

**1997 Rocky Flats  
Environmental Technology Site  
Annual Epidemiologic  
Surveillance Report**

**ROCKY FLATS  
ENVIRONMENTAL TECHNOLOGY SITE**

**1997 Epidemiologic Surveillance Report**

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## **ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE 1997**

### **At a Glance**

Rocky Flats reported 32 percent fewer absences in 1997 than were reported in 1996. Reported absences decreased 38 percent among women and 29 percent among men. The roster declined 14 percent over the time period, 18 percent among women and 13 percent among men.

The rate of 5-day absences increased with age among both women and men. The average length of absence did not increase with age, nor was length of absence related to gender.

The highest absence rate was noted among the Nuclear workers for both women (37 per 100) and men (12 per 100). Service personnel had the lowest rate of absence for women (0 per 100) and Professional workers had the lowest rate for men (3 per 100).

As in 1995 and 1996, high diagnosis rates for both women and men included respiratory conditions, injuries, and conditions affecting the muscles and skeleton.

Overexertion and strenuous movements made up the majority of accidents. Falls were the second most common type of accident for both women and men.

OSHA-recordable rates among women were highest among Crafts and Manual Labor, Nuclear, and Other/Unknown workers. The highest rates among men were among Service/Security, Crafts and Manual Labor, and Nuclear workers.

OSHA-recordable rates changed erratically for most job categories over the 4-year period. The changes are not typical of those observed at other epidemiologic surveillance sites, and may reflect the effects of reclassifying workers from one job category to another and the uncertainty of reporting by lower tier subcontractors at Rocky Flats since 1995.

|  |   |  |    |
|--|---|--|----|
| <b>Introduction</b> .....  | 1 | Most Frequently Reported<br>Diagnoses by Job<br>Category and Gender .....  | 8  |
| <b>Site Overview</b> .....   | 2 |  |    |
| <b>The Rocky Flats</b>   |   |  |    |
| <b>Work Force</b> .....  | 3 | Illness and Injury Rates<br>by Job Category, Gender,<br>and Age .....  | 9  |
| The Work Force by Gender<br>and Age.....   | 3 |  |    |
| The Work Force by Job<br>Category and Gender.....  | 3 |  |    |
| <b>Number and Length of<br/>Absences</b> .....   | 4 | <b>Time Trends</b> .....   | 11 |
| Absence Rate by Gender<br>and Age.....   | 4 | Age-Adjusted Rates for Selected<br>Diagnostic Categories for<br>Men and Women from 1993<br>to 1997.....              | 12 |
| Number of Days Absent by<br>Gender and Age.....  | 5 | Age-Adjusted Rates for All<br>Diagnoses Combined Among<br>Women and Men by<br>Job Category from 1993<br>to 1997..... | 13 |
| Absence Rate by Job<br>Category and Gender.....  | 5 | <b>Sentinel Health Events<br/>for Occupations</b> .....  | 14 |
| Average Duration of Absence<br>Job Category and Gender .....   | 5 | Characteristics of SHEOs<br>by Gender.....   | 14 |
| <b>Diagnostic Categories</b> .....   | 6 | <b>Disabilities Among Active<br/>Workers</b> .....   | 14 |
| Number of Diagnoses<br>and Lost Calendar<br>Days by Diagnostic Category<br>(Categorized by ICD-9-CM)<br>and Gender ..... | 6 | <b>Deaths Among Active<br/>Workers</b> .....   | 15 |

**OSHA-Recordable Events** ..... 15

OSHA-Recordable Events by  
Gender and Age..... 15

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

**Diagnostic and Accident  
Categories for OSHA-  
Recordable Events**..... 16

OSHA-Recordable Diagnoses  
by Diagnostic Category  
and Gender ..... 16

OSHA-Recordable Accidents  
by Type and Gender ..... 17

**Rates of OSHA-  
Recordable Events**..... 17

OSHA-Recordable Rates by  
Age and Job Category Among  
Women, All Diagnoses  
Combined ..... 18

OSHA-Recordable Rates by  
Age and Job Category Among  
Men, All Diagnoses  
Combined ..... 18

**Time Trends for OSHA-  
Recordable Events**..... 18

Age-Adjusted Rates for All  
OSHA-Recordable Diagnoses  
Combined Among Women by  
Job Category from 1994  
to 1997..... 19

Age-Adjusted Rates for All  
OSHA-Recordable Diagnoses  
Combined Among Men by  
Job Category from 1994  
to 1997..... 19

**Glossary** ..... 20

**Explanation of Diagnostic  
Categories**..... 21

**ICD-9-CM Codes**..... 22

## 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 five or more consecutive workdays, occupational injuries and illnesses, and disabilities and deaths among current workers.

This report provides a summary of epidemiologic surveillance data collected from the Rocky Flats Environmental Technology Site from January 1, 1997 through December 31, 1997. The data were collected by a coordinator at Rocky Flats and submitted to DOE's Epidemiologic Surveillance Data Center, located at Oak Ridge Institute for Science and Education, where quality control procedures and preliminary data analyses were carried out. The analyses were interpreted and the final report prepared by the DOE Office of Epidemiologic Studies. Epidemiologic surveillance has been ongoing at Rocky Flats since 1992.

The information presented in this report provides highlights of the data analyses conducted. Earlier surveillance reports and additional supporting tables for this report are posted on the Office of Epidemiologic Studies' Web Site (<http://www.eh.doe.gov/epi/surv>), or

are available by request. The main sections of the report include: work force characteristics; absences due to injury or illness of five 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. This report includes sections on time trends that provide comparative information on the work force from 1993 to 1997 for health data based on absences and for OSHA-recordable data from 1994 through 1997.



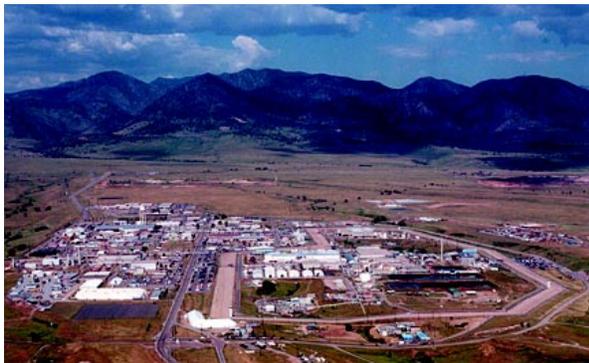
**Note that in the figures and calculations that follow, percentages have been rounded to the nearest whole number.**

DOE sites vary by mission, function, job classification, and worker exposures. Comparisons of Rocky Flats 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 Rocky Flats Environmental Technology Site is situated on the western slopes of the Rocky Mountains near Golden, Colorado, 16 miles northwest of Denver. The site encompasses about 400 acres located on a 6,500 acre reserve that includes over 400 separate buildings and structures. The site was established in 1952 by the Atomic Energy Commission to serve as one of seven production plants in the national nuclear weapons complex. The site's operations involved the development of new technology needed for the manufac-



ture and assembly of nuclear weapons. During the Cold War, Rocky Flats was responsible for the fabrication of the hollow plutonium sphere, or "pit," that serves as the trigger device for nuclear warheads. With the end of the Cold War, the plant's mission changed from weapons production to environmental cleanup.

In 1989, Rocky Flats was added to the National Priorities List for Superfund, the national environmental cleanup program. The site has areas in which buried chemicals and nuclear materials have contaminated both the soil and groundwater. The buried chemicals and materials include thousands of cubic yards of wastes left

over from the production era that must be removed for disposal. The cleanup of contaminated areas in both the natural environment and the buildings will also contribute to the already large waste volume. In July 1994, the name "Rocky Flats Plant" was changed to "Rocky Flats Environmental Technology Site" to more accurately reflect the current environmental restoration and cleanup mission. Kaiser-Hill, a partnership between ICF-Kaiser and CH2M Hill, assumed responsibility as the integrating management contractor for the site on July 1, 1995.

The site's current mission is to safely manage its existing nuclear wastes and materials until national repositories are established to accept them, clean up the areas of environmental contamination, and decontaminate and decommission the site. The ultimate goal is to close the site.



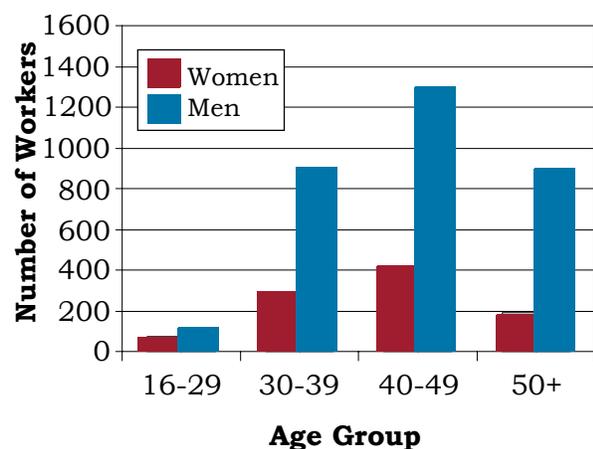
## The Rocky Flats Work Force - 1997

A total of 4,154 Rocky Flats employees were included in epidemiologic surveillance in 1997, 673 fewer workers than were present in 1996. Twenty-two workers were excluded from the roster of current workers because no information on gender or age was available for these workers. The age and gender distribution of the work force is shown in Figure 1.



There were 967 (23 percent) women and 3,187 (77 percent) men in the work force. The average age of male Rocky Flats workers was 44 years and 42 years for females. Eighty-two percent of the workers were White. Hispanics comprised 11 percent and African Americans 4 percent of the work force. Asians and Native Americans made up the majority of the remaining 3 percent.

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



The distribution of workers by gender and job category is shown in Figure 2. Individual job titles reported by Rocky Flats were grouped together into 8 job categories. This is because there were either too few workers or too few health events within a particular job title, thereby limiting the types of analyses that could be conducted. Men and women were not distributed equally among the various job categories. We noted the largest gender differences in the Administration who were primarily women, and Crafts and Manual Labor groups who were primarily men.

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

| Job Category          | Women      | Men          |
|-----------------------|------------|--------------|
| Administration        | 592<br>61% | 1,209<br>38% |
| Professional          | 88<br>9%   | 433<br>14%   |
| Technical             | 38<br>4%   | 201<br>6%    |
| Service               | 9<br>1%    | 56<br>2%     |
| Security              | 41<br>4%   | 217<br>7%    |
| Crafts & Manual Labor | 58<br>6%   | 547<br>17%   |
| Nuclear               | 60<br>6%   | 289<br>9%    |
| Other/Unknown         | 81<br>9%   | 235<br>7%    |

## Number and Length of Absences

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



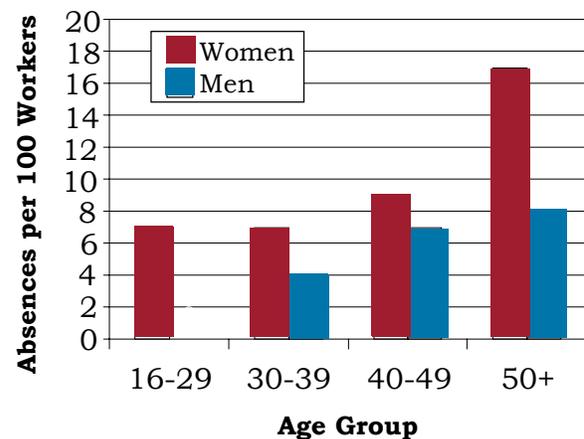
worker has been absent for five or more consecutive workdays. If an absence on a Friday continues through Tuesday, the length of that absence includes the weekend. All injuries and illnesses due to a work-related incident must be reported. Non-occupational illnesses and injuries that involve absences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

Unlike Epidemiologic Surveillance Annual Reports issued prior to 1996, we excluded some types of absences of 5 or more workdays because they were not the result of an injury or illness. In this report, specific absences of 5 or more consecutive workdays that were excluded include 14 women with 14 reported absences due to maternity leave and 3 women and 1 man with reported absences due to elective surgical 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.

We noted a striking decrease in the number of absences reported in 1997. Rocky Flats reported 32 percent fewer absences in 1997 than were reported in 1996. Reported absences decreased 38 percent among women and 29 percent among men. The roster declined 14 percent over the time period, 18 percent among women and 13 percent among men. The decline may be associated with the distribution of work to lower tier subcontractors under Rocky Flats' integrated contract. Not all lower tier subcontractors may be included in the site's reporting of rosters and health events.

The rate of five-day absences due to injury or illness varied by gender and age as shown in Figure 3. There were 95 5-day absences among 79 women resulting in an absence rate of 10 per 100 (95/967). Among the 3,187 men, there were 197 absences resulting in an absence rate of 6 per 100 (197/3,187). The rate of 5-day absences increased with age among both women and men. No absences were reported by men under 30 years of 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 similar for women (27 days) and men (28 days). The average length of absence did not increase with age, nor was it related to gender.

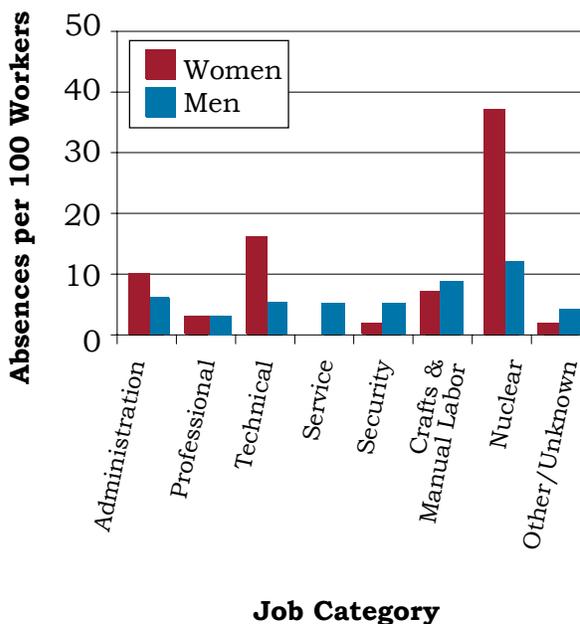
**Figure 4. Number of Days Absent by Gender and Age**

| Gender | Age          | Number of Absences | Number of Days Absent | Average Number of Days Absent |
|--------|--------------|--------------------|-----------------------|-------------------------------|
| Women  | 16 - 29      | 5                  | 80                    | 16                            |
|        | 30 - 39      | 21                 | 756                   | 36                            |
|        | 40 - 49      | 37                 | 736                   | 20                            |
|        | 50 +         | 32                 | 983                   | 31                            |
|        | <b>Total</b> | <b>95</b>          | <b>2,555</b>          | <b>27</b>                     |
| Men    | 16 - 29      | 0                  | 0                     | 0                             |
|        | 30 - 39      | 39                 | 956                   | 25                            |
|        | 40 - 49      | 91                 | 2,588                 | 28                            |
|        | 50 +         | 67                 | 1,913                 | 29                            |
|        | <b>Total</b> | <b>197</b>         | <b>5,457</b>          | <b>28</b>                     |

The rate of five-day absences due to illness or injury varied by job category for men and women as shown in Figure 5. Across similar job categories, we observed no relationship between rate of absence and gender. The highest absence rate was noted among the Nuclear workers for both women (37 per 100) and men (12 per 100). Service personnel had the lowest rate of absence for women (0 per 100) and Professional workers had the lowest rate for men (3 per 100).

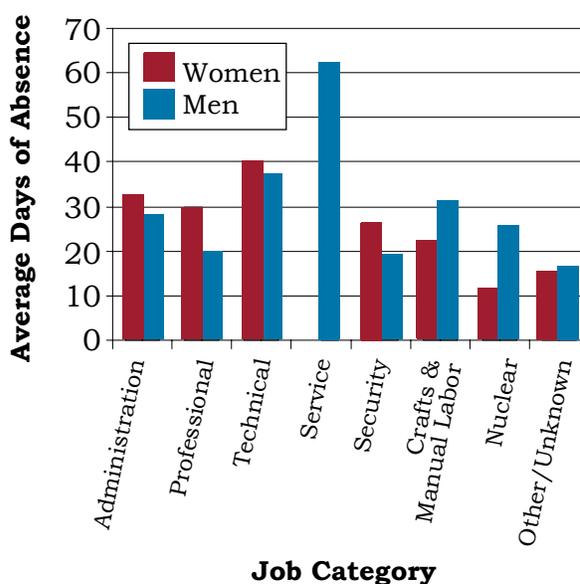
The average duration of absence by job category and gender is shown in Figure 6. There was no consistent pattern for average absence duration among men and women. Although Nuclear workers had the highest rate of 5-day absences, the average duration of their absences was the shortest for women and comparable to other job categories

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



for men. Among women, Technical workers had the longest average duration of absence (40 days). Service workers had the longest absence duration (62 days) among men. These workers reported only 3 absences, one of which lasted 120 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 what health effects are due to occupational exposures and what 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, 9<sup>th</sup> 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 at the end 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. There were 122 diagnoses reported by women and 235 diagnoses reported by men in 1997. The most frequently reported diagnoses varied little by gender.

Female employees lost 2,555 calendar days due to injury and illness. Respiratory conditions (30 percent), muscles and skeleton conditions (16 percent), and genitourinary disorders (11 percent) accounted for 57 percent of their reported diagnoses. The majority

(54 percent) of respiratory conditions were acute upper respiratory infections, bronchitis and asthma (32 percent), and flu and pneumonia (14 percent). Rheumatism made up 37 percent of the muscles and skeleton conditions, followed by arthritis (32 percent) and disc disorders and back problems (32 percent). Disorders of the female reproductive organs accounted for almost 70 percent of the genitourinary conditions.

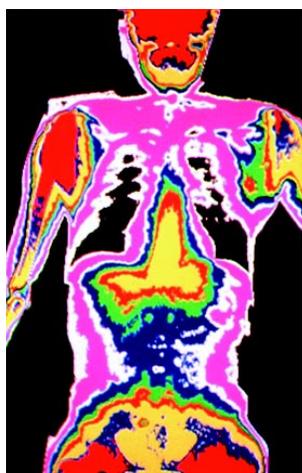
**Figure 7. Number of Diagnoses and Lost Calendar Days by Diagnostic Category (Categorized by ICD-9-CM) and Gender**

| Diagnostic Category      | Women               |                              | Men                 |                              |
|--------------------------|---------------------|------------------------------|---------------------|------------------------------|
|                          | Number of Diagnoses | Number of Lost Calendar Days | Number of Diagnoses | Number of Lost Calendar Days |
| Benign Growths           | 0                   | 0                            | 2                   | 61                           |
| Blood                    | 0                   | 0                            | 0                   | 0                            |
| Cancer                   | 0                   | 0                            | 3                   | 87                           |
| Digestive                | 12                  | 321                          | 28                  | 487                          |
| Endocrine / Metabolic    | 1                   | 35                           | 1                   | 8                            |
| Existing Birth Condition | 0                   | 0                            | 0                   | 0                            |
| Genitourinary            | 13                  | 519                          | 8                   | 165                          |
| Heart / Circulatory      | 4                   | 86                           | 16                  | 426                          |
| Infections / Parasites   | 4                   | 47                           | 9                   | 129                          |
| Injury                   | 10                  | 372                          | 45                  | 1,468                        |
| Miscarriage              | 0                   | 0                            | 0                   | 0                            |
| Muscles and Skeleton     | 19                  | 610                          | 38                  | 1,344                        |
| Nervous System           | 7                   | 153                          | 11                  | 470                          |
| Psychological            | 6                   | 282                          | 11                  | 249                          |
| Respiratory              | 37                  | 553                          | 55                  | 636                          |
| Skin                     | 0                   | 0                            | 3                   | 53                           |
| Unspecified Symptoms     | 9                   | 246                          | 5                   | 109                          |

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

Among women, the more frequently reported diagnoses were not as consistent among the various age groups as they were among men. Respiratory conditions were among the top two categories in all age groups. For women younger than age 40, the most frequently reported diagnoses included injuries. For 30-49 year old women, genitourinary diagnoses were common. Conditions affecting the muscles and skeleton were common among women 40 years and older.

Men lost 5,457 calendar days due to injury and illness. Over 50 percent of all reported diagnoses among these workers were respiratory conditions (23 percent), injuries (19 percent), and muscles and skeleton conditions (16 percent). Acute respiratory infections accounted for 42 percent of the respiratory conditions, followed by pneumonia and flu (29 percent) and bronchitis (20 percent). Frequently reported injuries were sprains and strains (42 percent), unspecified injuries (22 percent), and fractures (13 percent). No allergic reactions or



complications of medical care were reported among the 45 diagnoses categorized as injuries. The diagnoses affecting the muscles and skeleton included arthritis (47 percent), back problems (34 percent), and rheumatism (11 percent).

The above diagnoses did not vary by age. Injuries, respiratory conditions, and diagnoses affecting the muscles and skeleton ranked among the top categories for men of all ages except 16-29 year

olds. Workers in this age group reported no 5-day absences in 1997. Digestive disorders appeared in the other age groups. Twenty-five men reported 28 diagnoses for the digestive system. Over 40 percent of these were hernias and 18 percent were related to the teeth and oral cavity. Among workers aged 50 and older, heart/circulatory system diagnoses outnumbered conditions of the muscles and skeleton. Nine men in this oldest age group reported 13 diagnoses of the heart/circulatory system; 8 were for ischemic heart disease (restriction of blood flow in an artery).

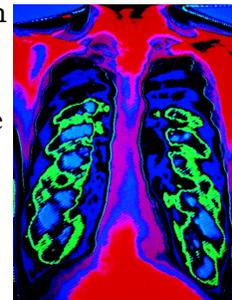


Figure 8 shows the frequency of reported diagnoses by job category for women and men. Among women, genitourinary disorders, conditions affecting the muscles and skeleton, and respiratory diagnoses were common among the job categories. The 9 women in the Service group reported no absences during 1997.

Among men, muscles and skeleton conditions, injuries, and respiratory conditions appeared most often in nearly all job categories. In the Crafts and Manual Labor group, 4 workers reported 6 diagnoses for a psychological condition. Two of these diagnoses were for substance abuse, 2 for depression, 1 for a sleep disorder, and 1 for obsessive compulsive behavior. The ranking of diagnoses should be interpreted cautiously; in many job categories the actual number of diagnoses was very small. For example, cancer diagnoses ranked third among men in the Other/Unknown group, but the ranking involved only 2 cancer diagnoses reported by the same worker.

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

| Job Category          | Men  | Women   |
|-----------------------|--|---|
| Administration        | Respiratory (22)<br>Muscles and Skeleton (20)<br>Digestive (10)                                  | Respiratory (18)<br>Muscles and Skeleton (15)<br>Injury (9)<br>Digestive (8)<br>Genitourinary (8) |
| Professional          | Injury (4)<br>Respiratory (3)<br>Muscles and Skeleton (3)<br>Digestive (2)                       | Psychological (2)<br>Muscles and Skeleton (1)<br>Nervous System (1)                               |
| Technical             | Injury (4)<br>Respiratory (4)<br>Five Diagnoses Tied (1)   | Respiratory (4)<br>Nervous System (2)   |
| Service               | Injury (2)<br>Muscles and Skeleton (1)   | None  |
| Security              | Injury (5)<br>Respiratory (5)<br>Digestive (2)   | Digestive (1)<br>Genitourinary (1)  |
| Crafts & Manual Labor | Respiratory (11)<br>Muscles and Skeleton (9)<br>Digestive (6)<br>Injury (6)<br>Psychological (6) | Genitourinary (4)<br>No Others  |
| Nuclear               | Injury (16)<br>Respiratory (10)<br>Digestive (5)   | Respiratory (14)<br>Five Diagnoses Tied (2)   |
| Other/<br>Unknown     | Heart/<br>Circulatory (4)<br>Digestive (3)<br>Cancer (2)   | Respiratory (1)<br>Muscles and Skeleton (1)   |

Note: Numbers in parentheses are number of diagnoses reported.

## Rates of Disease Occurrence

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 box below).

**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 38 and women reported 19 diagnoses involving muscles and skeleton conditions during 1997. Men, therefore, reported twice as many muscles and skeleton diagnoses as women. As there are more than 3 times as many men than women at Rocky Flats, it seems reasonable to expect more muscles and skeleton diagnoses among men than women. Does this mean that men were at greater risk of muscles and skeleton disorders compared with women in 1997? To correctly answer the question, the total number of men and women in the work force must be considered. To compare risk between men and women, it is necessary to calculate the muscles and skeleton diagnosis rate for each gender. Rates are calculated by dividing the number of muscles and skeleton 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:

38 muscles and skeleton diagnoses  
 $\div 3,187$  men =  $.012 \times 1,000 =$   
 12 muscles and skeleton diagnoses per  
 1,000 men

19 muscles and skeleton diagnoses  
 $\div 967$  women =  $.020 \times 1,000 =$   
 20 muscles and skeleton diagnoses per  
 1,000 women

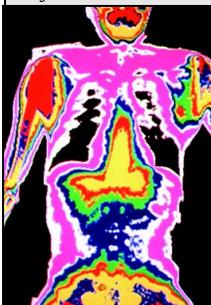
Comparing these rates now correctly suggests that the rate of muscles and skeleton disorders among women is substantially higher than the rate for men. They are called **crude rates** because they do not account for possible differences between men and women such as age and other factors that might affect the individual's risk of having a condition of the muscles and skeleton. 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 using statistical methods of adjustment.

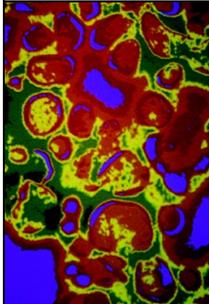
One health condition, arthritis for example, may result in several 5-day absences over a year. Conversely, one 5-day absence may be associated with multiple diagnoses (e.g. the flu and a sprained wrist) recorded for epidemiologic surveillance.

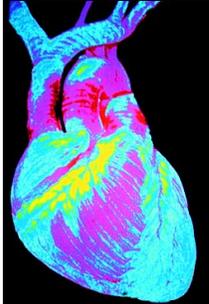
In the following analyses, the four age groups used previously were combined into two groups, workers less than 50 years of age and those 50 or older. These groups were combined to ensure that the number of diagnoses in each group was large enough to analyze. In addition, the eight job categories were combined into six 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.

Among women, workers under age 50 years had higher rates for all illnesses and injuries combined than did younger workers with the exception of the Administration and Other/Unknown groups. Among men, the rates for all illnesses and injuries combined were higher for workers aged 50 and older than for younger males.

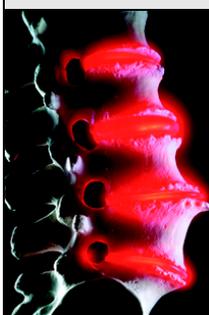
**Figure 9. Illness and Injury Rates by Job Category, Gender, and Age**

| Diagnostic Category   | Rate per 1,000         |     |     |       |
|---|------------------------|-----|-----|-------|
|   | Occupational Group     | Age | Men | Women |
|  | Administration         | <50 | 69  | 86    |
|   |                        | 50+ | 71  | 257   |
|   | Professional/Technical | <50 | 45  | 110   |
|   |                        | 50+ | 27  | 59    |
|   | Service/Security       | <50 | 50  | 43    |
|   |                        | 50+ | 114 | 0     |
|   | Crafts & Manual Labor  | <50 | 86  | 75    |
|   |                        | 50+ | 120 | 0     |
|   | Nuclear                | <50 | 147 | 458   |
|   |                        | 50+ | 185 | 417   |
|   | Other/Unknown          | <50 | 16  | 15    |
|   |                        | 50+ | 154 | 63    |

| Diagnostic Category  | Rate per 1,000         |     |     |       |
|--|------------------------|-----|-----|-------|
|  | Occupational Group     | Age | Men | Women |
|  | Administration         | <50 | 0   | 0     |
|  |                        | 50+ | 0   | 0     |
|  | Professional/Technical | <50 | 2   | 0     |
|  |                        | 50+ | 0   | 0     |
|  | Service/Security       | <50 | 0   | 0     |
|  |                        | 50+ | 0   | 0     |
|  | Crafts & Manual Labor  | <50 | 0   | 0     |
|  |                        | 50+ | 0   | 0     |
|  | Nuclear                | <50 | 0   | 0     |
|  |                        | 50+ | 0   | 0     |
|  | Other/Unknown          | <50 | 0   | 0     |
|  |                        | 50+ | 38  | 0     |

| Diagnostic Category   | Rate per 1,000         |     |     |       |
|---|------------------------|-----|-----|-------|
|   | Occupational Group     | Age | Men | Women |
|  | Administration         | <50 | 0   | 0     |
|   |                        | 50+ | 11  | 22    |
|   | Professional/Technical | <50 | 0   | 0     |
|   |                        | 50+ | 0   | 0     |
|   | Service/Security       | <50 | 4   | 0     |
|   |                        | 50+ | 0   | 0     |
|   | Crafts & Manual Labor  | <50 | 0   | 0     |
|   |                        | 50+ | 20  | 0     |
|   | Nuclear                | <50 | 9   | 21    |
|   |                        | 50+ | 15  | 0     |
|   | Other/Unknown          | <50 | 0   | 0     |
|   |                        | 50+ | 77  | 0     |

| Diagnostic Category  | Rate per 1,000         |     |     |       |
|--|------------------------|-----|-----|-------|
|  | Occupational Group     | Age | Men | Women |
|  | Administration         | <50 | 23  | 26    |
|  |                        | 50+ | 6   | 44    |
|  | Professional/Technical | <50 | 16  | 37    |
|  |                        | 50+ | 0   | 0     |
|  | Service/Security       | <50 | 17  | 0     |
|  |                        | 50+ | 29  | 0     |
|  | Crafts & Manual Labor  | <50 | 14  | 0     |
|  |                        | 50+ | 30  | 0     |
|  | Nuclear                | <50 | 36  | 229   |
|  |                        | 50+ | 31  | 250   |
|  | Other/Unknown          | <50 | 0   | 15    |
|  |                        | 50+ | 0   | 0     |

| Diagnostic Category  | Rate per 1,000         |     |     |       |
|--|------------------------|-----|-----|-------|
|  | Occupational Group     | Age | Men | Women |
|  | Administration         | <50 | 8   | 11    |
|  |                        | 50+ | 3   | 29    |
|  | Professional/Technical | <50 | 11  | 0     |
|  |                        | 50+ | 16  | 0     |
|  | Service/Security       | <50 | 25  | 0     |
|  |                        | 50+ | 29  | 0     |
|  | Crafts & Manual Labor  | <50 | 9   | 0     |
|  |                        | 50+ | 15  | 0     |
|  | Nuclear                | <50 | 40  | 21    |
|  |                        | 50+ | 103 | 0     |
|  | Other/Unknown          | <50 | 0   | 0     |
|  |                        | 50+ | 0   | 0     |

There was one exception: Men younger than 50 years and classified as Professional/Technical workers had an overall illness and injury rate higher than that of older workers. For both women and men, the highest illness and injury rates for all employees were for workers classified in the Nuclear category. In general, differences in rates between women and men appeared unrelated to job category or age.

Cancer rates presented in this report are based on reported 5-day absences

during the year. A worker may experience several absences from one cancer diagnosis due to medical complications or treatment. Each absence results in the report of a cancer diagnosis;

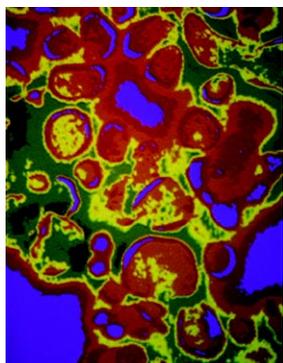
however, it does not imply that this is a new cancer. The cancer rates in this report are *not* comparable to the *incidence* rates frequently published in many articles on cancer with which you may be familiar. Incident cancer rates are based on the number of new cancer cases diagnosed within a given time, usually one year. Only three 5-day absences related to cancer were reported during 1997. Two men reported the three diagnoses. Neither of the workers reporting cancer in 1997 reported cancer between 1994 and 1996.

Among women, only two groups reported any heart/circulatory diagnoses, the Administration and Nuclear groups. Women reported four heart/circulatory diagnoses; three were reported by two women aged 50 or older. Three of the four diagnoses involved high blood pressure or ischemic heart disease

(restricted blood flow through an artery). In general, men aged 50 or older had the highest rates of heart/circulatory problems, with the exception of workers categorized as Service/Security (one absence). Eighty percent (12/15) of the absences among men occurred in workers aged 50 and older. Sixty-two percent (8/13) of the diagnoses from these older men involved ischemic heart disease. Men in the Other/Unknown job category had the highest rate of heart/circulatory disorders. Compared with workers in other job categories, Nuclear workers were almost five times more likely to report heart/circulatory diagnoses.

Women generally had higher rates of respiratory disease than did men. Age did not appear related to the rate of respiratory diagnoses for either women or men. Nuclear workers had the highest rates of respiratory diagnoses among both women and men. These workers were almost 3 times more likely to report a respiratory diagnosis than were other workers. The respiratory disease rate appeared particularly high among women in the Nuclear trades regardless of age. The rates are based on 14 absences among 8 workers in a job category that contains only 60 women.

Even a small number of absences can produce an apparently high rate when based on such a small group of workers.



Most job categories among women at Rocky Flats reported no injuries in 1997. Older women in the Administration job category had a rate of 29 injuries per 1,000 workers, similar to the rate observed in this group in 1996. For women in other job categories, the 1997 injury rates were generally lower than those observed in 1996. In general, men aged 50 or older were at higher risk of an injury than were younger men. With the exception of Administration workers,



rates for men were higher than those for women in the same job category regardless of age. Nuclear workers were 4 times more likely to report an injury than were other groups. Nuclear workers were 8 percent of the work force but reported 31 percent (17/55) of the injury diagnoses in 1997.

The risk of illness and injury among workers classified in one job category was compared with workers in the remaining job categories. Nuclear workers were at twice the risk of illness and injury compared with all other groups. This occupational group was also at almost 4 times the risk for nervous system disorders. We also noted that workers in the Crafts and Manual Labor group were almost 6 times more likely



than workers in other job categories to report genitourinary disorders. This job category made up 15 percent of the work force in 1997, and reported 38 percent (8/21) of the genitourinary diagnoses.

## Time Trends

### Why Are Rates Age-Adjusted?

The injury and illness rates in this section of the report are **age-adjusted**. Differences in the age composition among groups of workers are taken into consideration in the analyses and one rate is calculated for an entire group. This allows us to make comparisons between groups with different age compositions. Age-adjusted rates are calculated using the age distribution of the 1970 U.S. population as a reference.

Age-adjusted rates for selected illness and injury categories are presented in Figure 10. It is important to note that the age-adjusted rates for the year 1994 presented in this report differ from those reported in the *1994 Annual Epidemiologic Surveillance Report* due to the

exclusion of health conditions resulting from maternity leave.

The age-adjusted rates for all illness and injury categories combined have decreased among women and men over the past five years (Figure 10). The overall diagnosis rate for women was much



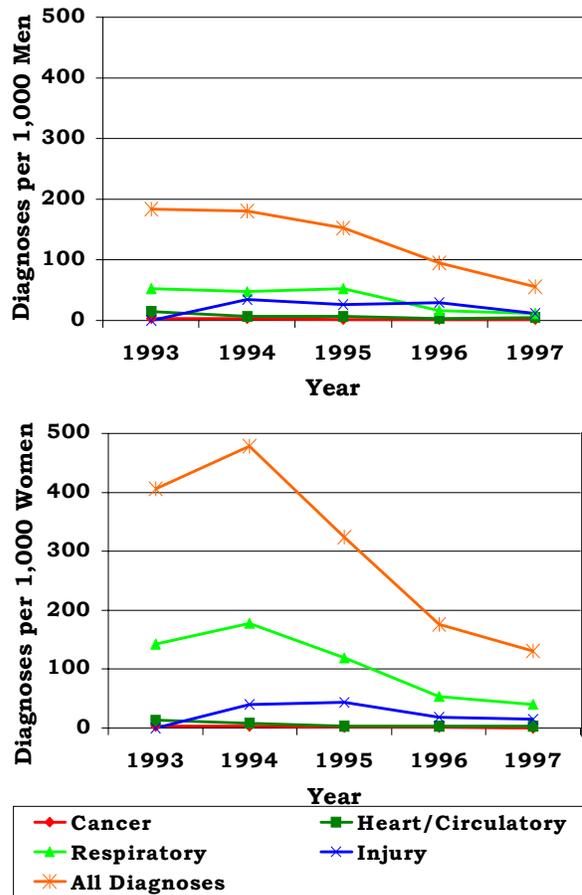
higher than that of men throughout the period. The respiratory diagnosis rate for women declined dramatically, and decreased to a lesser extent for

men. We also noted a modest decrease in injury rates for both women and men. The rapid overall decline for both women and men is without precedent at other epidemiologic surveillance sites and suggests a change in the reporting of absence-based diagnoses rather than a true decline in illnesses and injury in the work force. The introduction of an integrated contract at Rocky Flats Environmental Technology Site in 1995 coincided with a reduction in the use of on-site occupational medicine services from which epidemiologic surveillance health data are collected. The number of lower tier subcontractors using off-site occupational medicine services increased, and data from these off-site services are not routinely reported to Epidemiologic Surveillance program staff. The reduced reporting may account for much of the apparent decrease in illness and injury rates for the site's work force.

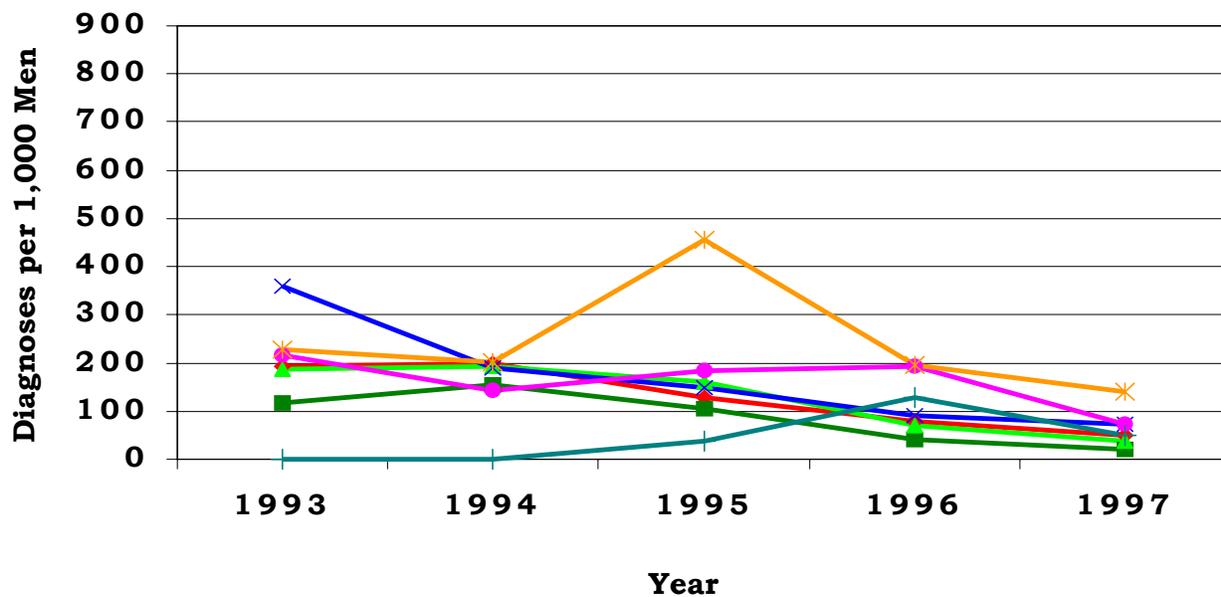
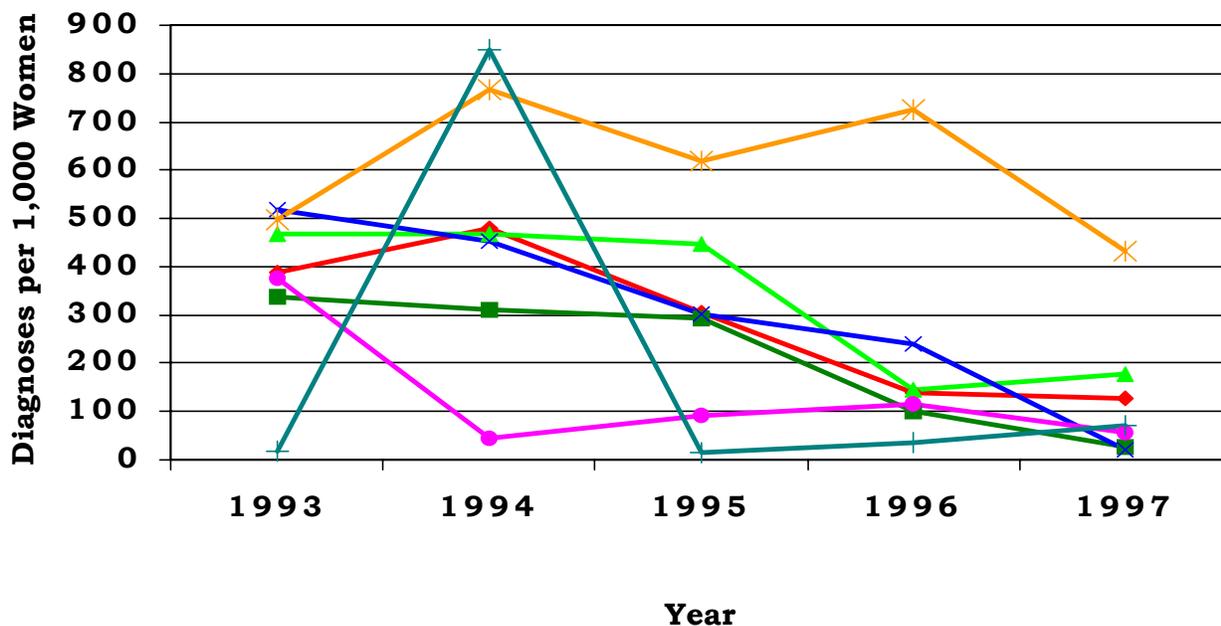
The rates for all illnesses and injuries combined did not increase in any occupational group for either women or men (Figure 11). Women in the Nuclear trades had the most variable rates over the period, but their rate in 1997 was only marginally lower than in 1993 (Figure 11). We noted similar variability in the rates among men (Figure 11).



**Figure 10. Age-Adjusted Rates for Selected Diagnostic Categories for Men and Women from 1993 to 1997**



**Figure 11. Age-Adjusted Rates for All Diagnoses Combined Among Women and Men by Job Category from 1993 to 1997**



## Sentinel Health Events for Occupations

An occupational sentinel health event (SHEO) is a disease, disability, or death which 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 in the work force. Sixty-four medical conditions associated with workplace exposures from studies of many different industries have been identified as sentinel health events. Although sentinel health events may indicate an occupational exposure, many may result from non-occupational exposures. Due to this uncertainty, sentinel health events are assessed in two categories:

### *Definite Sentinel Health Events:*

Diseases that are unlikely to occur in the absence of an occupational exposure. Asbestosis, a lung disease resulting from exposure to asbestos, is an example.

### *Possible Sentinel Health Events:*

Conditions such as lung cancer or carpal tunnel syndrome may or may not be related to occupation. Detailed occupational and non-occupational information is required to determine the work-relatedness of the illness. For example, lung cancer may result from asbestos exposure or



from smoking. Carpal tunnel syndrome may result from a job requiring typing or from a hobby such as playing the piano.

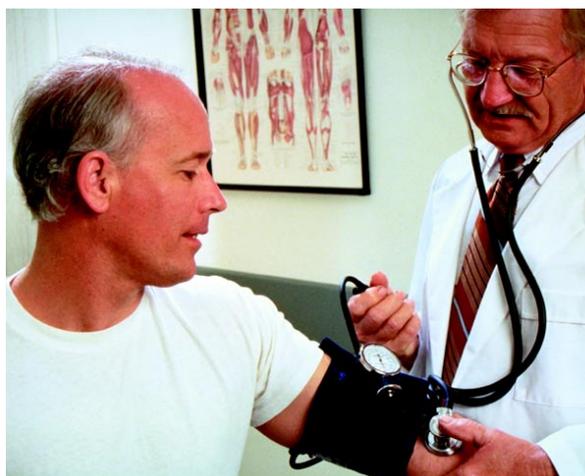
No *definite* sentinel health events were reported in 1997. Four of 357 (1 percent) diagnoses were identified as *possible* sentinel health events (Figure 12). These four sentinel health events (identified as carpal tunnel syndrome) were reported by four workers (two women and two men) and resulted in 85 lost calendar days. All four of the workers were in different job categories and all were under 50 years of age (three were in the 40-49 age group).

**Figure 12. 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 | 2                              | 2     | 44                          | 41    |
| Total    | 2                              | 2     | 44                          | 41    |

## Disabilities Among Active Workers

No disabilities in the current work force were reported in 1997.

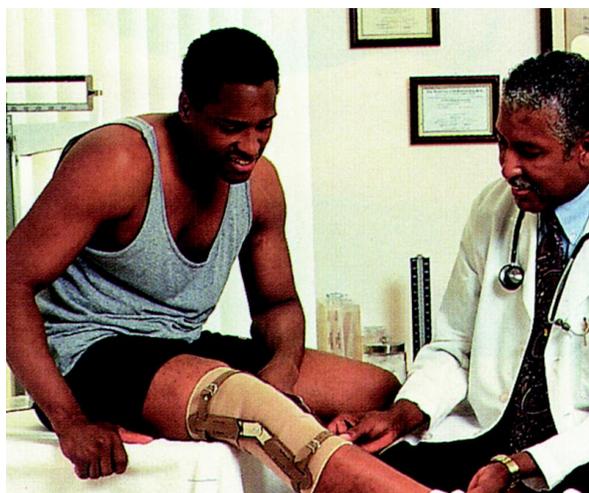


## Deaths Among Active Workers

No deaths among active workers were reported in 1997.

## OSHA-Recordable Events

The Occupational Safety and Health Administration (OSHA) requires employers to maintain a record of occupational

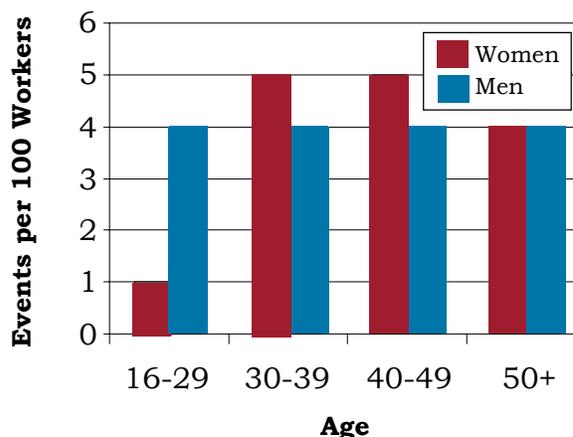


injuries and illnesses that have occurred among employees and to make that information available to OSHA upon request. Employers maintain the information from these OSHA-recordable events in the OSHA 200 Log. OSHA-recordable events differ from health events captured through return-to-work clearances in at least two important respects: 1) they do not necessarily result in days lost from work, and 2) they are usually accompanied by a specific determination that they are work-related.

The distribution of OSHA events by gender and age is shown in Figure 13. There were 39 women with at least one

OSHA-recordable event and 116 men with at least one recordable event noted. The rate of OSHA events was the same for women and men (4 per 100 workers) and did not differ significantly by age group with the exception of women under age 30, whose rate was 1 event per 100 workers.

**Figure 13. OSHA-Recordable Events by Gender and Age**



The rates of OSHA-recordable events by job categories and gender are shown in Figure 14. Among women, the Nuclear and Other/Unknown job categories had noticeably higher rates of illness and injury attributable to work compared with other job categories. Men in the Service, Technical, and Crafts and Manual Labor groups all had relatively high rates compared with men in other job categories, but the differences between groups were not as marked as those noted among women.

Women had a total of 850 lost or restricted workdays and 1,393 lost or restricted workdays were recorded for men. Overall, the average number of workdays lost or with restricted activity due to an OSHA-recordable event was

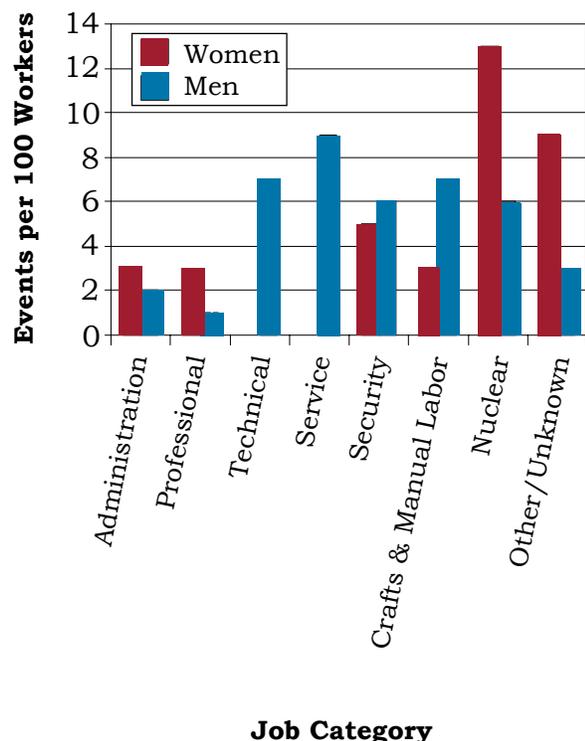
higher among women (20 days) than among men (12 days). There was no apparent relationship between age and average number of lost or restricted workdays. Women in the Nuclear trades had the highest average number of lost or restricted workdays (41 days). Men in the Nuclear trades also had the highest average number of lost or restricted workdays (18 days), but the average was substantially lower than among women. There was no consistent relationship between gender and average number of lost or restricted workdays when job categories were compared.



### Diagnostic and Accident Categories for OSHA-Recordable Events

From the 162 OSHA events recorded on the OSHA 200 Logs, we noted 67 diagnoses among women and 143 diagnoses among men as shown in Figure 15. Among women, injuries accounted for 34 percent (23/67) of the diagnoses reported; the most common type of OSHA-recordable diagnosis was unspecified injuries (48 percent). Fifty-six percent (80/143) of the diagnoses reported among men were injuries, again primarily due to unspecified injuries (34 percent). Sprains and strains (28 percent) and open wounds (15 percent) were also reported frequently among men.

**Figure 14. OSHA-Recordable Events by Job Category and Gender**



**Figure 15. OSHA-Recordable Diagnoses by Diagnostic Category and Gender**

| Diagnostic Category                         | Gender |     |
|---|--------|-----|
|   | Women  | Men |
| Digestive                                   | 0      | 1   |
| Genitourinary                               | 0      | 1   |
| Muscles and Skeleton                        | 29     | 43  |
| Nervous System                              | 2      | 1   |
| Respiratory                                 | 1      | 1   |
| Skin  | 2      | 6   |
| Unspecified Symptoms                        | 10     | 10  |
| Injury                                      | 23     | 80  |
| Fractures-Neck, Trunk                       | 0      | 1   |
| Fractures-Upper Limb                        | 1      | 3   |
| Fractures-Lower Limb                        | 1      | 2   |
| Back Sprains and Strains                    | 2      | 9   |
| Other Sprains and Strains                   | 1      | 13  |
| Intracranial Injuries                       | 1      | 0   |
| Open Wounds-Head, Neck, Trunk               | 0      | 1   |
| Open Wounds-Upper Limb                      | 1      | 10  |
| Open Wounds-Lower Limb                      | 0      | 1   |
| Superficial Injuries                        | 1      | 1   |
| Bruises                                     | 1      | 3   |
| Foreign Bodies Entering Orifice             | 1      | 5   |
| Burns                                       | 0      | 1   |
| Unspecified Injuries                        | 11     | 27  |
| Adverse Reactions to Non-medical Substances | 1      | 2   |
| Adverse Reactions to External Causes        | 1      | 1   |

Eighty percent (129) of the 162 OSHA events were described as accidents in the OSHA Logs (Figure 16). The majority of events were “other accidents,” 61 percent (19/31) among women and 78 percent (76/98) among men.



Overexertion and strenuous movements made up the majority of that category. Falls were the second most common type of accident for both women and men.



**Figure 16. OSHA-Recordable Accidents by Type and Gender**

| Accident Category                         | Gender                       |                            |
|---|------------------------------|----------------------------|
|   | Women<br>Number of Accidents | Men<br>Number of Accidents |
| Motor Vehicle Traffic                     | 0                            | 1                          |
| Motor Vehicle Non-Traffic                 | 1                            | 2                          |
| Poisoning Non-medicinal                   | 0                            | 1                          |
| Falls                                     | 9                            | 11                         |
| Natural/Environmental Factors             | 1                            | 2                          |
| Submersion/Suffocation/Foreign Bodies     | 1                            | 5                          |
| Other Accidents                           | 19                           | 76                         |
| Caught Between Objects                    | 1                            | 2                          |
| Cutting/Piercing Instrument/Object        | 1                            | 8                          |
| Hot, Corrosive, or Caustic Material/Steam | 0                            | 1                          |
| Machinery                                 | 0                            | 1                          |
| Overexertion and Strenuous Movements      | 9                            | 49                         |
| Repetitive Trauma                         | 6                            | 3                          |
| Struck by an Object                       | 2                            | 12                         |

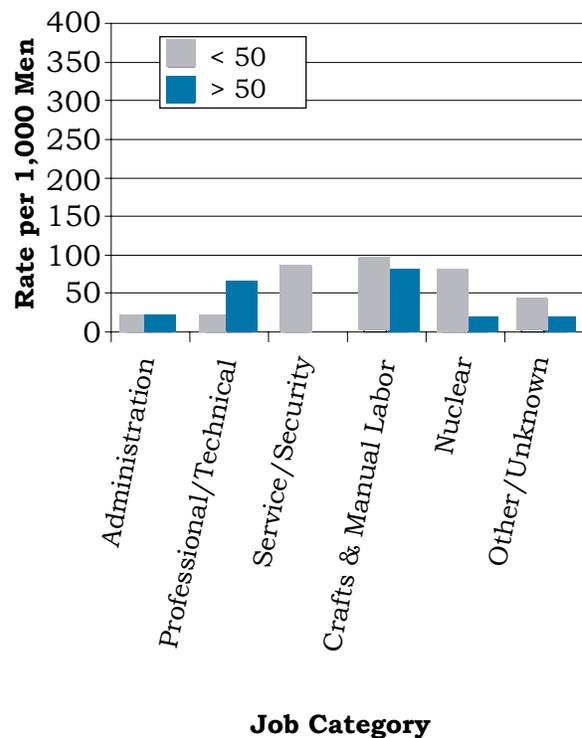
### Rates of OSHA-Recordable Events

The rates of all OSHA-recordable events by age category, job category, and gender are shown in Figures 17 and 18. The OSHA-recordable rates among women were highest among Crafts and Manual Labor, Nuclear, and Other/Unknown workers. The rates among men were highest for Service/Security, Crafts and Manual Labor, and Nuclear workers. Almost half of the

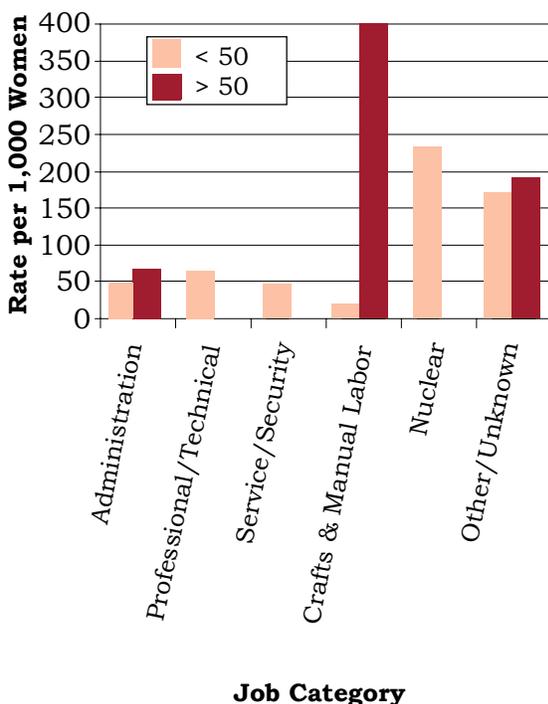
OSHA-recordable diagnoses involved injuries. When the rate for OSHA-recordable injuries was considered separately, the same job categories had the highest rates for both men and women. Nuclear workers accounted for 8 percent of the work force but 15 percent of the OSHA-recordable events.

Crafts and Manual Laborers were at 5 times higher risk for back sprains and strains compared with other workers and were also 3 times more likely to experience a problem with the muscles and skeleton. Compared with other workers, Service workers showed a 10 times higher risk for sprains and strains other than those affecting the back. Unspecified symptoms were more likely to be reported by Technical (4 times) and Nuclear (5 times) workers.

**Figure 18. OSHA-Recordable Rates by Age and Job Category Among Men, All Diagnoses Combined**



**Figure 17. OSHA-Recordable Rates by Age and Job Category Among Women, All Diagnoses Combined**



### Time Trends for OSHA-Recordable Events

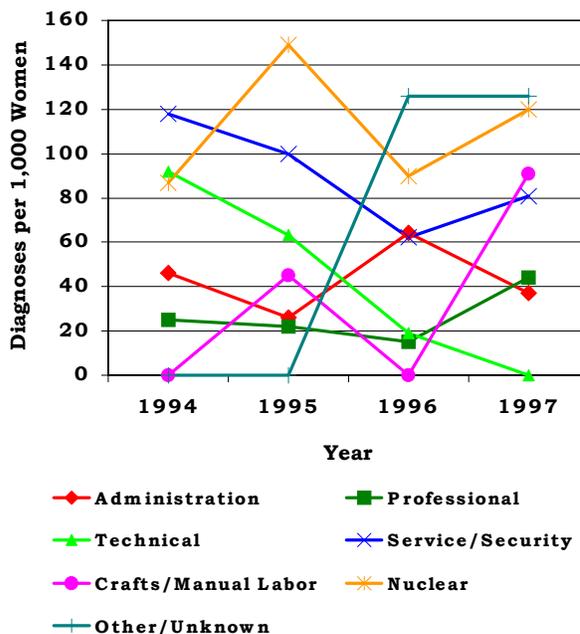
OSHA-recordable data for Rocky Flats became available for epidemiologic surveillance analysis beginning in 1994. The age-adjusted rates from 1994 to 1997 by job category and gender are shown in Figures 19 and 20. We observed considerable variability in the rates for both women and men over the four-year period. Among women, the rate dropped dramatically among Technical workers and increased drastically from 1995 to 1996 in the Other/Unknown group (Figure 19). An apparent increase was observed among

Crafts and Manual Laborers from 1996 to 1997, but the erratic behavior of rates for most job categories over the four-year period may reflect the effects of reclassifying workers from one job category to another and the uncertainty of reporting by lower tier subcontractors since 1995.

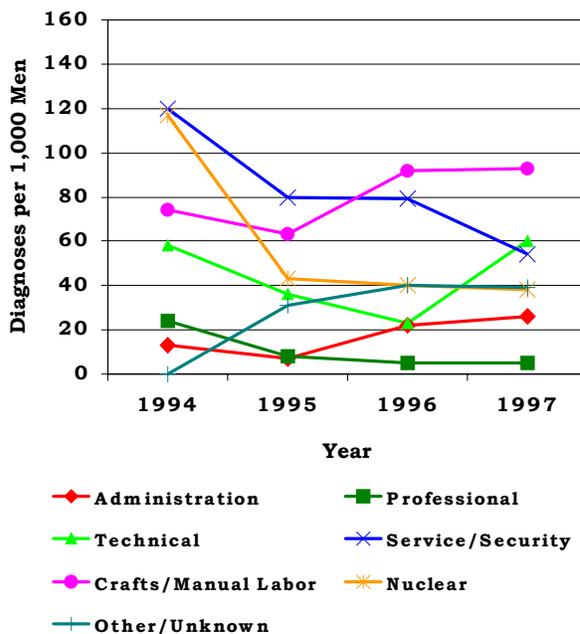
The rates among men were somewhat more stable than those of women over the four-year period (Figure 20). The rate decreased among Service/Security workers. A sharp decline was noted from 1994 to 1995 among Nuclear workers, but the rate in this group remained stable after 1995. Following an initial decline, the rate increased among Technical workers, and we noted a moderate increase in OSHA-recordable rates among Administration and Crafts and Manual Labor workers.

The changes occurring among women, and to a lesser extent, men during the four years are difficult to interpret. Dramatic changes in OSHA-recordable rates over a short period of time are not typical of the patterns observed at other Epidemiologic Surveillance sites. Although the changing illness and injury rates at Rocky Flats may indicate rapid changes in the types of work being conducted as site remediation goes forward, it is equally possible that administrative changes in the way workers are classified by job category and the impact of integrated contracting on the reporting of health and safety data by lower tier subcontractor workers may be reflected in injury and illness rates over time. Continued surveillance will help to clarify the impact of administrative changes on our ability to monitor the health and safety of Rocky Flats workers.

**Figure 19. Age-Adjusted Rates for All OSHA-Recordable Diagnoses Combined Among Women by Job Category from 1994 to 1997**



**Figure 20. Age-Adjusted Rates for All OSHA-Recordable Diagnoses Combined Among Men by Job Category from 1994 to 1997**



## 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.

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

**ICD-9-CM Codes**

|   |         |   |
|---|---------|---|
| <b>All conditions</b>   | 001-V82 | All reported health events  |
| <b>Infectious and parasitic diseases</b>                                      | 001-139 | Diseases caused by bacteria, viruses, and parasites   |
| • Intestinal infections   | 001-009 | Infections of the bowel or gut  |
| • Tuberculosis  | 010-018 | TB in the lungs and other organs  |
| • Zoonotic bacterial diseases   | 020-027 | Bacterial diseases that animals transmit to humans  |
| • Other bacterial diseases  | 030-041 | Whooping cough, diphtheria, strep throat, and gangrene  |
| • Human Immunodeficiency Virus (HIV) infection                                | 042     | AIDS  |
| • Poliomyelitis and other nonarthropod 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, whipworms  |

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

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

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- 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

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

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| • Infections of the skin and subcutaneous tissue                         | 680-686 | Abscesses, boils, hair-containing cysts, and pus-filled blisters  |
| • Other inflammatory conditions of skin and subcutaneous tissue          | 690-698 | Skin rashes caused by detergents, oils, greases, solvents, sun, food, drugs, or medicine  |
| • Other diseases of the skin and subcutaneous tissue                     | 700-709 | Corns, calluses, heat rash, swollen hair follicles, acne, and ingrown fingernails and toenails  |
| <b>Diseases of the musculoskeletal system and connective tissue</b>      | 710-739 | Arthritis, systemic lupus erythematosus, ankylosing spondylitis, herniated intervertebral 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             |
| <b>Congenital anomalies</b>  | 740-759 | Spina bifida; cleft palate; harelip; and various chromosomal anomalies, such as Klinefelter’s syndrome  |
| <b>Certain conditions originating in the perinatal period</b>            | 760-779 | Maternal high blood pressure; maternal malnutrition; ectopic pregnancy; breech birth; fetal malnutrition or slow growth; injuries related to birth trauma; and perinatal jaundice       |

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

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

## **NOTES**

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