

1999

Oak Ridge East Tennessee Technology Park Annual Epidemiologic Surveillance Report



East Tennessee Technology Park 1999 Epidemiologic Surveillance Report

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

East Tennessee Technology Park 1999

At A Glance

This is the first Epidemiologic Surveillance Report for the East Tennessee Technology Park.

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

The rate of 5-day absences among men and women increased with age. Duration of absence also tended to increase with age in workers under the age of 50.

Thirty-two events were recorded on the OSHA 200 Logs, containing 14 diagnoses among women and 18 among men. Injuries accounted for 43 percent of the diagnoses among women, but half of these were unspecified in the information contained in the logs. Injuries accounted for two-thirds of the OSHA-recordable diagnoses among men, primarily due to open wounds. Other than injuries, conditions involving the muscles and skeleton were most prominent among the OSHA events.

Crafts workers and Laborers accounted for 16 percent of the work force and 53 percent of the OSHA-recordable events.

Introduction	1	Sentinel Health Events for Occupations	11
Site Overview	2	Characteristics of SHEOs by Gender	11
The East Tennessee Technology Park Work Force - 1999	3	Disabilities Among Active Workers	11
The Work Force by Gender and Age.....	3	Deaths Among Active Workers	11
The Work Force by Job Category and Gender.....	3	OSHA-Recordable Events	12
Number and Length of Absences	4	OSHA-Recordable Events by Gender and Age	12
Absence Rate by Gender and Age.....	4	OSHA-Recordable Events by Job Category and Gender.....	13
Number of Days Absent by Gender and Age.....	4	Diagnostic and Accident Categories for OSHA-Recordable Events	13
Absence Rate by Job Category and Gender.....	5	OSHA-Recordable Diagnoses by Diagnostic Category and Gender.....	13
Average Duration of Absence by Job Category and Gender.....	5	OSHA-Recordable Accidents by Type and Gender.....	13
Diagnostic Categories	6	Rates of OSHA-Recordable Events	14
Number of Diagnoses and Lost Calendar Days by Diagnostic Category (Categorized by ICD-9-CM) and Gender.....	6	OSHA-Recordable Rates by Age and Job Categories Among Women, All Diagnoses Combined.....	14
Most Frequently Reported Diagnoses by Job Category and Gender.....	8	OSHA-Recordable Rates by Age and Job Categories Among Men, All Diagnoses Combined.....	14
Rates of Disease Occurrence	8		
Illness and Injury Rates by Job Category, Gender, and Age	9		

Glossary 15

**Explanation of Diagnostic
Categories** 16

ICD-9-CM Codes 17

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 East Tennessee Technology Park (ETTP) from January 1, 1999 through December 31, 1999.



The data were collected by a coordinator at ETTP and submitted to DOE's Epidemiologic Surveillance Data Center, located at Oak Ridge Institute for Science and

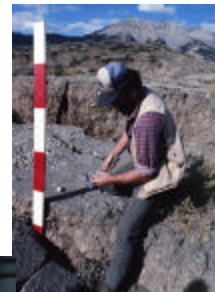
Education, where quality control procedures and data analyses were carried out. Epidemiologic surveillance begins at ETTP with this report.

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 ETTP with other DOE sites should be made with caution. In addition, many factors can affect the completeness and accuracy of health information reported at the sites, thereby affecting the observed patterns of illness and injury.



Site Overview

The East Tennessee Technology Park (ETTP), formerly known as the Oak Ridge Gaseous Diffusion Plant and as the K-25 Site, is located on a 1,500-



acre tract of land adjacent to the Clinch River and approximately 10 miles west of downtown Oak Ridge, Tennessee. The plant was built in 1943-1946 as part of the World War II Manhattan Project. The site's original mission was to produce uranium enriched in the ^{235}U isotope for use in atomic weapons. The plant produced enriched uranium for the commercial nuclear power industry from 1945 to 1985 and was permanently shut down in 1987.

The mission of ETTP is environmental cleanup and reindustrialization / reuse of the assets (i.e., facilities, equipment, materials, utilities, and trained work force) of the site. The mission is being accomplished by cleaning up the site through the Environmental Management Program's management and integration contract and by forming partnerships with commercial interests who conduct environmental restoration, decontamination and decommissioning,

waste treatment and disposal, and diffusion technology development in exchange for reduced rents.

ETTP serves as the base of operations for environmental management at the Department of Energy Oak Ridge Operations facilities. These activities include management of the Toxic Substances Control Act Incinerator, which is the only U.S. facility capable of incinerating certain radioactive and / or hazardous wastes within permitted air emission requirements. Other activities at the site include treatment, storage, and disposal of hazardous and radioactive waste, and support of risk-based environmental cleanup programs for contaminated facilities and natural resources at DOE facilities in Oak Ridge and in Paducah, Kentucky and Portsmouth, Ohio.

Bechtel Jacobs Company, owned by Bechtel National, Inc. and Jacobs Engineering Group, Inc., is the primary management and integrating contractor, responsible for environmental management oversight and the enrichment facilities programs for operations at the site for the period of December 18, 1997 to September 30, 2003.

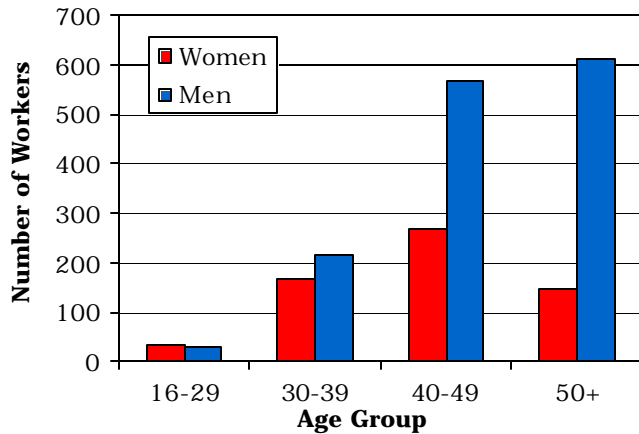


The East Tennessee Technology Park Work Force - 1999

A total of 2,044 ETPP 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 618 (30 percent) women and 1,426 (70 percent) men in the work force. The average age of male ETPP workers was 47 years and 43 years for females.



Figure 1. The Work Force by Gender and Age



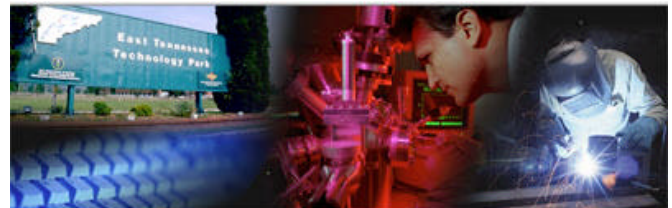
The distribution of workers by job category and gender is shown in Figure 2. Individual job titles reported by ETPP were grouped together into nine job categories. This is because there were either too few workers or too few health events within a particular job title, thereby limiting the type of analyses that could be conducted. Men and women were not distributed

equally among the various job categories. Over one-third of female workers (34 percent) were in the Administrative category; the next largest percentage of women (24 percent) were Professional workers. One-fourth (25 percent) of male workers were in the Engineering category, while almost the same percentage of men (22 percent) were Management workers.



Figure 2. The Work Force by Job Category and Gender

Job Category	Women	Men
Administrative	211 34%	0 0%
Management	44 7%	319 22%
Professional	146 23%	164 11%
Engineering	103 17%	350 25%
Scientists	8 1%	51 4%
Technicians	43 7%	73 5%
Crafts	4 1%	208 15%
Laborers	30 5%	93 6%
Operators	29 5%	168 12%



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.

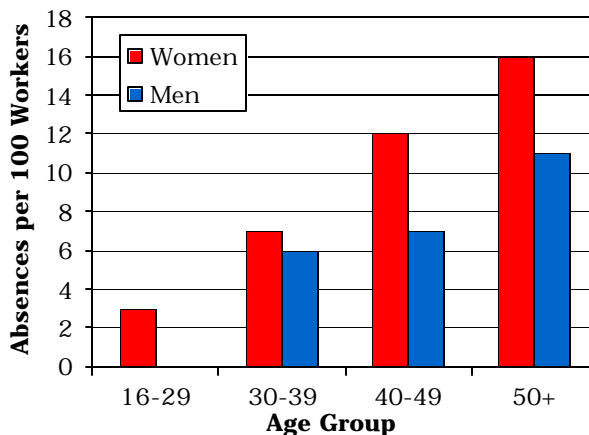
Specific absences of 5 or more consecutive workdays that were not the result of an injury or illness were excluded. These include eight absences among eight women due to maternity leave and one woman with reported absences due to elective procedures not related to the treatment of an illness or injury.

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

The rate of 5-day absences due to injury or illness varied by gender and age (Figure 3). The 66 5-day absences among 57 women resulted in an absence rate of 11 per 100 workers (66 / 618). Among the 1,426 men, 117

absences resulted in an absence rate of 8 per 100 workers (117 / 1,426). The rate of 5-day absences among men and women increased with age.

Figure 3. Absence Rate by Gender and Age



The average length of absence by gender and age is shown in Figure 4. The average length of absence was 27 days for men and 28 days for women. The average duration of absence among men and women increased with age for workers less than 50 years old and then declined.

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	12	12
	30-39	11	313	28
	40-49	31	984	32
	50+	23	549	24
	Total	66	1,858	28
Men	16-29	0	0	0
	30-39	12	211	18
	40-49	37	1,216	33
	50+	68	1,730	25
	Total	117	3,157	27

The rate of 5-day absences due to illness or injury varied by job category for both men and women (Figure 5).

Women tended to have a higher rate of absence than men in a given job category.

Crafts workers and Operators had the highest absence rates among male workers; Management and Engineering workers had the lowest absence rates (there were no male Administrative employees in 1999).

Among women, Laborers had the highest absence rate and Scientists and Crafts workers had the lowest rates. Female workers in the Scientists and Crafts groups had no events.



We saw no consistent pattern for average absence duration among men and women within a job category (Figure 6). Although Crafts workers had the highest absence rate among men, the average duration of their absences, 15 days, was at least 4 days shorter than in other job categories.

Among men, Engineering workers had the longest average number of days absent, 65 days. Four of the 12 absences reported by male Engineering workers lasted 60 days or more.

Among women, Technicians had the longest average absence, 69 days. One of the 4 absences reported by these workers lasted 225 days. Female Administrative workers averaged the shortest absences, 23 days.



Figure 5. Absence Rate by Job Category and Gender

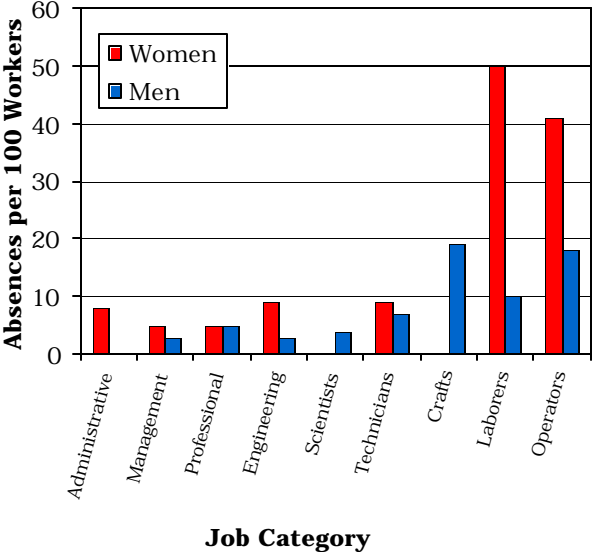
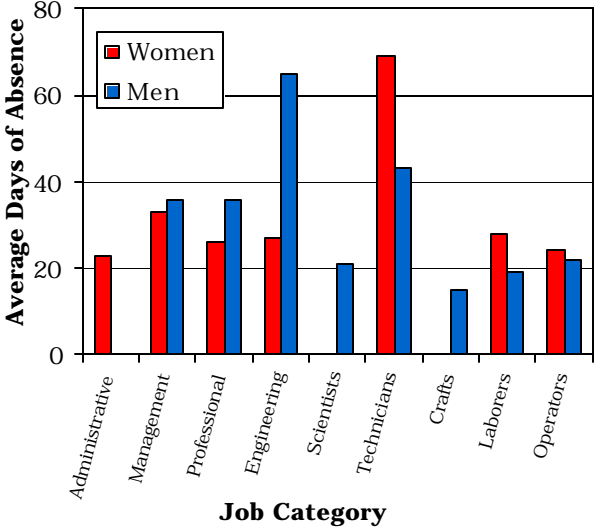


Figure 6. Average Duration of Absence by Job Category and Gender



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.

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 107 diagnoses and men reported 184 diagnoses in 1999. The most frequently reported diagnoses varied little by gender. Among both women and men, conditions affecting the muscles and skeleton were among the more frequently reported.

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	4	148	4	116
Blood	0	0	1	61
Cancer	1	22	3	94
Digestive	14	186	20	451
Endocrine/ Metabolic	2	27	6	95
Existing Birth Condition	0	0	1	48
Genitourinary	8	216	6	89
Heart/ Circulatory	3	66	19	449
Infections/ Parasites	2	10	4	60
Injury	10	187	22	398
Miscarriage	1	24	NA	NA
Muscles & Skeleton	28	961	28	1,015
Nervous System	5	105	2	35
Psychological	6	294	5	208
Respiratory	11	102	40	456
Skin	2	13	0	0
Unspecified Symptoms	10	174	23	262

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

Women lost 1,858 calendar days due to injury and illness. Muscles and skeleton conditions (26 percent), digestive disorders (13 percent), and respiratory diseases (10 percent)



accounted for 49 percent of all reported diagnoses among women. Disc and back problems (36 percent) and arthritis (32 percent) made up 68 percent of the muscles and skeleton

conditions, followed by rheumatism (21 percent). Fifty-seven percent of digestive disorders were gallbladder problems / gastrointestinal hemorrhage and enteritis and colitis (21 percent). The majority of the respiratory conditions were upper respiratory type infections (55 percent), followed by flu and pneumonia (27 percent).

Men lost 3,157 calendar days due to injury and illness. Sixty-two percent of all reported diagnoses among men were due to respiratory conditions (22 percent), muscles and skeleton



conditions (15 percent), unspecified symptoms (13 percent), and injuries (12 percent). Upper respiratory type infections accounted for 43 percent of the respiratory conditions, followed by pneumonia and flu (30 percent). A closer look at diagnoses affecting the muscles and skeleton showed that about 64 percent were back problems and disc disorders. Unspecified symptoms included general symptoms (fainting, dizziness, sleep disturbances, and malaise / fatigue; 43 percent). Frequently reported injuries included sprains and strains (32 percent), fractures (14 percent), and open wounds (14 percent).

The previously mentioned diagnoses did not vary much by age. No diagnoses were reported among men under 30 years old. Among men aged

50 or older, diagnoses of the heart / circulatory system were frequent. Eight men reported 16 diagnoses, 69 percent of which were for high blood pressure or ischemic heart disease (restricted blood flow to an artery).

Among women, the most frequently reported diagnoses were also consistent among the various age groups. Conditions of the genitourinary system were reported frequently by women 30 to 49 years old. Six women reported eight diagnoses, all of which were conditions of the female reproductive organs.

The types of diagnoses did not vary significantly by job category (Figure 8). Among men, muscles and skeleton conditions and respiratory conditions appeared frequently among the job categories. Heart / circulatory conditions were common among men in the Management, Professional, and Technicians groups. Men in the Management, Professional, and Engineering groups frequently reported



digestive disorders. Injuries were common diagnoses among male Technicians, Laborers, and Operators. There were no male workers in the Administrative category in 1999. Among women, muscles and skeleton conditions and digestive diagnoses were common across job categories. No diagnoses were reported among women in the Scientists and Crafts groups.

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

Job Category	Men	Women
Administrative	None	Genitourinary (3) Injury (3) Muscles & Skeleton (3)
Management	Heart/Circulatory (4) Digestive (3) Cancer (2) Muscles & Skeleton (2)	Digestive (1) Muscles & Skeleton (1)
Professional	Respiratory (4) Muscles & Skeleton (3) Digestive (2) Heart/Circulatory (2)	Muscles & Skeleton (4) Digestive (1) Genitourinary (1) Heart/Circulatory (1) Miscarriage (1) Unspecified Symptoms (1)
Engineering	Digestive (3) Respiratory (3) Muscles & Skeleton (2) Psychological (2)	Digestive (4) Muscles & Skeleton (3) Benign Growths (2) Genitourinary (2) Injury (2)
Scientists	Endocrine/Metabolic (1) Nervous System (1)	None
Technicians	Heart/Circulatory (2) Respiratory (2) Genitourinary (1) Injury (1)	Muscles & Skeleton (4) Digestive (2) Psychological (1) Respiratory (1)
Crafts	Respiratory (16) Unspecified Symptoms (10) Muscles & Skeleton (9)	None
Laborers	Unspecified Symptoms (7) Injury (3) Muscles & Skeleton (3) Respiratory (3)	Muscles & Skeleton (7) Respiratory (6) Unspecified Symptoms (6)
Operators	Injury (13) Respiratory (12) Muscles & Skeleton (9)	Muscles & Skeleton (6) Digestive (3) Injury (3)

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

Rates of Disease Occurrence

A Word about Rates: The previous section considered the number of absences and health conditions among various worker groups. For example, Figure 7 shows that men reported 22 diagnoses and women reported 10 diagnoses involving injuries during 1999. As there are more than 2 times as many men than women at ETTP, 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:

$$22 \text{ injury diagnoses} \div 1,426 \text{ men} = .015 \times 1,000 = 15 \text{ injury diagnoses per 1,000 men}$$

$$10 \text{ injury diagnoses} \div 618 \text{ women} = .016 \times 1,000 = 16 \text{ injury diagnoses per 1,000 women}$$

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

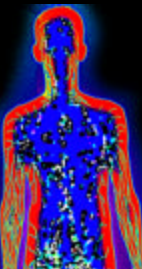


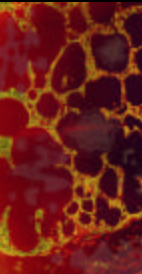
year per 1,000 workers at risk of getting that condition (see shaded box). One health condition, arthritis for

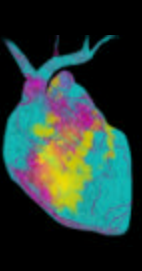
example, may result in several 5-day absences over a year. Conversely, one 5-day absence may be associated with multiple diagnoses (e.g. the flu and a sprained wrist) recorded for epidemiologic surveillance.

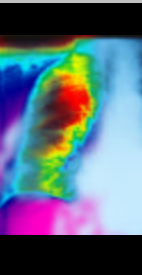
In the following set of analyses, the four age groups previously used were collapsed into two groups: workers younger than 50 years of age and those 50 or older. In addition, the nine job categories were combined into five larger groups. Five groups of diagnoses of particular interest to workers are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

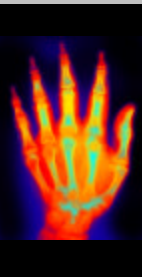
Figure 9. Illness and Injury Rates by Job Category, Gender, and Age

Diagnostic Category	Rate per 1,000			
	Job Category	Age	Men	Women
	Administrative/Management	<50	36	86
		50+	65	103
	Professional	<50	46	46
		50+	127	108
	Scientists/Engineering	<50	27	131
		50+	70	333
	Technicians/Operators	<50	234	351
		50+	260	600
	Crafts/Laborers	<50	179	833
		50+	335	875

Diagnostic Category	Rate per 1,000			
	Job Category	Age	Men	Women
	Administrative/Management	<50	6	0
		50+	7	15
	Professional	<50	0	0
		50+	0	0
	Scientists/Engineering	<50	4	0
		50+	0	0
	Technicians/Operators	<50	0	0
		50+	0	0
	Crafts/Laborers	<50	0	0
		50+	0	0

Diagnostic Category	Rate per 1,000			
	Job Category	Age	Men	Women
	Administrative/Management	<50	0	0
		50+	26	0
	Professional	<50	0	9
		50+	36	0
	Scientists/Engineering	<50	0	10
		50+	7	0
	Technicians/Operators	<50	21	18
		50+	21	0
	Crafts/Laborers	<50	0	0
		50+	42	0

Diagnostic Category	Rate per 1,000			
	Job Category	Age	Men	Women
	Administrative/Management	<50	0	11
		50+	0	0
	Professional	<50	0	0
		50+	73	0
	Scientists/Engineering	<50	4	10
		50+	14	0
	Technicians/Operators	<50	69	18
		50+	42	67
	Crafts/Laborers	<50	22	167
		50+	96	188

Diagnostic Category	Rate per 1,000			
	Job Category	Age	Men	Women
	Administrative/Management	<50	6	5
		50+	0	29
	Professional	<50	0	0
		50+	0	0
	Scientists/Engineering	<50	0	20
		50+	7	0
	Technicians/Operators	<50	41	53
		50+	83	0
	Crafts/Laborers	<50	15	56
		50+	24	63

The rates for all illnesses and injuries combined were greater for female and male ETPP workers 50 years of age and older than for younger workers. Men and women classified as Crafts / Laborers had the highest illness and injury rates. Except for the Professional group, women had higher rates than men for all illnesses and injuries combined in a given job category.

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. Incidence 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. Only four workers reported cancer during 1999, making the numbers too few to look at trends for age groups. Three men reported three 5-day absences due to cancer. One diagnosis each was reported for cancer of the brain, prostate, and skin. One woman reported one diagnosis for breast cancer. We found no relationship between the type of cancer and job category.

Older workers had the highest rates of heart / circulatory problems, with one exception, among men. The highest rate was seen among older men in the Crafts / Laborers category. Thirteen of the 15 absences among men

occurred in workers aged 50 or older; 11 of 16 diagnoses reported by these older men involved high blood pressure or ischemic heart disease (restricted blood flow through an artery). Among women, all three of the diagnoses for heart / circulatory problems were for high blood pressure or ischemic heart disease. They were reported by women under 50 years old.

Women tended to have higher rates of respiratory disease than did men in nearly all job categories. Age was not



related to reported respiratory diagnoses for women or men.

The Crafts / Laborers group had the highest rate of respiratory disease for both male and female workers. Workers in the Crafts, Laborers, and Operators

categories were at least 3 times more likely to report a respiratory condition than were other workers.

Except for the Administrative / Management category, older workers had higher rates of injury than did younger workers among men. Among younger workers, women had higher rates than did men in all job categories except Administrative / Management. The highest rates of injury were among men in the Technicians / Operators group and among women in the Crafts / Laborers group. Operators were 6 times more likely and Laborers 5 times more likely to report an injury as other workers.

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 eight job categories. Workers in the Crafts, Laborers, and Operators categories were at more than twice the risk compared with all other groups. These workers were also at least 3 times more likely to report unspecified symptoms. Crafts workers were 7 times as likely to report a genitourinary condition compared with other workers. Operators were at 3 times increased risk of reporting a digestive disorder.

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. Three of 291 diagnoses (1 percent) were identified as possible sentinel health events (Figure 10). All of the possible sentinel health events were identified as carpal tunnel syndrome. They were reported by two workers (one woman and one man) and resulted in 44 lost calendar days. The woman was an Administrative worker in the 40-49 age group; the man was in the 30-39 age group and in the Scientists job category.

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	1	2	28	16
Total	1	2	28	16

Disabilities Among Active Workers

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

Deaths Among Active Workers

During 1999, three male ETPP employees died. The causes of death were one each for brain cancer, brain hemorrhage, and injuries from an auto accident. All three of the workers were in the Management job category, but these causes of death do not suggest a specific mortality pattern among ETPP workers.

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

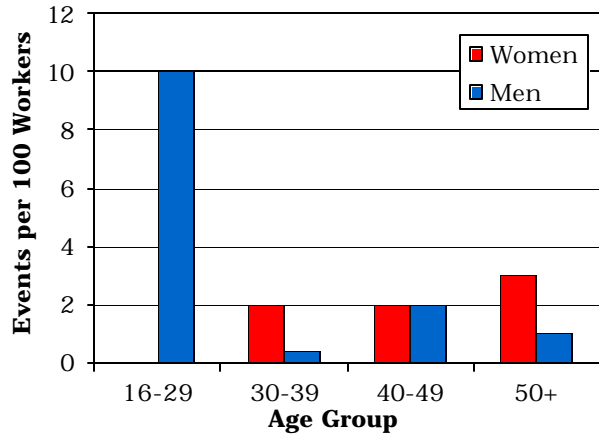
at least two important respects: 1) they do not necessarily result in days lost from work, and 2) they are usually accompanied by a specific determination that they are work-related.



Figure 11 shows the distribution of OSHA events by gender and age. There were 14 OSHA-recordable events among women and 18 OSHA-recordable events among men. The rate of OSHA-recordable events was similar for men (1 per 100 workers) and women (2 per

100 workers). The average number of lost or restricted workdays was not related to age for either men or women. Women aged 40-49 and men aged 50+ had the highest average number of lost and restricted workdays (18 and 24 days, respectively).

Figure 11. OSHA-Recordable Events by Gender and Age



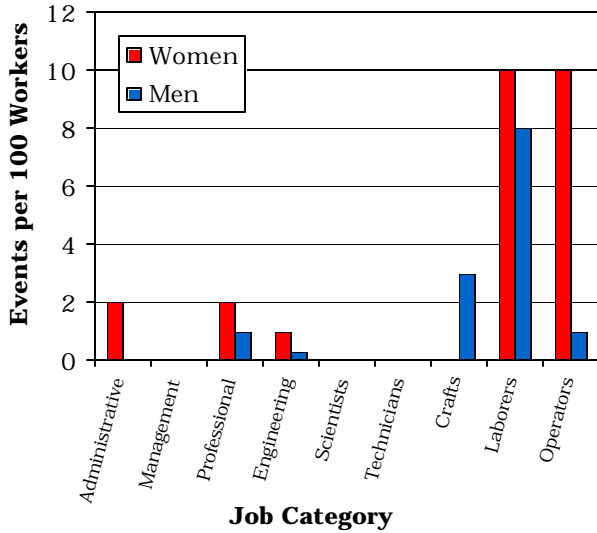
The distribution of OSHA-recordable events by job category and gender is shown in Figure 12. Women had higher rates of OSHA-recordable events than did men in five job categories:

Administrative, Professional, Engineering, Laborers, and Operators. Men and women in the Management, Scientists, and



Technicians job categories and women in the Crafts category did not report any OSHA events. There were no men working in the Administrative category in 1999. Laborers and Operators had the highest rates of OSHA events (10 per 100 workers) among women. Laborers had the highest rate of OSHA events among men (8 per 100 workers).

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 12 days for men and 10 days for women. Crafts workers had the highest average number of lost or restricted workdays (20 days) among male workers. Women in the Laborers category averaged the highest number of lost or restricted workdays (23 days). One event reported by a female Laborer was responsible for the total lost and restricted workdays among women Laborers (68 days). The worker, in the 40-49 age group, had a displaced intervertebral disc.

Diagnostic and Accident Categories for OSHA-Recordable Events

The 32 OSHA events recorded on the OSHA 200 Logs contained 14 diagnoses among women and 18 diagnoses among men (Figure 13). Among women, injuries accounted for 43 percent of the diagnoses reported. The most common (50 percent) type of OSHA-recordable injury among women was unspecified injuries. Among men, injuries accounted for 67 percent of the

diagnoses reported; these were primarily due to open wounds (33 percent). Unspecified injuries (25 percent) were also frequently reported by men. After injuries, the most common type of OSHA-recordable diagnosis among workers was conditions involving the muscles and skeleton.

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

Diagnostic Category	Gender	
	Women	Men
Digestive	0	1
Muscles & Skeleton	6	2
Nervous System	2	2
Psychological	0	1
Injury	6	12
Fractures – Upper Limb	1	1
Back Sprains and Strains	1	2
Open Wounds – Head, Neck, Trunk	0	2
Open Wounds – Upper Limb	0	2
Superficial Injuries	0	2
Unspecified Injuries	3	3
Adverse Reactions to External Causes	1	0

Nine percent (3) of the 32 OSHA events were described as “an accident” in the OSHA logs (Figure 14). One accident was reported by a female Operator aged 30-39. Two men in the Laborers category, one aged 16-29 and one in the 40-49 age group, reported two accidents. Natural / environmental factors were responsible for all the accidents.

Figure 14. OSHA-Recordable Accidents by Type and Gender

Accident Category	Gender	
	Women	Men
	Number of Accidents	Number of Accidents
Natural/Environmental Factors	1	2
Total	1	2

Rates of OSHA-Recordable Events

Figures 15 and 16 show the rates of all OSHA-recordable events by age and job categories and gender. Women had higher rates than did men in all job categories. The rates among both men and women were highest among Crafts / Laborers workers. Most of the OSHA-recordable 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 rate for both men and women. Crafts / Laborers workers accounted for 16 percent of the work force and 53 percent of the OSHA-recordable events.

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

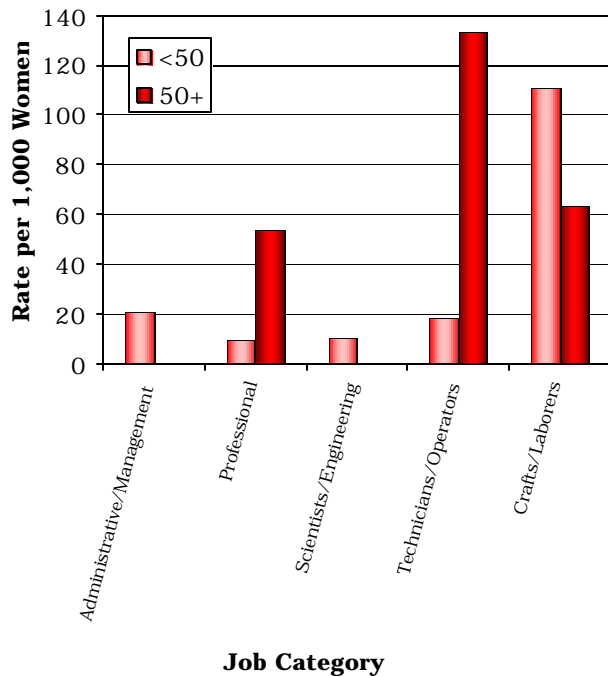
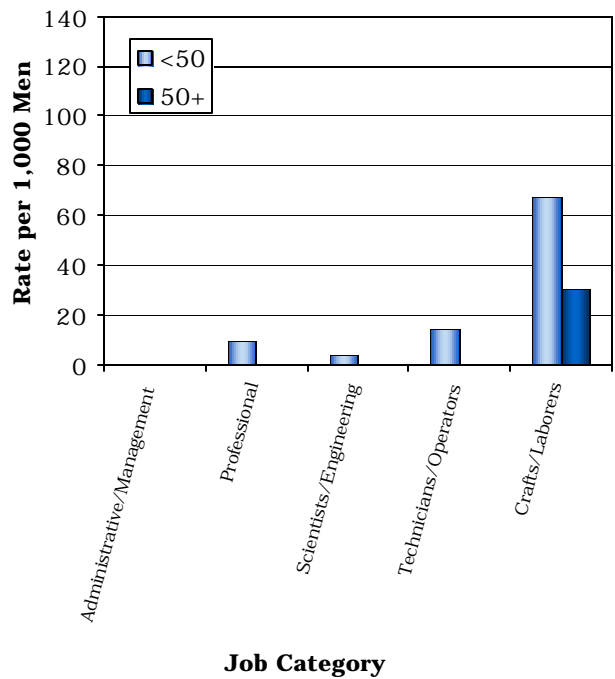


Figure 16. OSHA-Recordable Rates by Age and Job Categories Among Men, All Diagnoses Combined



Crafts workers and Laborers were at increased risk of reporting an illness or injury. Workers in the Crafts category were 5 times more likely than other workers to report an illness or an injury, while Laborers were at a 6 times higher risk of an illness or injury.

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

<ul style="list-style-type: none"> • Other injuries and late effects of external causes 	<p>900-999</p>	<p>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</p>
<p>Supplementary classifications related to personal or family history of disease</p>	<p>V10-V19</p>	<p>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</p>
<p>Supplementary classifications related to health care for reproduction and child development</p>	<p>V20-V28</p>	<p>Problems related to pregnancy, postpartum care, contraception, outcome of delivery, and physical development of child</p>
<p>Contact with health services for reasons other than illness or injury</p>	<p>V50-V59</p>	<p>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</p>

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