Annual Report for

# Fernald Environmental Management Project

Epidemiologic Surveillance

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Prepared by the Epidemiologic Surveillance Data Center, a joint program of the Oak Ridge Institute for Science and Education in conjunction with the Office of Epidemiologic Studies, U.S. Department of Energy

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This annual report is sponsored by the U.S. Department of Energy. It is based on information submitted by participating laboratories. The views and opinions expressed in this report are those of its authors and do not necessarily reflect the views of the U.S. Government, its agencies, or its employees.

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## Foreword

The U.S. Department of Energy (DOE) is committed to assuring the health and safety of its workers through the development of epidemiologic surveillance activities. A pilot epidemiologic surveillance program has been implemented at selected DOE sites during the past several years. This approach has been expanded to include surveillance of all medical conditions that result in an absence of 5 or more consecutive workdays, occupational injuries and accidents, and deaths among active employees. This annual epidemiologic surveillance report provides the final summary for the Fernald Environmental Management Project for the 12-month period, January 1, 1993, through December 31, 1993.

Caution is required when comparing this information with that of other DOE facilities. Interpretation of these data must take into account the occupational medicine program, health and safety practices, the composition of the work force, and potential occupational exposures unique to this facility; therefore, the data presented are pertinent only to the Fernald Environmental Management Project site. Continuing surveillance and data examination may suggest emerging trends that change the preliminary interpretation of the data.

Plans for future annual reports include a discussion of important new findings and changes occurring since previous reports and the incorporation of information from the National Center for Health Statistics and the National Cancer Institute's Surveillance, Epidemiology, and End Results Program. This information will allow early recognition and investigation of possible work-related problems, as well as an analysis of trends over time. In addition, the results of epidemiologic surveillance will be combined with those of medical and exposure surveillance to form an integrated approach to worker health protection.

### Fernald at a Glance

- This report marks the first annual epidemiologic surveillance report for the Fernald Environmental Management Project.
- Respiratory diseases, injuries, and musculoskeletal diseases accounted for 50% of all diagnoses at Fernald during 1993.
- The highest diagnosis rate for men involved injuries, but this diagnostic category ranked fourth for women.
- Overall diagnosis rates were almost four times higher for hourly than for salaried workers. Diagnosis rates were consistently higher among hourly occupational groups, suggesting underreporting of health events by salaried workers.
- The rate of OSHA-recordable events was 50% higher among women than among men. For all Fernald workers, sprains and strains were the most common OSHA-recordable injuries.

## Introduction

Epidemiologic surveillance at DOE facilities consists of regular and systematic collection, analysis, and interpretation of data on absences due to illness and injury in the work force. Its purpose is to provide an early warning system about health problems occurring among employees at participating sites. Data are collected by coordinators at each site and submitted to the Epidemiologic Data Surveillance Center, located at the Oak Ridge Institute for Science and Education, where quality control procedures and analyses are carried out. Rates of absences and rates of diagnoses associated with absences are analyzed by occupation and other relevant variables. They may be compared with the disease experience of different groups within the DOE work force and with populations that do not work for DOE to identify disease patterns or clusters that may be associated with work activities.

In this annual report, the 1993 morbidity data for the Fernald Environmental Management Project site are summarized. These analyses focus on absences of 5 or more consecutive workdays occurring among workers aged 17–72 years. They are arranged in five sets of tables that present: 1) the distribution of the labor force by occupational category and pay status; 2) the absences per person, diagnoses per absence, and diagnosis rates for the whole work force; 3) diagnosis rates by type of disease or injury; 4) diagnosis rates by occupational category; and 5) relative risks for specific types of disease or injury by occupational category. In addition to this information, the report contains health events that are considered recordable by the Occupational Safety and Health Administration (OSHA). Analyses of the OSHA data are arranged like the absences of 5 or more consecutive workdays. OSHA-recordable events are those that occurred on the job and involve fatalities (regardless of the time between the injury and death), lost workday cases other than fatalities, and nonfatal cases without lost workdays resulting in transfer to another job, termination of employment, medical treatment other than first aid, loss of consciousness, or restriction of work or motion. Also recordable are any diagnosed occupational health events reported to the employer that are neither fatal nor result in lost workdays. Deaths occurring among active workers are listed separately; they are not included in any tables. All rates presented in this report are age-adjusted (see glossary) and represent the number of diagnoses reported per 1,000 persons in 1 year.

Throughout this report, the symbol "NA" means "not available" or "not applicable." An empty cell in a table indicates that the value of the cell is zero or that the value cannot be computed. The tables show the results of analyses of diagnoses resulting from *absences*. An absence is defined as a period of 5 or more consecutive workdays away from work due to some health problem, such as an illness or injury. In tables presenting analyses of *diagnoses*, each diagnosis is counted because a diagnosis is for a specific illness or injury. A worker can have more than one diagnosis related to one absence from work. For example, a worker's single absence might involve both a back injury and pneumonia. Unlike analyses of absences, analyses of diagnoses focus on the rates of occurrence of specific types of disease and injury. Thus the worker with one absence in which he had a back injury and pneumonia would be counted twice in the analysis of diagnoses because two separate diagnoses are recorded for this one absence.

The data included in this report are supplemental to, but do not replace, those reported in other safety, industrial hygiene, and health physics reports prepared by DOE. There has been no attempt to validate diagnoses with medical records, pathology, or other laboratory reports. Also, there has been no attempt to validate occupational information reported by the site. For reporting purposes, occupational titles have been grouped into broad categories within which a great deal of diversity in tasks and exposures is likely to exist. Additional material outlining the methods used and explaining the diagnostic categories and frequently used terms can be found on the inside back cover.

## Facility Overview

The Fernald Environmental Management Project site is located approximately 20 miles northwest of downtown Cincinnati, Ohio, spreading into both Butler and Hamilton counties. Construction of this complex began in May of 1951 by the Atomic Energy Commission with the mission to process feed materials consisting of uranium ore concentrates and uranium of low grade enrichment into fabricated uranium metal products or reactor core target elements for use by the nation's defense programs. As with many of the early Manhattan Engineer District Sites, the operational direction and oversight were administrated through the Office of the Assistant Manager for Defense Programs, Oak Ridge Operations, in Tennessee. The first management and operating contractor of the facility was the National Lead Company of Ohio in 1951.

The National Lead Company was succeeded in January 1986 by the Westinghouse Materials Company of Ohio. In December 1992, management of the site was contracted to the Fernald Environmental Restoration Management Corporation.

First known as the Feed Materials Production Center, operations began in late 1951 with pilot plant work and grew as process buildings were completed. The Feed Materials Production Center used kerosene to dilute tributyl phosphate for the purification of foreign and domestic uranium ores and concentrates by solvent extraction. The facilities were originally designed for depleted uranium; however, by 1958 the metals plant was being used for the production of enriched uranium (<1%). In subsequent years, there were frequent changes in production requirements, which included production of enriched uranium that was 5 to 10% U–235. Beginning in January 1954, operations included the production of thorium metal. Employment at the facility reached its peak in 1956 and slowly decreased until operations halted in July 1989. Much of the employment in the early period of production was due to the continued construction, which was completed in 1954.

In June of 1991, Congress approved the closure of this DOE facility and retraining plans for employees. Program management responsibility within DOE was transferred from Defense Programs to the Office of Environmental Restoration and Waste Management. Subsequently, an on-site DOE field office was established to oversee the environmental restoration of the complex.

## Labor Force by Occupational Category, 1993

During 1993, there were 2,636 employees (aged 17-72) identified by Fernald Environmental Management Project as participants in epidemiologic surveillance. Sixty-eight percent (1,789 workers) were men, and 32% (847 workers) were women. Eighty-nine percent (2,357 workers) were Caucasian, and 9% (233) were African American. The remaining 2% (46 workers) included Asians, Hispanics, and Native Americans.

The composition of the work force by occupational category and salary status is given in Table 1. The occupational categories used in the table are based on the occupation and industry codes created by the Bureau of the Census in 1980. Because a worker's occupational category can change over the course of a year, workers were counted in the occupational category in which they first appeared in the roster.

Five workers were excluded from this table because pay status was not reported for them. Throughout the remainder of the report, these five workers are only included in tables for which occupational category is not considered.

A small number of workers (1.4%) were placed in the "other" hourly category. Ten of these workers were storeroom attendants, six were planner estimators, five each were operations supervisors and stationary engineers, three were material operators, and the other seven were either unknown or had inaccurate data.

Seventy-six percent of the workers were salaried, whereas 24% were hourly. The occupational categories with the largest number of employees were office management and administration (32%); engineers, scientists, and health care (17%); and technical support (17%).

***Table 1. Labor Force by Occupational Category***

| | Occupational Category | Number of Workers in 1993* | Number of Workers in 1992 | % Change from Last Year |
|---|---|---|---|---|
| Salaried | Office Management and Administration | 835 | NA | NA |
| | Engineers, Scientists, and Health Care | 456 | NA | NA |
| | Technical Support | 443 | NA | NA |
| | Other Management and Administration | 261 | NA | NA |
| | Subtotal | 1,995 | NA | NA |
| Hourly | Service | 114 | NA | NA |
| | Crafts and Repair | 262 | NA | NA |
| | Nuclear Specialties | 224 | NA | NA |
| | Other | 36 | NA | NA |
| | Subtotal | 636 | NA | NA |
| | TOTAL | 2,631 | NA | NA |

* Five workers were excluded from this table because pay status was not reported.

## Absences Among Work Force, 1993

*Absences per Person.* In 1993, 265 Fernald employees reported an absence of 5 or more consecutive workdays because of illness or injury. Forty-six (17%) of these workers had two or more absences. A total of 317 absences were reported by the employees (Table 2.A).

*Diagnoses per Absence.* A total of 440 diagnoses were associated with the 317 absences of 5 or more consecutive workdays. Multiple diagnoses were reported for 100 (32%) absences (Table 2.B).

*Diagnosis Rates.* In 1993, 440 diagnoses noted for absences of 5 or more consecutive workdays yielded an age-adjusted rate of 172.7 diagnoses per 1,000 persons. The diagnosis rate for women (250.3 per 1,000) was double the rate for men (136.1 per 1,000) (Table 2.C).

| Employee Category | Number of Workers | Number of Absences | | | | Total Persons Absent at Least Once | Total Number of Absences |
|---|---|---|---|---|---|---|---|
| | | 0 | 1 | 2 | 3 | | |
| Male | 1,789 | 1,632 | 134 | 18 | 5 | 157 | 185 |
| Female | 847 | 739 | 85 | 22 | 1 | 108 | 132 |
| **TOTAL** | **2,636** | **2,371** | **219** | **40** | **6** | **265** | **317** |

***Table 2.A. Absences per Person***

| Employee Category | Number of Diagnoses per Absence | | | | Total Number of Absences | Total Number of Diagnoses |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | | |
| Male | 140 | 40 | 4 | 1 | 185 | 236 |
| Female | 77 | 42 | 9 | 4 | 132 | 204 |
| **TOTAL** | **217** | **82** | **13** | **5** | **317** | **440** |

***Table 2.B. Diagnoses per Absence***

| Employee Category | Number of Workers | Number of Diagnoses† | Crude Rate per 1,000 | Age-Adjusted Rate per 1,000* | Lower 95% Confidence Limit per 1,000 | Upper 95% Confidence Limit per 1,000 |
|---|---|---|---|---|---|---|
| Male | 1,789 | 236 | 131.9 | 136.1 | 118.9 | 155.8 |
| Female | 847 | 204 | 240.9 | 250.3 | 209.6 | 298.9 |
| **TOTAL** | **2,636** | **440** | **166.9** | 172.7 | 156.3 | 190.8 |

***Table 2.C. Diagnosis Rates***

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

## Diseases and Injuries by Diagnostic Category, 1993

The age-adjusted diagnosis rate for each diagnostic category is given for all workers in Table 3. Because the patterns of diagnoses reported among men and women differ, Tables 4 and 5 show the diagnosis rates by gender to further describe the disease and injury patterns in the work force. Diagnoses associated with pregnancy, labor, and delivery are described in Table 6.

For all workers, the three diagnostic categories with the highest rates were diseases of the respiratory system (40.4 per 1,000), injury and poisoning (27.4 per 1,000), and diseases of the musculoskeletal system (20.3 per 1,000). Together, these three categories accounted for 50% of all diagnoses.

The diagnostic category with the highest rate among men was injury and poisoning (29.3 per 1,000), with 52 diagnoses reported for 44 men. This accounted for 22% of all diagnoses among men. Twenty-two diagnoses were due to sprains and strains, and 13 were due to other injuries. These included three heat-related injuries to the extremities, two eye injuries, two contusion/crushing injuries, two post-surgical infections, and one drug reaction. The category with the second highest rate, accounting for 18% of the total diagnoses, was diseases of the respiratory system (25.2 per 1,000), with 43 diagnoses reported for 32 men. Twenty of these diagnoses were due to pneumonia/bronchitis, 10 were due to chronic respiratory conditions, and 9 were due to upper respiratory illnesses. The category of musculoskeletal disorders (21.3 per 1,000) ranked third, with 37 diagnoses reported for 31 men. Twenty of these diagnoses were related to dorsopathies (spinal disorders). Additionally, 27 digestive system disorders (15.3 per 1,000) were reported among 24 men; 30% of these were due to hernias. Eighteen circulatory system diagnoses (11.1 per 1,000) were reported for 15 men. One man had colon cancer and another had skin cancer in 1993.

The diagnostic category with the highest rate among women was diseases of the respiratory system (69.8 per 1,000), with 58 diagnoses reported among 41 women. Of these diagnoses, 29 were related to upper respiratory problems, 14 to pneumonia or bronchitis, and 14 to chronic respiratory conditions. The category with the second highest rate was diseases of the genitourinary system (35.1 per 1,000), with 21 diagnoses reported for 17 women. Five of these diagnoses were due to endometriosis. The category of musculoskeletal disorders (22.7 per 1,000) ranked third, with 13 diagnoses reported among 11 women, 5 of which were bone spurs and 2 were dorsopathies (spinal disorders). Injury and poisoning (22.3 per 1,000) ranked a close fourth, with 19 diagnoses reported for 15 women. These included six sprains/strains, four fractures, two injuries to internal organs, two open wounds, two cases of complications, one eye injury, one drug poisoning, and one dislocated shoulder. Other less common diagnostic categories included the digestive system (17.6 per 1,000), the nervous system and sense organs (15.3 per 1,000), pregnancy and childbirth (13.8 per 1,000), and circumstances of reproduction or development (11.8 per 1,000). One woman had lung cancer and another had colon cancer in 1993.

*Table 3. Diseases and Injuries by Diagnostic Category - Males and Females*

| Category of Diagnoses | ICD9-CM Code | Number of Diagnoses† | Age-Adjusted Rate per 1,000* | Lower 95% Confidence Limit per 1,000 | Upper 95% Confidence Limit per 1,000 |
|---|---|---|---|---|---|
| Infections and parasitic diseases | 001-139 | 14 | 4.9 | 2.8 | 8.5 |
| Malignant neoplasms | 140-208, 230-234 | 4 | 2.2 | 0.8 | 6.1 |
| • Digestive organs | 150-159 | 2 | 1.1 | 0.2 | 4.7 |
| • Respiratory system | 160-165 | 1 | 0.3 | 0.0 | 2.4 |
| • Breast | 174-175 | 0 | | | |
| • Genitourinary | 179-185 | 0 | | | |
| • Nervous system | 191-192 | 0 | | | |
| • Leukemia, lymphoma | 200-208 | 0 | | | |
| Benign neoplasms and other | 210-229, 235-239 | 9 | 3.4 | 1.7 | 7.0 |
| Endocrine and metabolic diseases | 240-279 | 2 | 0.8 | 0.2 | 3.3 |
| Blood and blood-forming organs | 280-289 | 1 | 0.2 | 0.0 | 1.7 |
| Mental disorders | 290-319 | 18 | 5.6 | 3.4 | 9.1 |
| • Alcoholism | 303 | 0 | | | |
| • Drug abuse | 304-305 | 0 | | | |
| Nervous system and sense organs | 320-389 | 18 | 8.3 | 5.1 | 13.4 |
| Circulatory system | 390-459 | 21 | 9.1 | 5.8 | 14.4 |
| • Hypertension | 401 | 4 | 2.1 | 0.8 | 5.9 |
| • Acute myocardial infarction | 410 | 1 | 0.3 | 0.0 | 2.4 |
| • Ischemic disease, not M.I. | 411-414, 429.2 | 6 | 1.9 | 0.8 | 4.5 |
| • Cerebrovascular disease | 430-438 | 1 | 0.7 | 0.1 | 5.2 |
| Respiratory system | 460-519 | 101 | 40.4 | 32.7 | 49.7 |
| • Upper respiratory | 460-465, 470-478 | 38 | 15.0 | 10.6 | 21.0 |
| • Pneumonia/bronchitis | 466, 480-487 | 34 | 12.0 | 8.3 | 17.3 |
| • Chronic respiratory conditions | 490-496 | 24 | 10.6 | 7.0 | 16.1 |
| Digestive system | 520-579 | 46 | 16.8 | 12.4 | 22.7 |
| • Hernias | 550-553 | 8 | 2.9 | 1.4 | 6.3 |
| • Gall bladder disease | 574-575 | 4 | 1.0 | 0.4 | 2.5 |
| Genitourinary system | 580-629 | 25 | 9.8 | 6.5 | 14.9 |
| • Benign prostatic hypertrophy | 600 | 0 | | | |
| • Endometriosis | 617 | 5 | 1.6 | 0.7 | 4.0 |
| • Ovarian cysts | 620.0-620.2 | 1 | 0.2 | 0.0 | 1.7 |
| • Female genital pain/bleeding | 625-626 | 1 | 0.3 | 0.0 | 2.4 |
| Pregnancy and childbirth[1,2] | 630-676 | 15 | 13.8 | 8.3 | 23.1 |
| Skin and subcutaneous tissue | 680-709 | 11 | 4.5 | 2.4 | 8.4 |
| Musculoskeletal | 710-739 | 50 | 20.3 | 15.1 | 27.3 |
| • Dorsopathies | 720-724 | 22 | 8.2 | 5.2 | 12.8 |
| Congenital anomalies[1] | 740-759 | 1 | 0.5 | 0.1 | 3.3 |
| Certain perinatal conditions[1] | 760-779 | 0 | | | |
| Symptoms, signs, and ill-defined conditions | 780-799 | 17 | 6.8 | 4.1 | 11.4 |
| Injury and poisoning | 800-999 | 71 | 27.4 | 21.4 | 35.3 |
| • Fractures, all sites | 800-829 | 13 | 5.7 | 3.1 | 10.2 |
| • Dislocations | 830-839 | 7 | 2.2 | 1.0 | 4.8 |
| • Sprains and strains | 840-848 | 27 | 10.6 | 7.1 | 15.8 |
| • Intracranial injuries | 850-854 | 0 | | | |
| • Internal injuries | 860-869 | 2 | 0.7 | 0.2 | 2.8 |
| • Open wounds | 870-897 | 5 | 2.2 | 0.8 | 6.0 |
| • Other injuries | 900-999 | 17 | 6.1 | 3.7 | 10.1 |
| Family history of health problems | V10-V19 | 0 | | | |
| Circumstances related to reproduction/development | V20-V28 | 15 | 5.4 | 3.2 | 9.2 |
| Specific procedure/aftercare | V50-V59 | 1 | 0.5 | 0.1 | 3.3 |
| **Total minus pregnancies** | | **425** | **166.8** | **150.7** | **184.7** |
| **TOTAL** | | **440** | **172.7** | **156.3** | **190.8** |

† Includes all diagnoses reported with an absence of 5 or more days.
* Standardized to age distribution of 1970 U.S. population.
[1] These diagnoses pertain to the worker, not to children born to workers.
[2] Only women age 18-45 years were included in the calculation of the rate for this diagnostic category.

***Table 4. Diseases and Injuries by Diagnostic Category - Males***

| Category of Diagnoses | ICD9-CM Code | Number of Diagnoses† | Age-Adjusted Rate per 1,000* | Lower 95% Confidence Limit per 1,000 | Upper 95% Confidence Limit per 1,000 |
|---|---|---|---|---|---|
| Infections and parasitic diseases | 001-139 | 7 | 4.1 | 1.9 | 9.2 |
| Malignant neoplasms | 140-208, 230-234 | 2 | 1.6 | 0.4 | 6.6 |
| • Digestive organs | 150-159 | 1 | 0.8 | 0.1 | 5.8 |
| • Respiratory system | 160-165 | 0 | | | |
| • Breast | 174-175 | 0 | | | |
| • Genitourinary | 179-185 | 0 | | | |
| • Nervous system | 191-192 | 0 | | | |
| • Leukemia, lymphoma | 200-208 | 0 | | | |
| Benign neoplasms and other | 210-229, 235-239 | 6 | 3.0 | 1.3 | 7.1 |
| Endocrine and metabolic diseases | 240-279 | 0 | | | |
| Blood and blood-forming organs | 280-289 | 0 | | | |
| Mental disorders | 290-319 | 11 | 6.1 | 3.3 | 11.5 |
| • Alcoholism | 303 | 0 | | | |
| • Drug abuse | 304-305 | 0 | | | |
| Nervous system and sense organs | 320-389 | 8 | 5.3 | 2.6 | 10.9 |
| Circulatory system | 390-459 | 18 | 11.1 | 6.8 | 18.0 |
| • Hypertension | 401 | 3 | 2.2 | 0.7 | 6.7 |
| • Acute myocardial infarction | 410 | 0 | | | |
| • Ischemic disease, not M.I. | 411-414, 429.2 | 5 | 2.2 | 0.9 | 5.5 |
| • Cerebrovascular disease | 430-438 | 1 | 0.8 | 0.1 | 5.8 |
| Respiratory system | 460-519 | 43 | 25.2 | 18.4 | 34.7 |
| • Upper respiratory | 460-465, 470-478 | 9 | 6.0 | 3.1 | 11.8 |
| • Pneumonia/bronchitis | 466, 480-487 | 20 | 10.1 | 6.3 | 16.2 |
| • Chronic respiratory conditions | 490-496 | 10 | 6.4 | 3.3 | 12.1 |
| Digestive system | 520-579 | 27 | 15.3 | 10.2 | 22.8 |
| • Hernias | 550-553 | 8 | 3.9 | 1.9 | 8.1 |
| • Gall bladder disease | 574-575 | 2 | 0.7 | 0.2 | 2.8 |
| Genitourinary system | 580-629 | 4 | 2.3 | 0.8 | 6.3 |
| • Benign prostatic hypertrophy | 600 | 0 | | | |
| • Endometriosis | 617 | NA | NA | NA | NA |
| • Ovarian cysts | 620.0-620.2 | NA | NA | NA | NA |
| • Female genital pain/bleeding | 625-626 | NA | NA | NA | NA |
| Pregnancy and childbirth[1] | 630-676 | NA | NA | NA | NA |
| Skin and subcutaneous tissue | 680-709 | 9 | 4.7 | 2.4 | 9.4 |
| Musculoskeletal | 710-739 | 37 | 21.3 | 15.2 | 30.0 |
| • Dorsopathies | 720-724 | 20 | 10.9 | 6.9 | 17.4 |
| Congenital anomalies[1] | 740-759 | 0 | | | |
| Certain perinatal conditions[1] | 760-779 | 0 | | | |
| Symptoms, signs, and ill-defined conditions | 780-799 | 9 | 5.0 | 2.5 | 10.1 |
| Injury and Poisoning | 800-999 | 52 | 29.3 | 21.9 | 39.1 |
| • Fractures, all sites | 800-829 | 9 | 5.4 | 2.7 | 10.8 |
| • Dislocations | 830-839 | 5 | 2.3 | 0.9 | 5.9 |
| • Sprains and strains | 840-848 | 22 | 13.0 | 8.3 | 20.2 |
| • Intracranial injuries | 850-854 | 0 | | | |
| • Internal injuries | 860-869 | 0 | | | |
| • Open wounds | 870-897 | 3 | 2.0 | 0.6 | 6.6 |
| • Other injuries | 900-999 | 13 | 6.6 | 3.7 | 11.8 |
| Family history of health problems | V10-V19 | 0 | | | |
| Circumstances related to reproduction/development | V20-V28 | 2 | 0.7 | 0.2 | 2.8 |
| Specific procedure/aftercare | V50-V59 | 1 | 0.9 | 0.1 | 6.1 |
| **TOTAL** | | **236** | **136.1** | **118.9** | **155.8** |

† Includes all diagnoses reported with an absence of 5 or more days.
* Standardized to age distribution of 1970 U.S. population.
[1] These diagnoses pertain to the worker, not to children born to workers.

***Table 5. Diseases and Injuries by Diagnostic Category - Females***

| Category of Diagnoses | ICD9-CM Code | Number of Diagnoses† | Age-Adjusted Rate per 1,000* | Lower 95% Confidence Limit per 1,000 | Upper 95% Confidence Limit per 1,000 |
|---|---|---|---|---|---|
| Infections and parasitic diseases | 001-139 | 7 | 6.4 | 3.0 | 13.6 |
| Malignant neoplasms | 140-208, 230-234 | 2 | 2.3 | 0.6 | 9.2 |
| • Digestive organs | 150-159 | 1 | 1.2 | 0.2 | 8.2 |
| • Respiratory system | 160-165 | 1 | 1.2 | 0.2 | 8.2 |
| • Breast | 174-175 | 0 | | | |
| • Genitourinary | 179-185 | 0 | | | |
| • Nervous system | 191-192 | 0 | | | |
| • Leukemia, lymphoma | 200-208 | 0 | | | |
| Benign neoplasms and other | 210-229, 235-239 | 3 | 4.5 | 1.3 | 16.4 |
| Endocrine and metabolic diseases | 240-279 | 2 | 2.2 | 0.5 | 8.7 |
| Blood and blood-forming organs | 280-289 | 1 | 0.7 | 0.1 | 5.3 |
| Mental disorders | 290-319 | 7 | 5.2 | 2.5 | 10.9 |
| • Alcoholism | 303 | 0 | | | |
| • Drug abuse | 304-305 | 0 | | | |
| Nervous system and sense organs | 320-389 | 10 | 15.3 | 7.7 | 30.5 |
| Circulatory system | 390-459 | 3 | 3.5 | 1.1 | 10.7 |
| • Hypertension | 401 | 1 | 1.2 | 0.2 | 8.2 |
| • Acute myocardial infarction | 410 | 1 | 1.2 | 0.2 | 8.2 |
| • Ischemic disease, not M.I. | 411-414, 429.2 | 1 | 1.2 | 0.2 | 8.2 |
| • Cerebrovascular disease | 430-438 | 0 | | | |
| Respiratory system | 460-519 | 58 | 69.8 | 52.2 | 93.4 |
| • Upper respiratory | 460-465, 470-478 | 29 | 34.7 | 22.8 | 52.8 |
| • Pneumonia/bronchitis | 466, 480-487 | 14 | 16.1 | 8.9 | 29.2 |
| • Chronic respiratory conditions | 490-496 | 14 | 18.0 | 10.1 | 31.9 |
| Digestive system | 520-579 | 19 | 17.6 | 11.2 | 27.8 |
| • Hernias | 550-553 | 0 | | | |
| • Gall bladder disease | 574-575 | 2 | 1.5 | 0.4 | 6.0 |
| Genitourinary system | 580-629 | 21 | 35.1 | 18.4 | 67.0 |
| • Benign prostatic hypertrophy | 600 | NA | NA | NA | NA |
| • Endometriosis | 617 | 5 | 4.8 | 2.0 | 11.7 |
| • Ovarian cysts | 620.0-620.2 | 1 | 0.7 | 0.1 | 5.3 |
| • Female genital pain/bleeding | 625-626 | 1 | 1.2 | 0.2 | 8.2 |
| Pregnancy and childbirth[1,2] | 630-676 | 15 | 13.8 | 8.3 | 23.1 |
| Skin and subcutaneous tissue | 680-709 | 2 | 8.4 | 1.5 | 47.8 |
| Musculoskeletal | 710-739 | 13 | 22.7 | 10.5 | 48.8 |
| • Dorsopathies | 720-724 | 2 | 1.9 | 0.5 | 7.8 |
| Congenital anomalies[1] | 740-759 | 1 | 1.0 | 0.1 | 7.2 |
| Certain perinatal conditions[1] | 760-779 | 0 | | | |
| Symptoms, signs, and ill-defined conditions | 780-799 | 8 | 7.7 | 3.8 | 15.5 |
| Injury and Poisoning | 800-999 | 19 | 22.3 | 13.6 | 36.5 |
| • Fractures, all sites | 800-829 | 4 | 4.5 | 1.7 | 11.9 |
| • Dislocations | 830-839 | 2 | 2.2 | 0.5 | 8.7 |
| • Sprains and strains | 840-848 | 5 | 4.7 | 1.9 | 11.3 |
| • Intracranial injuries | 850-854 | 0 | | | |
| • Internal injuries | 860-869 | 2 | 2.3 | 0.6 | 9.2 |
| • Open wounds | 870-897 | 2 | 1.5 | 0.4 | 6.0 |
| • Other injuries | 900-999 | 4 | 7.2 | 2.4 | 21.3 |
| Family history of health problems | V10-V19 | 0 | | | |
| Circumstances related to reproduction/development | V20-V28 | 13 | 11.8 | 6.8 | 20.4 |
| Specific procedure/aftercare | V50-V59 | 0 | | | |
| **Total minus pregnancies** | | **189** | **236.5** | **196.5** | **284.7** |
| **TOTAL** | | **204** | **250.3** | **209.6** | **298.9** |

† Includes all diagnoses reported with an absence of 5 or more days.
* Standardized to age distribution of 1970 U.S. population.
[1] These diagnoses pertain to the worker, not to children born to workers.
[2] Only women age 18-45 years were included in the calculation of the rate for this diagnostic category.

## Diagnoses Associated with Pregnancy, Labor, and Delivery

During 1993, 15 pregnancy-related diagnoses were reported among 15 women (Table 6). There were 3 diagnoses associated with pregnancy complications, 1 miscarriage, and 11 normal deliveries.

## Diagnoses by Occupational Category, 1993

During 1993, the age-adjusted diagnosis rate for all employees was more than three times higher among hourly workers than salaried workers (371.9 versus 106.8 per 1,000 persons) (Table 7). Nuclear specialty workers, who comprised 8.5% of the work force, had the highest diagnosis rate (430.6 per 1,000), with 96 diagnoses reported for 52 workers. Service workers had the second highest diagnosis rate (429.7 per 1,000), with 47 diagnoses reported among 27 persons.

Other hourly workers ranked third, with 11 diagnoses reported for 7 workers (350.8 per 1,000). The category of other management and administration workers had the lowest rate (64.9 per 1,000 workers), with 11 diagnoses among 9 workers.

The diagnosis rate among men was higher for hourly workers (312.4 per 1,000) than for salaried workers (59.8 per 1,000) (Table 8). "Other" hourly workers had the highest rate (431.8 per 1,000), with seven diagnoses reported for four men. The second highest rate was among nuclear specialty workers (379.5 per 1,000), with 74 diagnoses reported among 42 men. Crafts and repair workers ranked third, with 64 diagnoses reported among 44 men (271.2 per 1,000). Office management and administrative workers had the lowest rate (44.4 per 1,000), with 12 diagnoses reported among 9 men.

The diagnosis rate among women was more than five-and-a-half times higher for hourly workers (933.7 per 1,000) than for salaried workers (168.6 per 1,000) (Table 9). Service workers had the highest rate (858.3 per 1,000), with 25 diagnoses reported among 10 women. The second highest rate was among nuclear specialty workers (750.6 per 1,000), with 22 diagnoses reported among 10 women. Crafts and repair workers ranked third, with 13 diagnoses reported among 10 women (390.5 per 1,000). Other management and administrative workers had the lowest rate (75.2 per 1,000), with three diagnoses reported among three women. The women had higher diagnosis rates than the men; this suggests a greater tendency among women to report injury or illness.

| Category of Diagnoses | ICD9-CM Code | Number of Diagnoses† | Age-Adjusted Rate per 1,000* | Lower 95% Confidence Limit per 1,000 | Upper 95% Confidence Limit per 1,000 |
|---|---|---|---|---|---|
| Ectopic and Molar Pregnancy/Abortive Outcome | 630-639 | 1 | 1.0 | 0.1 | 7.2 |
| Complications Related to Pregnancy | 640-648 | 3 | 3.0 | 1.0 | 9.4 |
| Normal Delivery | 650 | 11 | 9.8 | 5.4 | 17.8 |
| Other Indications for Care in Pregnancy, Labor, and Delivery‡ | 651-659 | 0 | | | |
| Complications of Labor, Delivery, and Puerperium | 660-676 | 0 | | | |
| **TOTAL** | | **15** | **13.8** | **8.3** | **23.1** |

†Includes all diagnoses reported with an absence of 5 or more days.
*Only women aged 18-45 were included in the calculation of the rates for these diagnostic categories.
‡Includes delivery by cesarian section and multiple births.

***Table 6. Diagnoses Associated with Pregnancy, Labor, and Delivery***

*Table 7. Diagnoses by Occupational Category - Males and Females*

| | Occupational Category | Number of Workers* | Number of Diagnoses† | Age-Adjusted Rate per 1,000** | Lower 95% Confidence Limit per 1,000 | Upper 95% Confidence Limit per 1,000 |
|---|---|---|---|---|---|---|
| Salaried | Office Management and Administration | 835 | 109 | 128.9 | 104.8 | 158.5 |
| | Engineers, Scientists, and Health Care | 456 | 46 | 100.3 | 73.5 | 136.9 |
| | Technical Support | 443 | 43 | 100.2 | 72.6 | 138.3 |
| | Other Management and Administration | 261 | 11 | 64.9 | 32.2 | 130.5 |
| | **Subtotal** | **1,995** | **209** | **106.8** | **92.1** | **123.8** |
| Hourly | Service | 114 | 47 | 429.7 | 317.0 | 582.4 |
| | Crafts and Repair | 262 | 77 | 296.0 | 234.0 | 374.5 |
| | Nuclear Specialties | 224 | 96 | 430.6 | 345.8 | 536.2 |
| | Other | 36 | 11 | 350.8 | 174.7 | 704.1 |
| | **Subtotal** | **636** | **231** | **371.9** | **324.3** | **426.4** |
| | **TOTAL** | **2,631** | **440** | **173.0** | **156.6** | **191.2** |

*Table 8. Diagnoses by Occupational Category - Males*

| | Occupational Category | Number of Workers* | Number of Diagnoses | Age-Adjusted Rate per 1,000** | Lower 95% Confidence Limit per 1,000 | Upper 95% Confidence Limit per 1,000 |
|---|---|---|---|---|---|---|
| Salaried | Office Management and Administration | 319 | 12 | 44.4 | 23.8 | 83.0 |
| | Engineers, Scientists, and Health Care | 378 | 29 | 78.2 | 53.2 | 114.9 |
| | Technical Support | 318 | 20 | 62.1 | 38.7 | 99.8 |
| | Other Management and Administration | 230 | 8 | 50.6 | 22.2 | 115.7 |
| | **Subtotal** | **1,245** | **69** | **59.8** | **46.3** | **77.1** |
| Hourly | Service | 77 | 22 | 248.4 | 157.5 | 391.6 |
| | Crafts and Repair | 240 | 64 | 271.2 | 209.9 | 350.5 |
| | Nuclear Specialties | 198 | 74 | 379.5 | 295.5 | 487.4 |
| | Other | 26 | 7 | 431.8 | 116.9 | 1,594.9 |
| | **Subtotal** | **541** | **167** | **312.4** | **265.8** | **367.2** |
| | **TOTAL** | **1,786** | **236** | **136.3** | **119.1** | **156.0** |

*Table 9. Diagnoses by Occupational Category - Females*

| | Occupational Category | Number of Workers* | Number of Diagnoses† | Age-Adjusted Rate per 1,000** | Lower 95% Confidence Limit per 1,000 | Upper 95% Confidence Limit per 1,000 |
|---|---|---|---|---|---|---|
| Salaried | Office Management and Administration | 516 | 97 | 165.4 | 133.7 | 204.7 |
| | Engineers, Scientists, and Health Care | 78 | 17 | 230.7 | 131.3 | 405.3 |
| | Technical Support | 125 | 23 | 206.0 | 128.2 | 331.0 |
| | Other Management and Administration | 31 | 3 | 75.2 | 24.1 | 234.4 |
| | **Subtotal** | **750** | **140** | **168.6** | **140.6** | **202.2** |
| Hourly | Service | 37 | 25 | 858.3 | 542.0 | 1,359.3 |
| | Crafts and Repair | 22 | 13 | 390.5 | 197.7 | 771.2 |
| | Nuclear Specialties | 26 | 22 | 750.6 | 476.5 | 1,182.1 |
| | Other | 10 | 4 | 302.6 | 113.6 | 806.3 |
| | **Subtotal** | **95** | **64** | **933.7** | **636.1** | **1,370.3** |
| | **TOTAL** | **845** | **204** | **250.7** | **210.0** | **299.3** |

* Five workers were excluded because pay status was not reported.
† Includes all diagnoses reported with an absence of 5 or more days, including absences for pregnancy and delivery.
**Standardized to age distribution of 1970 U.S. population.

## Relative Risk for All Disease Categories by Occupation

In Table 10, the risk of one or more absences associated with all diagnoses for specific occupational categories is compared with all other occupational categories in the Fernald work force. This comparison also takes into account the possible confounding effects of age and gender. In contrast to the previous series of tables, these analyses examine the risk of a worker having *one or more* absences for 5 or more consecutive workdays during 1993. This was done to minimize the problem associated with one person having multiple absences for the same condition.

The statistical methods used to compare the incidence of absences are the relative risk (RR) and the 95% confidence interval. The relative risk is the rate of absence in one group divided by the rate in a reference (comparison) group.

The reference group is all workers other than the occupational category of primary interest. A relative risk of *1.0* indicates that both groups have the same risk of absence. A relative risk *greater than 1.0* indicates that workers in a selected occupational category have a higher risk of absence than workers in all other occupational categories combined. A relative risk *less than 1.0* implies that the selected occupational group has a lower risk of absence compared with all other occupational categories combined.

The confidence interval is a statistical measure of the precision of the risk estimate. A 95% confidence interval indicates the range in which one would expect the relative risk to fall 95% of the time. If the confidence interval includes the value *1.0*, then the rate of absence is likely to have occurred by chance; in other words, the relative risk is not statistically significant at the 95% confidence level. For example, a relative risk of 2.0 with a confidence interval of *0.9 to 2.1* would not be considered statistically significant, whereas a relative risk of 1.4 with a confidence interval of *1.2 to 1.7* would be considered statistically significant. The width of the confidence interval indicates the amount of uncertainty in the risk estimate and is affected by sample size and the number of events in the diagnostic category.

Service workers (RR=2.5), crafts and repair workers (RR=2.5), and nuclear specialties workers (RR=3.0) had a statistically significant, increased risk of being absent 5 or more consecutive workdays in 1993 due to disease or injury. Office management and administrative workers (RR=0.5); engineers, scientists, and health care workers (RR=0.6); technical support workers (RR=0.6); and other management and administrative workers (RR=0.4) had a statistically significant, decreased risk of absence.

| Occupational Category | Person-Years[1] | Persons with at Least One Event* | Relative Risk** | Lower 95% Confidence Limit | Upper 95% Confidence Limit |
|---|---|---|---|---|---|
| Office Management and Administration | 835 | 62 | 0.5 | 0.3 | 0.7 |
| Engineers, Scientists, and Health Care | 456 | 29 | 0.6 | 0.4 | 0.9 |
| Technical Support | 443 | 27 | 0.6 | 0.4 | 0.9 |
| Other Management and Administration | 261 | 9 | 0.4 | 0.2 | 0.7 |
| Service | 114 | 27 | 2.5 | 1.7 | 3.7 |
| Crafts and Repair | 262 | 52 | 2.5 | 1.8 | 3.4 |
| Nuclear Specialties | 224 | 52 | 3.0 | 2.2 | 4.0 |
| Other | 36 | 7 | 1.9 | 0.9 | 4.0 |
| **TOTAL** | **2,631** | **265** | | | |

* Persons with multiple absences during the time period were counted only once.
** Adjusted for age and gender – compared with all occupational categories.
[1] Five workers were excluded from this table because pay status was not reported.

***Table 10. All Diseases and Injuries by Occupational Categories***

## Relative Risk for Selected Disease Categories by Occupation

Tables 11.A through 11.M present the relative risk of absences of 5 or more consecutive workdays for selected disease categories among workers by each occupational category.

Service workers were significantly more likely to be absent at least once during 1993 for infections and parasitic diseases (RR=6.0); diseases of the skin and subcutaneous tissues (RR=8.7); diseases of the musculoskeletal system (RR=3.5); symptoms, signs, and ill-defined conditions (RR=6.1); and injuries and poisoning (RR=3.4). Crafts and repair workers were significantly more likely to be absent at least once during 1993 for diseases of the digestive system (RR=3.0), diseases of the skin and subcutaneous tissues (RR=5.2), diseases of the musculoskeletal system (RR=3.1), and injuries and poisoning (RR=3.2).

Nuclear specialties workers were found to have a statistically significant, elevated risk associated with diseases of the respiratory system (RR=4.1); diseases of the skin and subcutaneous tissues (RR=6.1); diseases of the musculoskeletal system (RR=3.5); symptoms, signs, and ill-defined conditions (RR=7.5); and injuries and poisoning (RR=3.8). Workers in the "other" hourly category were significantly more likely to be absent for mental disorders (RR=8.9) and diseases of the nervous system and sense organs (RR=7.8).

The lower overall diagnosis rates observed among salaried workers was also apparent in the relative risk analyses.

Office management and administrative personnel were significantly less likely to be absent at least once during 1993 for diseases of the respiratory system (RR=0.3) and injuries and poisoning (RR=0.4). Technical support workers had a statistically significant, decreased risk of injuries and poisoning (RR=0.3).

The reasons for the large differences in overall diagnosis rates and relative risks for particular diagnostic categories among different occupational categories may be due to small numbers. However, the consistency of the differences across broad diagnostic categories suggests that compliance with reporting back to work through an occupational physician varies among occupational categories.

## Deaths Among Active Employees, 1993

During 1993, no deaths were reported among active employees.

| Occupational Category | Person-Years[1] | Persons with at Least One Event* | Relative Risk** | Lower 95% Confidence Limit | Upper 95% Confidence Limit |
|---|---|---|---|---|---|
| Office Management and Administration | 835 | 3 | 0.3 | 0.1 | 1.6 |
| Engineers, Scientists, and Health Care | 456 | 1 | 0.4 | 0.1 | 2.6 |
| Technical Support | 443 | 3 | 1.3 | 0.4 | 4.6 |
| Other Management and Administration | 261 | 1 | 0.9 | 0.1 | 6.3 |
| Service | 114 | 3 | 6.0 | 1.7 | 21.3 |
| Crafts and Repair | 262 | 2 | 2.2 | 0.4 | 10.6 |
| Nuclear Specialties | 224 | 1 | 1.1 | 0.1 | 8.9 |
| Other | 36 | 0 | | | |
| **TOTAL** | **2,631** | **14** | | | |

* Persons with multiple absences during the time period were counted only once.
** Adjusted for age and gender – compared with all occupational categories.
[1] Five workers were excluded from this table because pay status was not reported.

***Table 11.A. Infections and Parasitic Diseases***

| Occupational Category | Person-Years[1] | Persons with at Least One Event* | Relative Risk** | Lower 95% Confidence Limit | Upper 95% Confidence Limit |
|---|---|---|---|---|---|
| Office Management and Administration | 835 | 1 | 0.4 | 0.02 | 6.9 |
| Engineers, Scientists, and Health Care | 456 | 1 | 1.8 | 0.3 | 11.5 |
| Technical Support | 443 | 1 | 2.1 | 0.2 | 20.0 |
| Other Management and Administration | 261 | 0 | | | |
| Service | 114 | 0 | | | |
| Crafts and Repair | 262 | 0 | | | |
| Nuclear Specialties | 224 | 1 | 4.1 | 0.3 | 51.0 |
| Other | 36 | 0 | | | |
| **TOTAL** | **2,631** | **4** | | | |

***Table 11.B. Malignant Neoplasms***

| Occupational Category | Person-Years[1] | Persons with at Least One Event* | Relative Risk** | Lower 95% Confidence Limit | Upper 95% Confidence Limit |
|---|---|---|---|---|---|
| Office Management and Administration | 835 | 2 | 0.5 | 0.1 | 4.9 |
| Engineers, Scientists, and Health Care | 456 | 1 | 0.7 | 0.1 | 7.0 |
| Technical Support | 443 | 1 | 0.8 | 0.1 | 6.0 |
| Other Management and Administration | 261 | 0 | | | |
| Service | 114 | 1 | 3.0 | 0.4 | 25.2 |
| Crafts and Repair | 262 | 1 | 1.2 | 0.2 | 8.5 |
| Nuclear Specialties | 224 | 2 | 3.8 | 0.7 | 21.3 |
| Other | 36 | 0 | | | |
| **TOTAL** | **2,631** | **8** | | | |

***Table 11.C. Benign Neoplasms***

| Occupational Category | Person-Years[1] | Persons with at Least One Event* | Relative Risk** | Lower 95% Confidence Limit | Upper 95% Confidence Limit |
|---|---|---|---|---|---|
| Office Management and Administration | 835 | 1 | 0.2 | 0.04 | 1.2 |
| Engineers, Scientists, and Health Care | 456 | 2 | 0.8 | 0.2 | 3.5 |
| Technical Support | 443 | 2 | 0.8 | 0.2 | 3.8 |
| Other Management and Administration | 261 | 0 | | | |
| Service | 114 | 1 | 2.1 | 0.3 | 16.5 |
| Crafts and Repair | 262 | 3 | 2.5 | 0.7 | 8.2 |
| Nuclear Specialties | 224 | 3 | 2.9 | 0.9 | 9.7 |
| Other | 36 | 1 | 8.9 | 1.1 | 73.3 |
| **TOTAL** | **2,631** | **13** | | | |

***Table 11.D. Mental Disorders***

| Occupational Category | Person-Years[1] | Persons with at Least One Event* | Relative Risk** | Lower 95% Confidence Limit | Upper 95% Confidence Limit |
|---|---|---|---|---|---|
| Office Management and Administration | 835 | 5 | 0.6 | 0.2 | 2.1 |
| Engineers, Scientists, and Health Care | 456 | 1 | 0.4 | 0.05 | 3.6 |
| Technical Support | 443 | 1 | 0.4 | 0.1 | 3.1 |
| Other Management and Administration | 261 | 0 | | | |
| Service | 114 | 2 | 3.2 | 0.7 | 14.4 |
| Crafts and Repair | 262 | 1 | 0.7 | 0.1 | 6.9 |
| Nuclear Specialties | 224 | 3 | 3.1 | 0.9 | 10.3 |
| Other | 36 | 2 | 7.8 | 1.8 | 33.8 |
| **TOTAL** | **2,631** | **15** | | | |

***Table 11.E. Diseases of the Nervous System and Sense Organs***

* Persons with multiple absences during the time period were counted only once.
** Adjusted for age and gender – compared with all occupational categories.
[1] Five workers were excluded from this table because pay status was not reported.

| Occupational Category | Person-Years[1] | Persons with at Least One Event* | Relative Risk** | Lower 95% Confidence Limit | Upper 95% Confidence Limit |
|---|---|---|---|---|---|
| Office Management and Administration | 835 | 4 | 0.8 | 0.2 | 3.4 |
| Engineers, Scientists, and Health Care | 456 | 2 | 0.5 | 0.1 | 2.5 |
| Technical Support | 443 | 1 | 0.3 | 0.04 | 2.3 |
| Other Management and Administration | 261 | 2 | 1.0 | 0.2 | 4.3 |
| Service | 114 | 1 | 1.3 | 0.2 | 9.3 |
| Crafts and Repair | 262 | 5 | 2.6 | 0.9 | 7.6 |
| Nuclear Specialties | 224 | 3 | 1.8 | 0.5 | 6.4 |
| Other | 36 | 0 | | | |
| **TOTAL** | **2,631** | **18** | | | |

***Table 11.F. Diseases of the Circulatory System***

| Occupational Category | Person-Years[1] | Persons with at Least One Event* | Relative Risk** | Lower 95% Confidence Limit | Upper 95% Confidence Limit |
|---|---|---|---|---|---|
| Office Management and Administration | 835 | 17 | 0.3 | 0.2 | 0.6 |
| Engineers, Scientists, and Health Care | 456 | 8 | 0.7 | 0.3 | 1.5 |
| Technical Support | 443 | 13 | 1.1 | 0.6 | 2.1 |
| Other Management and Administration | 261 | 2 | 0.3 | 0.1 | 1.4 |
| Service | 114 | 6 | 2.0 | 0.9 | 4.6 |
| Crafts and Repair | 262 | 8 | 1.5 | 0.7 | 3.2 |
| Nuclear Specialties | 224 | 16 | 4.1 | 2.3 | 7.2 |
| Other | 36 | 3 | 2.8 | 0.9 | 8.8 |
| **TOTAL** | **2,631** | **73** | | | |

***Table 11.G. Diseases of the Respiratory System***

| Occupational Category | Person-Years[1] | Persons with at Least One Event* | Relative Risk** | Lower 95% Confidence Limit | Upper 95% Confidence Limit |
|---|---|---|---|---|---|
| Office Management and Administration | 835 | 11 | 0.7 | 0.3 | 1.5 |
| Engineers, Scientists, and Health Care | 456 | 10 | 1.7 | 0.8 | 3.7 |
| Technical Support | 443 | 2 | 0.3 | 0.1 | 1.1 |
| Other Management and Administration | 261 | 2 | 0.5 | 0.1 | 2.2 |
| Service | 114 | 3 | 1.9 | 0.6 | 6.3 |
| Crafts and Repair | 262 | 9 | 3.0 | 1.4 | 6.6 |
| Nuclear Specialties | 224 | 3 | 1.0 | 0.3 | 3.1 |
| Other | 36 | 0 | | | |
| **TOTAL** | **2,631** | **40** | | | |

***Table 11.H. Diseases of the Digestive System***

| Occupational Category | Person-Years[1] | Persons with at Least One Event* | Relative Risk** | Lower 95% Confidence Limit | Upper 95% Confidence Limit |
|---|---|---|---|---|---|
| Office Management and Administration | 835 | 7 | 0.4 | 0.2 | 1.1 |
| Engineers, Scientists, and Health Care | 456 | 3 | 1.6 | 0.5 | 5.7 |
| Technical Support | 443 | 3 | 1.0 | 0.3 | 3.4 |
| Other Management and Administration | 261 | 0 | | | |
| Service | 114 | 2 | 2.3 | 0.5 | 10.5 |
| Crafts and Repair | 262 | 2 | 2.6 | 0.5 | 13.7 |
| Nuclear Specialties | 224 | 3 | 3.8 | 1.0 | 13.7 |
| Other | 36 | 0 | | | |
| **TOTAL** | **2,631** | **20** | | | |

***Table 11.I. Diseases of the Genitourinary System***

* Persons with multiple absences during the time period were counted only once.
** Adjusted for age and gender – compared with all occupational categories.
[1] Five workers were excluded from this table because pay status was not reported.

| Occupational Category | Person-Years[1] | Persons with at Least One Event* | Relative Risk** | Lower 95% Confidence Limit | Upper 95% Confidence Limit |
|---|---|---|---|---|---|
| Office Management and Administration | 835 | 0 | | | |
| Engineers, Scientists, and Health Care | 456 | 0 | | | |
| Technical Support | 443 | 0 | | | |
| Other Management and Administration | 261 | 0 | | | |
| Service | 114 | 3 | 8.7 | 2.1 | 36.1 |
| Crafts and Repair | 262 | 4 | 5.2 | 1.4 | 19.8 |
| Nuclear Specialties | 224 | 4 | 6.1 | 1.7 | 22.1 |
| Other | 36 | 0 | | | |
| **TOTAL** | **2,631** | **11** | | | |

***Table 11.J. Diseases of the Skin and Subcutaneous Tissue***

| Occupational Category | Person-Years[1] | Persons with at Least One Event* | Relative Risk** | Lower 95% Confidence Limit | Upper 95% Confidence Limit |
|---|---|---|---|---|---|
| Office Management and Administration | 835 | 7 | 0.4 | 0.2 | 1.0 |
| Engineers, Scientists, and Health Care | 456 | 2 | 0.2 | 0.05 | 1.0 |
| Technical Support | 443 | 2 | 0.2 | 0.1 | 1.0 |
| Other Management and Administration | 261 | 1 | 0.2 | 0.04 | 1.6 |
| Service | 114 | 6 | 3.5 | 1.5 | 8.4 |
| Crafts and Repair | 262 | 11 | 3.1 | 1.5 | 6.4 |
| Nuclear Specialties | 224 | 11 | 3.5 | 1.7 | 7.1 |
| Other | 36 | 2 | 3.2 | 0.8 | 13.7 |
| **TOTAL** | **2,631** | **42** | | | |

***Table 11.K. Diseases of the Musculoskeletal System***

| Occupational Category | Person-Years[1] | Persons with at Least One Event* | Relative Risk** | Lower 95% Confidence Limit | Upper 95% Confidence Limit |
|---|---|---|---|---|---|
| Office Management and Administration | 835 | 2 | 0.2 | 0.04 | 1.5 |
| Engineers, Scientists, and Health Care | 456 | 2 | 0.8 | 0.2 | 3.0 |
| Technical Support | 443 | 1 | 0.4 | 0.05 | 3.0 |
| Other Management and Administration | 261 | 0 | | | |
| Service | 114 | 3 | 6.1 | 1.7 | 22.0 |
| Crafts and Repair | 262 | 1 | 0.7 | 0.1 | 5.1 |
| Nuclear Specialties | 224 | 5 | 7.5 | 2.1 | 26.8 |
| Other | 36 | 0 | | | |
| **TOTAL** | **2,631** | **14** | | | |

***Table 11.L. Symptoms, Signs, and Ill-Defined Conditions***

| Occupational Category | Person-Years[1] | Persons with at Least One Event* | Relative Risk** | Lower 95% Confidence Limit | Upper 95% Confidence Limit |
|---|---|---|---|---|---|
| Office Management and Administration | 835 | 9 | 0.4 | 0.2 | 0.9 |
| Engineers, Scientists, and Health Care | 456 | 5 | 0.4 | 0.2 | 1.0 |
| Technical Support | 443 | 3 | 0.3 | 0.1 | 0.8 |
| Other Management and Administration | 261 | 1 | 0.2 | 0.02 | 1.1 |
| Service | 114 | 8 | 3.4 | 1.6 | 7.2 |
| Crafts and Repair | 262 | 16 | 3.2 | 1.8 | 5.7 |
| Nuclear Specialties | 224 | 16 | 3.8 | 2.1 | 6.9 |
| Other | 36 | 1 | 1.1 | 0.2 | 8.2 |
| **TOTAL** | **2,631** | **59** | | | |

***Table 11.M. Injury and Poisoning***

* Persons with multiple absences during the time period were counted only once.
** Adjusted for age and gender – compared with all occupational categories.
[1] Five workers were excluded from this table because pay status was not reported.

## OSHA-Recordable Events Among Fernald Employees, 1993

*Events per Person.* In 1993, 53 Fernald employees had an OSHA-recordable event. One (2%) of these workers had two or more events. There was a total of 54 OSHA-recordable events among all employees (Table 12.A).

*Diagnoses per Event.* A total of 64 diagnoses were associated with the 54 OSHA-recordable events reported during 1993. Multiple diagnoses were reported for eight (15%) of the events (Table 12.B).

*Diagnosis Rates.* In 1993, the 64 diagnoses noted for the OSHA-recordable events yielded an age-adjusted rate of 25.0 per 1,000 persons. The age-adjusted diagnosis rate for women (35.3 per 1,000) was higher than the rate for men (24.8 per 1,000) (Table 12.C).

| Employee Category | Number of Workers | Number of OSHA-Recordable Events | | | | | Total Persons with at Least One Event | Total Number of Events |
|---|---|---|---|---|---|---|---|---|
| | | 0 | 1 | 2 | 3 | 4 | | |
| Male | 1,789 | 1,752 | 36 | 1 | 0 | 0 | 37 | 38 |
| Female | 847 | 831 | 16 | 0 | 0 | 0 | 16 | 16 |
| **TOTAL** | **2,636** | **2,583** | **52** | **1** | **0** | **0** | **53** | **54** |

***Table 12.A. OSHA-Recordable Events per Person***

| Employee Category | Number of Diagnoses per OSHA Event | | | | | Total Number of Events | Total Number of Diagnoses |
|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | | |
| Male | 34 | 4 | 0 | 0 | 0 | 38 | 42 |
| Female | 12 | 2 | 2 | 0 | 0 | 16 | 22 |
| **TOTAL** | **46** | **6** | **2** | **0** | **0** | **54** | **64** |

***Table 12.B. Diagnoses per OSHA-Recordable Event***

| Employee Category | Number of Workers | Number of Diagnoses | Crude Rate per 1,000 | Age-Adjusted Rate per 1,000* | Lower 95% Confidence Limit per 1,000 | Upper 95% Confidence Limit per 1,000 |
|---|---|---|---|---|---|---|
| Male | 1,789 | 42 | 23.5 | 24.8 | 18.1 | 34.1 |
| Female | 847 | 22 | 26.0 | 35.3 | 18.6 | 67.1 |
| **TOTAL** | **2,636** | **64** | **24.3** | **25.0** | **19.3** | **32.4** |

***Table 12.C. Diagnosis Rates for OSHA-Recordable Events***

*Standardized to age distribution of 1970 U.S. population.

## OSHA-Recordable Diseases and Injuries by Diagnostic Category, 1993

The age-adjusted diagnosis rate for each diagnostic category is presented for all workers combined in Table 13. Because the patterns of diagnoses reported by men and women may differ, Tables 14 and 15 show the diagnosis rates by gender to further describe disease and injury patterns in the work force.

For all workers, the diagnostic category with the highest rate was injury and poisoning (20.4 per 1,000), with 52 diagnoses reported for 45 people. This category accounted for 81% of all the diagnoses.

The leading diagnostic category among men, accounting for 83% of all diagnoses, was injury and poisoning (20.9 per 1,000), with 35 diagnoses among 31 men. Of these diagnoses, sprains and strains accounted for 40%, with 14 diagnoses related to joints and adjacent muscles reported among 13 men. Additionally, open wounds accounted for 31% of these diagnoses, with 11 diagnoses reported among 10 men. Wounds to the hands, thumbs, or fingers were reported for six workers. The remainder were wounds to the head.

The diagnostic category with the highest rate was the same for women as for men. Injury and poisoning (24.4 per 1,000) accounted for 77% of all diagnoses, with 17 diagnoses among 14 women. Of this category, sprains and strains accounted for 47% of the diagnoses, with eight diagnoses for eight women. There were four strains to the ankle and four strains to the back or hip. Additionally, "other" injuries accounted for 29% of these diagnoses, with five diagnoses among four women. These included four contusions and one non-venomous insect bite.

| Category of Diagnoses | ICD9-CM Code | Number of Diagnoses† | Age-Adjusted Rate per 1,000* | Lower 95% Confidence Limit per 1,000 | Upper 95% Confidence Limit per 1,000 |
|---|---|---|---|---|---|
| Infections and parasitic diseases | 001-139 | 0 | | | |
| Malignant neoplasms | 140-208, 230-234 | 0 | | | |
| • Digestive organs | 150-159 | 0 | | | |
| • Respiratory system | 160-165 | 0 | | | |
| • Breast | 174-175 | 0 | | | |
| • Genitourinary | 179-185 | 0 | | | |
| • Nervous system | 191-192 | 0 | | | |
| • Leukemia, lymphoma | 200-208 | 0 | | | |
| Benign neoplasms and other | 210-229, 235-239 | 0 | | | |
| Endocrine and metabolic diseases | 240-279 | 0 | | | |
| Blood and blood-forming organs | 280-289 | 0 | | | |
| Mental disorders | 290-319 | 0 | | | |
| • Alcoholism | 303 | 0 | | | |
| • Drug abuse | 304-305 | 0 | | | |
| Nervous system and sense organs | 320-389 | 2 | 0.6 | 0.1 | 2.4 |
| Circulatory system | 390-459 | 0 | | | |
| • Hypertension | 401 | 0 | | | |
| • Acute myocardial infarction | 410 | 0 | | | |
| • Ischemic disease, not M.I. | 411-414, 429.2 | 0 | | | |
| • Cerebrovascular disease | 430-438 | 0 | | | |
| Respiratory system | 460-519 | 2 | 0.7 | 0.2 | 3.0 |
| • Upper respiratory | 460-465, 470-478 | 2 | 0.7 | 0.2 | 3.0 |
| • Pneumonia/bronchitis | 466, 480-487 | 0 | | | |
| • Chronic respiratory conditions | 490-496 | 0 | | | |
| Digestive system | 520-579 | 1 | 0.3 | | 2.4 |
| • Hernias | 550-553 | 1 | 0.3 | | 2.4 |
| • Gall bladder disease | 574-575 | 0 | | | |
| Genitourinary system | 580-629 | 0 | | | |
| • Benign prostatic hypertrophy | 600 | 0 | | | |
| • Endometriosis | 617 | 0 | | | |
| • Ovarian cysts | 620.0-620.2 | 0 | | | |
| • Female genital pain/bleeding | 625-626 | 0 | | | |
| Pregnancy and childbirth[1,2] | 630-676 | 0 | | | |
| Skin and subcutaneous tissue | 680-709 | 5 | 1.8 | 0.7 | 4.4 |
| Musculoskeletal | 710-739 | 2 | 1.2 | 0.3 | 5.0 |
| • Dorsopathies | 720-724 | 1 | 0.7 | 0.1 | 5.2 |
| Congenital anomalies[1] | 740-759 | 0 | | | |
| Certain perinatal conditions[1] | 760-779 | 0 | | | |
| Symptoms, signs, and ill-defined conditions | 780-799 | 0 | | | |
| Injury and poisoning | 800-999 | 52 | 20.4 | 15.3 | 27.2 |
| • Fractures, all sites | 800-829 | 4 | 1.8 | 0.7 | 4.9 |
| • Dislocations | 830-839 | 0 | | | |
| • Sprains and strains | 840-848 | 22 | 9.2 | 5.9 | 14.2 |
| • Intracranial injuries | 850-854 | 0 | | | |
| • Internal injuries | 860-869 | 0 | | | |
| • Open wounds | 870-897 | 13 | 4.7 | 2.6 | 8.4 |
| • Other injuries | 900-999 | 13 | 4.8 | 2.7 | 8.6 |
| Family history of health problems | V10-V19 | 0 | | | |
| Circumstances related to reproduction/development | V20-V28 | 0 | | | |
| Specific procedure/aftercare | V50-V59 | 0 | | | |
| **Total minus pregnancies** | | **64** | **25.0** | **19.3** | **32.4** |
| **TOTAL** | | **64** | **25.0** | **19.3** | **32.4** |

***Table 13. OSHA-Recordable Diseases and Injuries by Diagnostic Category - Males and Females***

† Includes all diagnoses resulting from an OSHA-recordable event.
* Standardized to age distribution of 1970 U.S. population.
[1] These diagnoses pertain to the worker, not to children born to workers.
[2] Only women age 18-45 years were included in the calculation of the rate for this diagnostic category.

***Table 14. OSHA-Recordable Diseases and Injuries by Diagnostic Category - Males***

| Category of Diagnoses | ICD9-CM Code | Number of Diagnoses† | Age-Adjusted Rate per 1,000* | Lower 95% Confidence Limit per 1,000 | Upper 95% Confidence Limit per 1,000 |
|---|---|---|---|---|---|
| Infections and parasitic diseases | 001-139 | 0 | | | |
| Malignant neoplasms | 140-208, 230-234 | 0 | | | |
| • Digestive organs | 150-159 | 0 | | | |
| • Respiratory system | 160-165 | 0 | | | |
| • Breast | 174-175 | 0 | | | |
| • Genitourinary | 179-185 | 0 | | | |
| • Nervous system | 191-192 | 0 | | | |
| • Leukemia, lymphoma | 200-208 | 0 | | | |
| Benign neoplasms and other | 210-229, 235-239 | 0 | | | |
| Endocrine and metabolic diseases | 240-279 | 0 | | | |
| Blood and blood-forming organs | 280-289 | 0 | | | |
| Mental disorders | 290-319 | 0 | | | |
| • Alcoholism | 303 | 0 | | | |
| • Drug abuse | 304-305 | 0 | | | |
| Nervous system and sense organs | 320-389 | 2 | 0.8 | 0.2 | 3.4 |
| Circulatory system | 390-459 | 0 | | | |
| • Hypertension | 401 | 0 | | | |
| • Acute myocardial infarction | 410 | 0 | | | |
| • Ischemic disease, not M.I. | 411-414, 429.2 | 0 | | | |
| • Cerebrovascular disease | 430-438 | 0 | | | |
| Respiratory system | 460-519 | 2 | 1.2 | 0.3 | 5.5 |
| • Upper respiratory | 460-465, 470-478 | 2 | 1.2 | 0.3 | 5.5 |
| • Pneumonia/bronchitis | 466, 480-487 | 0 | | | |
| • Chronic respiratory conditions | 490-496 | 0 | | | |
| Digestive system | 520-579 | 1 | 0.5 | 0.1 | 3.5 |
| • Hernias | 550-553 | 1 | 0.5 | 0.1 | 3.5 |
| • Gall bladder disease | 574-575 | 0 | | | |
| Genitourinary system | 580-629 | 0 | | | |
| • Benign prostatic hypertrophy | 600 | 0 | | | |
| • Endometriosis | 617 | NA | NA | NA | NA |
| • Ovarian cysts | 620.0-620.2 | NA | NA | NA | NA |
| • Female genital pain/bleeding | 625-626 | NA | NA | NA | NA |
| Pregnancy and childbirth[1] | 630-676 | NA | NA | NA | NA |
| Skin and subcutaneous tissue | 680-709 | 1 | 0.5 | 0.1 | 3.5 |
| Musculoskeletal | 710-739 | 1 | 0.9 | 0.1 | 6.1 |
| • Dorsopathies | 720-724 | 0 | | | |
| Congenital anomalies[1] | 740-759 | 0 | | | |
| Certain perinatal conditions[1] | 760-779 | 0 | | | |
| Symptoms, signs, and ill-defined conditions | 780-799 | 0 | | | |
| Injury and poisoning | 800-999 | 35 | 20.9 | 14.8 | 29.7 |
| • Fractures, all sites | 800-829 | 2 | 1.4 | 0.3 | 5.7 |
| • Dislocations | 830-839 | 0 | | | |
| • Sprains and strains | 840-848 | 14 | 8.7 | 5.1 | 15.0 |
| • Intracranial injuries | 850-854 | 0 | | | |
| • Internal injuries | 860-869 | 0 | | | |
| • Open wounds | 870-897 | 11 | 6.0 | 3.2 | 11.2 |
| • Other injuries | 900-999 | 8 | 4.9 | 2.4 | 10.2 |
| Family history of health problems | V10-V19 | 0 | | | |
| Circumstances related to reproduction/development | V20-V28 | 0 | | | |
| Specific procedure/aftercare | V50-V59 | 0 | | | |
| **TOTAL** | | **42** | **24.8** | **18.1** | **34.1** |

† Includes all diagnoses resulting from an OSHA-recordable event.
* Standardized to age distribution of 1970 U.S. population.
[1] These diagnoses pertain to the worker, not to children born to workers.

***Table 15. OSHA-Recordable Diseases and Injuries by Diagnostic Category - Females***

| Category of Diagnoses | ICD9-CM Code | Number of Diagnoses† | Age-Adjusted Rate per 1,000* | Lower 95% Confidence Limit per 1,000 | Upper 95% Confidence Limit per 1,000 |
|---|---|---|---|---|---|
| Infections and parasitic diseases | 001-139 | 0 | | | |
| Malignant neoplasms | 140-208, 230-234 | 0 | | | |
| • Digestive organs | 150-159 | 0 | | | |
| • Respiratory system | 160-165 | 0 | | | |
| • Breast | 174-175 | 0 | | | |
| • Genitourinary | 179-185 | 0 | | | |
| • Nervous system | 191-192 | 0 | | | |
| • Leukemia, lymphoma | 200-208 | 0 | | | |
| Benign neoplasms and other | 210-229, 235-239 | 0 | | | |
| Endocrine and metabolic diseases | 240-279 | 0 | | | |
| Blood and blood-forming organs | 280-289 | 0 | | | |
| Mental disorders | 290-319 | 0 | | | |
| • Alcoholism | 303 | 0 | | | |
| • Drug abuse | 304-305 | 0 | | | |
| Nervous system and sense organs | 320-389 | 0 | | | |
| Circulatory system | 390-459 | 0 | | | |
| • Hypertension | 401 | 0 | | | |
| • Acute myocardial infarction | 410 | 0 | | | |
| • Ischemic disease, not M.I. | 411-414, 429.2 | 0 | | | |
| • Cerebrovascular disease | 430-438 | 0 | | | |
| Respiratory system | 460-519 | 0 | | | |
| • Upper respiratory | 460-465, 470-478 | 0 | | | |
| • Pneumonia/bronchitis | 466, 480-487 | 0 | | | |
| • Chronic respiratory conditions | 490-496 | 0 | | | |
| Digestive system | 520-579 | 0 | | | |
| • Hernias | 550-553 | 0 | | | |
| • Gall bladder disease | 574-575 | 0 | | | |
| Genitourinary system | 580-629 | 0 | | | |
| • Benign prostatic hypertrophy | 600 | NA | NA | NA | NA |
| • Endometriosis | 617 | 0 | | | |
| • Ovarian cysts | 620.0-620.2 | 0 | | | |
| • Female genital pain/bleeding | 625-626 | 0 | | | |
| Pregnancy and childbirth[1,2] | 630-676 | 0 | | | |
| Skin and subcutaneous tissue | 680-709 | 4 | 3.5 | 1.3 | 9.4 |
| Musculoskeletal | 710-739 | 1 | 7.4 | 1.0 | 52.4 |
| • Dorsopathies | 720-724 | 1 | 7.4 | 1.0 | 52.4 |
| Congenital anomalies[1] | 740-759 | 0 | | | |
| Certain perinatal conditions[1] | 760-779 | 0 | | | |
| Symptoms, signs, and ill-defined conditions | 780-799 | 0 | | | |
| Injury and poisoning | 800-999 | 17 | 24.4 | 12.1 | 49.1 |
| • Fractures, all sites | 800-829 | 2 | 3.7 | 0.8 | 16.7 |
| • Dislocations | 830-839 | 0 | | | |
| • Sprains and strains | 840-848 | 8 | 8.1 | 4.0 | 16.4 |
| • Intracranial injuries | 850-854 | 0 | | | |
| • Internal injuries | 860-869 | 0 | | | |
| • Open wounds | 870-897 | 2 | 8.1 | 1.4 | 48.6 |
| • Other injuries | 900-999 | 5 | 4.5 | 1.8 | 11.1 |
| Family history of health problems | V10-V19 | 0 | | | |
| Circumstances related to reproduction/development | V20-V28 | 0 | | | |
| Specific procedure/aftercare | V50-V59 | 0 | | | |
| **Total minus pregnancies** | | **22** | **35.3** | **18.6** | **67.0** |
| **TOTAL** | | **22** | **35.3** | **18.6** | **67.0** |

† Includes all diagnoses resulting from an OSHA-recordable event.
* Standardized to age distribution of 1970 U.S. population.
[1] These diagnoses pertain to the worker, not to children born to workers.
[2] Only women age 18-45 years were included in the calculation of the rate for this diagnostic category.

## OSHA-Recordable Diagnoses by Occupational Category, 1993

During 1993, the age-adjusted diagnosis rate for OSHA-recordable diagnoses was more than seven times higher for hourly workers than for salaried workers (75.6 versus 9.6 per 1,000 persons) (Table 16). Crafts and repair workers, who comprised 10% of the work force, had the highest diagnosis rate (85.9 per 1,000), with 20 diagnoses reported for 15 persons. The second highest diagnosis rate was among the nuclear specialty workers (71.3 per 1,000), with 15 diagnoses reported for 14 persons. "Other" hourly workers ranked third, with three diagnoses reported among three workers (66.8 per 1,000).

The diagnosis rate for workers in the category of engineers, scientists, and health care workers was substantially lower than for all other occupational categories (3.6 per 1,000 workers), with two diagnoses for two workers.

The diagnosis rate among men (Table 17) was more than ten times higher for hourly workers (67.2 per 1,000) than for salaried workers (6.5 per 1,000). The nuclear specialties workers had the highest rate (73.0 per 1,000), with 13 diagnoses reported for 12 men. Service workers ranked second (63.0 per 1,000), with six diagnoses reported among five men. Crafts and repair workers followed, with 12 diagnoses reported for 9 men (61.4 per 1,000). The lowest diagnosis rate for men was among the engineers, scientists, and health care workers (1.4 per 1,000), with one diagnosis for one man.

The diagnosis rate among women (Table 18) was more than four times higher for hourly workers (113.1 per 1,000) than for salaried workers (25.0 per 1,000).

The diagnosis rate for workers in the crafts and repair category (273.1 per 1,000) was the highest, with eight diagnoses reported among six women. "Other" hourly workers (66.2 per 1,000) ranked second, with one diagnosis reported for one worker. The third highest rate occurred in the category of nuclear specialties workers (56.7 per 1,000), with two diagnoses reported for two women. The lowest diagnosis rate was among the engineers, scientists, and health care workers (8.8 per 1,000), with one diagnosis reported for one woman.

*Table 16. OSHA Diagnoses by Occupational Category - Males and Females*

| | Occupational Category | Number of Workers* | Number of Diagnoses† | Age-Adjusted Rate per 1,000** | Lower 95% Confidence Limit per 1,000 | Upper 95% Confidence Limit per 1,000 |
|---|---|---|---|---|---|---|
| Salaried | Office Management and Administration | 835 | 8 | 10.8 | 4.5 | 25.9 |
| | Engineers, Scientists, and Health Care | 456 | 2 | 3.6 | 0.8 | 15.4 |
| | Technical Support | 443 | 9 | 20.8 | 10.1 | 42.9 |
| | Other Management and Administration | 261 | 0 | | | |
| | **Subtotal** | **1,995** | **19** | **9.6** | **5.8** | **15.9** |
| Hourly | Service | 114 | 7 | 52.0 | 24.2 | 111.5 |
| | Crafts and Repair | 262 | 20 | 85.9 | 53.8 | 137.1 |
| | Nuclear Specialties | 224 | 15 | 71.3 | 41.2 | 123.2 |
| | Other | 36 | 3 | 66.8 | 21.2 | 209.7 |
| | **Subtotal** | **636** | **45** | **75.6** | **55.4** | **103.1** |
| | **TOTAL** | **2,631** | **64** | **25.1** | **19.3** | **32.5** |

*Table 17. OSHA Diagnoses by Occupational Category - Males*

| | Occupational Category | Number of Workers* | Number of Diagnoses† | Age-Adjusted Rate per 1,000** | Lower 95% Confidence Limit per 1,000 | Upper 95% Confidence Limit per 1,000 |
|---|---|---|---|---|---|---|
| Salaried | Office Management and Administration | 319 | 0 | | | |
| | Engineers, Scientists, and Health Care | 378 | 1 | 1.4 | 0.2 | 10.3 |
| | Technical Support | 318 | 8 | 22.7 | 11.0 | 46.9 |
| | Other Management and Administration | 230 | 0 | | | |
| | **Subtotal** | **1,245** | **9** | **6.5** | **3.2** | 13.0 |
| Hourly | Service | 77 | 6 | 63.0 | 27.0 | 147.0 |
| | Crafts and Repair | 240 | 12 | 61.4 | 33.9 | 111.2 |
| | Nuclear Specialties | 198 | 13 | 73.0 | 40.7 | 131.1 |
| | Other | 26 | 2 | 55.4 | 13.9 | 221.6 |
| | **Subtotal** | **541** | **33** | **67.2** | **46.8** | **96.6** |
| | **TOTAL** | **1,786** | **42** | **24.9** | **18.1** | **34.2** |

*Table 18. OSHA Diagnoses by Occupational Category - Females*

| | Occupational Category | Number of Workers* | Number of Diagnoses† | Age-Adjusted Rate per 1,000** | Lower 95% Confidence Limit per 1,000 | Upper 95% Confidence Limit per 1,000 |
|---|---|---|---|---|---|---|
| Salaried | Office Management and Administration | 516 | 8 | 22.5 | 7.7 | 65.8 |
| | Engineers, Scientists, and Health Care | 78 | 1 | 8.8 | 1.2 | 62.4 |
| | Technical Support | 125 | 1 | 40.6 | 5.7 | 288.1 |
| | Other Management and Administration | 31 | 0 | | | |
| | **Subtotal** | **750** | **10** | **25.0** | **9.8** | **63.5** |
| Hourly | Service | 37 | 1 | 25.6 | 3.6 | 181.4 |
| | Crafts and Repair | 22 | 8 | 273.1 | 116.0 | 643.2 |
| | Nuclear Specialties | 26 | 2 | 56.7 | 14.2 | 226.9 |
| | Other | 10 | 1 | 66.2 | 9.3 | 469.8 |
| | **Subtotal** | **95** | **12** | **113.1** | **61.8** | **207.1** |
| | **TOTAL** | **845** | **22** | **35.3** | **18.6** | **67.1** |

* Five workers were excluded because pay status was not reported.
† Includes all diagnoses resulting from an OSHA-recordable event.
** Standardized to age distribution of 1970 U.S. population.

## Relative Risk for All OSHA-Recordable Diseases and Injuries by Occupation

In Table 19, the risk of one or more absences associated with all OSHA-recordable diagnoses for specific occupational categories is compared with all other occupational categories in the Fernald work force. The statistical methods used to compare the incidence of absences are the relative risk (RR) and the 95% confidence interval (explained on page 12).

Service workers (RR=2.7), crafts and repair workers (RR=3.4), nuclear specialties workers (RR=4.1), and "other" hourly workers (RR=5.1) had statistically significant, increased risks of an OSHA-recordable event in 1993. Office management and administrative workers (RR=0.1) and engineers, scientists, and health care workers (RR=0.2) had a statistically significant, decreased risk of an event.

## Relative Risk for Selected OSHA-Recordable Disease and Injury Categories by Occupation

Table 20 presents the relative risk of an OSHA-recordable event for the disease category of injury and poisoning among workers by each occupational category. Injury and poisoning was the only disease category with enough events to calculate relative risks. Service workers (RR=3.3), crafts and repair workers (RR=3.9), nuclear specialties workers (RR=4.2), and "other" hourly workers (RR=5.8) were significantly more likely to have at least one OSHA-recordable event during 1993 for injury and poisoning.

Office management and administrative personnel (RR=0.1) and engineers, scientists, and health care workers (RR=0.2) were significantly less likely to have an OSHA-recordable event during 1993 for injury and poisoning.

| Occupational Category | Person-Years[1] | Persons with at Least One Event* | Relative Risk** | Lower 95% Confidence Limit | Upper 95% Confidence Limit |
|---|---|---|---|---|---|
| Office Management and Administration | 835 | 4 | 0.1 | 0.03 | 0.4 |
| Engineers, Scientists, and Health Care | 456 | 2 | 0.2 | 0.05 | 0.7 |
| Technical Support | 443 | 9 | 1.0 | 0.5 | 2.1 |
| Other Management and Administration | 261 | 0 | | | |
| Service | 114 | 6 | 2.7 | 1.2 | 6.3 |
| Crafts and Repair | 262 | 15 | 3.4 | 1.9 | 6.2 |
| Nuclear Specialties | 224 | 14 | 4.1 | 2.2 | 7.7 |
| Other | 36 | 3 | 5.1 | 1.5 | 17.3 |
| **TOTAL** | **2,631** | **53** | | | |

***Table 19. All OSHA-Recordable Diseases and Injuries by Occupational Categories***

| Occupational Category | Person-Years[1] | Persons with at Least One Event* | Relative Risk** | Lower 95% Confidence Limit | Upper 95% Confidence Limit |
|---|---|---|---|---|---|
| Office Management and Administration | 835 | 4 | 0.1 | 0.04 | 0.5 |
| Engineers, Scientists, and Health Care | 456 | 2 | 0.2 | 0.1 | 0.9 |
| Technical Support | 443 | 4 | 0.5 | 0.2 | 1.3 |
| Other Management and Administration | 261 | 0 | | | |
| Service | 114 | 6 | 3.3 | 1.4 | 7.9 |
| Crafts and Repair | 262 | 14 | 3.9 | 2.1 | 7.3 |
| Nuclear Specialties | 224 | 12 | 4.2 | 2.1 | 8.2 |
| Other | 36 | 3 | 5.8 | 1.7 | 20.1 |
| **TOTAL** | **2,631** | **45** | | | |

***Table 20. Injuries and Poisoning***

* Persons with multiple absences during the time period were counted only once.
** Adjusted for age and gender – compared with all occupational categories.
[1] Five workers were excluded from this table because pay status was not reported.

## DIAGNOSTIC CATEGORIES

| Category of Diagnoses | ICD-9-CM Code | Types of Illness in Category |
|---|---|---|
| All conditions | 001-V82 | All reported health events. |
| Infectious and parasitic diseases | 001-139 | Diseases caused by bacteria, viruses, and parasites. |
| Malignant neoplasms | 140-208, 230-234 | All cancers, regardless of the part of the body affected. |
| Benign neoplasms and neoplasms of uncertain behavior and unspecified nature | 210-229, 235-239 | Tumors that are not cancerous or that do not exhibit clearly malignant behavior, regardless of the part of the body affected. |
| Endocrine, nutritional and metabolic diseases, and disorders of the immune system | 240-279 | Diseases and conditions affecting the hormone secreting glands and organs; nutritional disorders, such as vitamin deficiency; metabolic diseases, such as diabetes and gout; and problems affecting the antibody producing system. |
| Diseases of the blood and blood-forming organs | 280-289 | Includes anemia and hemophilia, but excludes leukemia. |
| Mental disorders | 290-319 | Psychiatric diagnoses, such as dementia, schizophrenia, depression, and anxiety disorders; alcoholism; drug dependence; and eating disorders, such as bulimia. |
| Diseases of the nervous system and sense organs | 320-389 | Diseases affecting the brain, spinal cord, and peripheral nerves. Examples include meningitis; encephalitis; hereditary diseases, such as Huntington's chorea; Alzheimer's and Parkinson's disease; epilepsy; multiple sclerosis; migraine; diseases of the eye, such as cataract and glaucoma; and diseases of the ear, such as conductive hearing loss and otitis. |
| Diseases of the circulatory system | 390-459 | Diseases involving the heart, arteries, veins, and lymphatic system. Examples include rheumatic fever, heart murmurs, heart attacks, angina, hardening of the arteries, varicose veins, hemorrhoids, and phlebitis. |
| Diseases of the respiratory system | 460-519 | Includes colds, sinusitis, laryngitis, pneumonia and influenza, chronic bronchitis, asthma, and emphysema. |
| 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 genitourinary system | 580-629 | Diseases affecting the kidneys, the prostrate and testes; benign breast diseases; infertility (male and female); pelvic inflammatory disease; diseases of the ovary; and menstrual disorders. |
| Complications of pregnancy, childbirth, and puerperium | 630-676 | Includes miscarriage; complications of pregnancy, such as hemorrhage; pregnancy-related high blood pressure; pre-eclampsia; premature labor or other complications of labor. |
| Diseases of the skin and subcutaneous tissue | 680-709 | Includes acne, cellulitis, sunburn, psoriasis, and seborrhea. |
| Diseases of the musculoskeletal system and connective tissue | 710-739 | Includes arthritis, systemic lupus erythematosus, ankylosing spondylitis, herniated intervertebral disc ("slipped disc"), lumbago, sciatica, rheumatism, tendinitis, and osteoporosis. |
| Congenital anomalies | 740-759 | Abnormal anatomical development present at birth. Includes spina bifida, cleft palate, harelip, and various chromosomal anomalies, such as Klinefelter's syndrome. |
| Certain conditions originating in the perinatal period | 760-779 | Conditions or diseases of the mother that can produce perinatal illness or death of the fetus or newborn. Examples include maternal high blood pressure, maternal malnutrition, ectopic pregnancy, and breech birth. Also includes other conditions originating in the perinatal period, such as fetal malnutrition or slow growth, injuries related to birth trauma, and perinatal jaundice. |
| Symptoms, signs, and ill-defined conditions | 780-799 | Symptoms, signs, abnormal results of laboratory or other tests, and conditions for which no specific diagnosis has been made. Examples include blackout, chills, dizziness, fatigue, pallor, abnormal weight loss, undiagnosed chest pain, and heartburn. |
| Injury and poisoning | 800-999 | Dislocation of joints; sprains and strains of joints and associated muscles; concussions; bruises; cuts; internal injuries due to crushing, puncture, tearing, or blunt impact; burns; blisters; poisoning; frostbite; heat stroke; 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 include injuries to muscle from overexertion or from stretching the muscle beyond its normal limit. Sprains include injuries involving tearing or overextending the ligaments of a joint. |
| Intracranial injuries excluding those with skull fractures | 850-854 | Includes concussions, internal bruises, and hemorrhages within the skull without a fracture of the bones of the skull. |
| Internal injuries of the chest, abdomen, and pelvis | 860-869 | Includes internal injuries to the chest, abdomen, and pelvis and the organs within these areas of the body that do not involve an open wound. |
| Open wounds | 870-897 | Includes animal bites, cuts, lacerations, punctures, and amputations, excluding the arteries and veins. |
| Other injuries and 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, heat stroke, electrocution, and altitude sickness. |
| Motor vehicle traffic accidents | E810-E819 | Includes accidents involving motor vehicles alone or with other motor vehicles, pedestrians, or vehicles operated by pedals. |
| Other accidents | E916-E928 | Includes accidents involving falling objects or machinery; accidents related to explosions; and those related to electrical current, radiation, hot or corrosive substances, noise, and overexertion. |
| 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 | Includes 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 | Includes 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. |

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

**Epidemiologic Surveillance** - The regular and systematic collection of data and interpretation of the distribution of illness, injury, and death in the DOE labor force over time.

**ICD-9-CM** - The ICD-9-CM (International Classification of Diseases-9th Revision-Clinical Modification) is based on the ICD-9 originally published by the World Health Organization and widely accepted as a standard for the coding of cause of death. The ICD-9-CM is required for the reporting of morbidity to all U.S. Public Health Service programs.

**Diagnoses Rate** - The number of new, reported health events observed among DOE workers per thousand DOE workers at risk during a given period of time.

The age-adjusted rate was calculated using the 1970 U.S. population. The age-adjusted rate represents the hypothetical rate that would have been observed if the 1993 group had the same age distribution as the 1970 U.S. population. The age-adjusted rate is used to compare populations that differ in age. The 1970 U.S. population was selected because it is the standard most used for published morbidity data.

The illness and injury absence rate is defined as an absence due to illness or injury of 5 or more consecutive work days, divided by the total number of workers. OSHA-recordable events may or may not involve an absence from work.

The 95% confidence interval is based on the normal approximation to the binomial distribution where the calculated illness and injury absence rate falls within the interval. The true rate lies within this interval 95% of the time.