatal period	760-779	Maternal high blood pressure; maternal malnutrition; ectopic pregnancy; breech birth; fetal malnutrition or slow growth; injuries related to birth trauma; and perinatal jaundice

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

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

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