Epidemiologic Surveillance

Annual Summary for

Brookhaven National Laboratory

Prepared by the Epidemiologic Surveillance Data Center, a joint program of the University of Washington and the Fred Hutchinson Cancer Research Center

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Introduction

Epidemiologic surveillance consists of regular and systematic collection, analysis, and interpretation of data on illness and injury in the U.S. Department of Energy (DOE) work force at participating sites. These tasks are carried out by the Epidemiologic Surveillance Data Center, which is located at the University of Washington. Using these data, disease and injury rates are calculated and adjusted for factors, such as age, that independently affect the risk of disease. These rates are then analyzed and may be compared with the disease experience of different groups within the DOE work force and with populations who do not work for DOE. Risk estimates are calculated, time trends determined, and analyses undertaken of any apparent disease clusters. The results of epidemiologic surveillance will be combined with those of medical surveillance and exposure surveillance to form an integrated approach to worker health protection.

In this annual report, the 1992 morbidity data for Brookhaven National Laboratory (BNL) are summarized and compared with morbidity data from 1990 (the first full year in which BNL participated in the surveillance system) and 1991. These analyses focus on absences of 21 or more consecutive days occurring among workers aged 16-69 years. A summary of deaths is given separately. Beginning in 1993, absences of 5 consecutive work days or more are reportable. These will be covered in 1993 quarterly and annual reports.

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 external medical records, pathology, or other laboratory reports.

Overview

Located at the center of Long Island, New York, BNL is one of the nation's leading scientific research laboratories. BNL was established in 1946 on the former site of Camp Upton and is operated by Associated Universities, Inc. (AUI), under contract with DOE. AUI is an independent corporation, governed by a board of trustees, whose members are affiliated with both national and international universities, research institutions, and industrial organizations.

BNL's initial mission, to carry out research on the peaceful aspects of nuclear science, has been considerably broadened to include basic and applied research in many different areas. BNL's primary objective has always been to gain a deeper understanding of the laws of nature—the necessary foundation for all technical advances. New knowledge is constantly sought in such fields as physics, chemistry, biology, mathematics, medicine, oceanography, atmospheric sciences, and energy technology.

Labor Force by Occupational Category, 1992

In 1992, there were 3,437 employees (aged 16-69) identified by BNL as participants in epidemiologic surveillance. This represented an increase of 190 (5.9%) from the beginning of 1991. Of these, 675 worked in administration, 1,385 were professional staff, 775 worked as technicians, 231 held service jobs, 296 were in crafts or manual labor, and 65 were in nuclear trades. The composition of the work force in terms of salaried and hourly categories is given in Table 1.

Table 1. Labor Force by Occupational Category

	Occupational Category	Number 1992	Number 1991	% Change from Last Year
White Collar	Administration	675	637	6.0
	Salaried	269	243	10.7
	Hourly	402	374	7.5
	Unknown	4	20	-80.0
	Professional	1,385	1,304	6.2
	Salaried	1,307	1,225	6.7
	Hourly	73	72	1.4
	Unknown	5	7	-28.6
	Technical	775	726	6.7
	Salaried	281	289	-2.8
	Hourly	489	435	12.4
	Unknown	5	2	150.0
	Subtotal	**2,835**	**2,667**	**6.3**
Blue Collar	Service	231	211	9.5
	Salaried	32	33	-3.0
	Hourly	197	174	13.2
	Unknown	2	4	-50.0
	Craftsmen and Manual Laborers	296	307	-3.6
	Salaried	31	35	-11.4
	Hourly	265	272	-2.6
	Unknown	0	0	0.0
	Nuclear	65	60	8.3
	Salaried	26	26	0.0
	Hourly	39	33	18.2
	Unknown	0	1	-100.0
	Other	10	2	400.0
	Salaried	0	0	0.0
	Hourly	1	0	N/C
	Unknown	9	2	350.0
	Subtotal	**602**	**580**	**3.8**
	Total Number of Employees	**3,437**	**3,247**	**5.9**

Absences Among Work Force, 1990–1992

Absences per Person, 1992

During 1992, 125 persons, or 3.6% of BNL's work force, were absent for 21 or more continuous days because of illness or injury. Nine of these workers had an additional absence resulting in 134 total absences (Table 2A).

Table 2A. Absences per Person

	Employee Categories	Number of Workers	Number of Absences (%)			Total Persons Absent at Least Once	Total Number of Absences
			0	1	2		
1992	Male	2,650	2,562 (96.7)	81 (3.0)	7 (0.3)	88	95
	Female	787	750 (95.3)	35 (4.4)	2 (0.3)	37	39
	TOTAL	**3,437**	**3,312 (96.4)**	**116 (3.4)**	**9 (0.2)**	**125**	**134**

Diagnoses per Absence, 1992

Two or more diagnoses were reported for 18% (24/134) of the absences. There was a similar number of diagnoses per absence noted for males and females. As shown in Table 2B, a total of 170 diagnoses were reported to the Epidemiologic Surveillance Data Center in 1992.

Table 2B. Diagnoses per Absence

	Employee Categories	Number of Diagnoses per Absence					Total Number of Absences	Total Number of Diagnoses
		1	2	3	4	5		
1992	Male	78	14	1	1	1	95	118
	Female	32	3	2	2	0	39	52
	TOTAL	**110**	**17**	**3**	**3**	**1**	**134**	**170**

Rate of Diagnoses, 1990-1992

These 170 diagnoses noted for absences of 21 or more days in 1992 yielded an age-adjusted diagnosis rate of 46.9/1,000 workers per year (Table 2C). The downward trend in rates from a high of 60.5 in 1990 to 53.8 in 1991 continued through 1992. Most of the reduction occurred among females, whose age-adjusted rates fell from 83.9/1,000 in 1990 to 59.7 in 1991 and 58.7 in 1992. Absences among females associated with pregnancies are included in these data.

Table 2C. Rate of Diagnoses

	Employee Categories	Number of Workers	Number of Diagnoses*	Crude Rate per 1,000*	Age-Adjusted Rate per 1,000**	Lower 95% Confidence Limit	Upper 95% Confidence Limit
1990	Male	2,497	149	59.7	49.0	41.4	58.1
	Female	710	62	87.3	83.9	63.8	110.4
	TOTAL	**3,207**	**211**	**65.8**	**60.5**	**52.1**	**70.2**
1991	Male	2,507	143	57.0	50.8	41.9	61.5
	Female	740	45	60.8	59.7	43.4	82.2
	TOTAL	**3,247**	**188**	**57.9**	**53.8**	**45.8**	**63.3**
1992	Male	2,650	118	44.5	42.6	34.3	53.0
	Female	787	52	66.1	58.7	43.8	78.7
	TOTAL	**3,437**	**170**	**49.5**	**46.9**	**39.5**	**55.7**

*All diagnoses reported with an absence of 21 or more days, including absences for pregnancy and delivery.
**Standardized to age distribution of 1970 U.S. population.

Diseases and Injuries by Diagnostic Category, 1992 and 1990–1991

A breakdown of the age-adjusted rates by diagnostic category for males and females together as well as for each gender separately are given in Tables 3, 4, and 5. Table 6 describes diagnoses associated with pregnancy, delivery, and conditions of the newborn.

As Table 3 shows, the most common diagnostic category during 1992, accounting for 46 absences, was external causes of injury; the age-adjusted rate was 13.7/1,000. Accidental falls accounted for 11 of these absences and transport accidents accounted for 6. The diagnosis rate for injuries during 1992 was essentially unchanged from the average of 1990-1991 and was similar for men and women (Tables 4 and 5). The age-adjusted rate for men was 14.9/1,000 and 10.1/1,000 for women in 1992.

The rate of the second most common diagnosis, diseases of the circulatory system, was down from an average rate of 11.7/1,000 during 1990-1991 to 7.4/1,000 in 1992. There were 30 absences in this category in 1992; the age-adjusted rate for men was 7.7/1,000 and 6.4/1,000 for women.

Pregnancy and childbirth was the third most common diagnosis for 1992. There were 22 absences resulting in an age-adjusted rate of 6.5/1,000, up from 4.9/1,000 in 1990-1991.

The fourth most common diagnosis group associated with an absence of 21 days or longer was disorders of the musculoskeletal system, which was noted for 18 absences. The rate in 1992, 4.9/1,000, was similar to the previous 2 years. The rate among men was slightly higher than among women, 5.3/1,000 compared with 3.8/1,000.

Two 21-day absences associated with malignancies were noted in 1992; the age-adjusted rate was 0.5/1,000. This was significantly less than the average age-adjusted rate of 8.5/1,000 during the previous years. This may be due to random fluctuation, a true decrease in absences due to malignancies, or under-reporting to the Occupational Medicine Department. One malignancy of the digestive system and one breast cancer were reported.

The diagnosis rate of mental disorders, including alcoholism and drug abuse, was significantly lower during 1992 (0.7/1,000) than the previous 2 years (3.3/1,000).

Diagnoses of respiratory system problems, primarily chronic conditions and pneumonia or bronchitis, occurred at a slightly higher rate during 1992 (2.1/1,000) than the average rate during 1990-1991 (1.4/1,000). There was suggestive evidence that the rate among females (5.6/1,000) was higher than among males (1.2/1,000).

All ten absences due to diseases of the digestive system (primarily hernias and gall bladder disease) were among men.

Table 3. Diseases and Injuries by Diagnostic Category: Males and Females

		1992				Yearly Average 1990-1991			
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	Average Number of Diagnoses	Age-Adjusted Rate per 1,000*	Lower 95% Confidence Limit per 1,000	Upper 95% Confidence Limit per 1,000
Infections & parasitic diseases	001-139	4	1.5	0.5	4.9	7.0	1.7	1.0	2.9
Malignant neoplasms	140-208, 230-234	2	0.5	0.1	1.9	8.5	2.2	1.4	3.5
Digestive organs	150-159	1	0.2	0.0	1.7	2.0	0.5	0.2	1.4
Respiratory system	160-165	0	0.0	0.0	0.0	1.0	0.3	0.1	1.0
Breast	174-175	1	0.2	0.0	1.7	1.0	0.3	0.1	1.0
Genitourinary	179-185	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Nervous system	191-192	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Leukemia, lymphoma	200-208	0	0.0	0.0	0.0	1.0	0.2	0.1	1.0
Benign neoplasms & other	210-229, 235-239	1	0.2	0.0	1.5	4.5	1.1	0.6	2.1
Endocrine & metabolic diseases	240-279	6	1.4	0.6	3.1	8.5	2.2	1.4	3.5
Blood & blood-forming organs	280-289	1	0.2	0.0	1.7	2.0	0.5	0.2	1.4
Mental disorders	290-319	3	0.7	0.2	2.1	10.5	3.3	2.0	5.4
Alcoholism	303	2	0.5	0.1	1.8	3.5	1.2	0.5	2.9
Drug abuse	304-305	0	0.0	0.0	0.0	0.5	0.1	0.0	0.8
Nervous system & sense organs	320-389	3	0.7	0.2	2.3	2.5	0.7	0.3	1.6
Circulatory system	390-459	30	7.4	5.1	10.5	45.5	11.7	9.6	14.4
Acute myocardial infarction	410	5	1.2	0.5	3.0	7.0	1.8	1.1	3.0
Ischemic disease, not M.I.	411-414	9	2.2	1.1	4.2	15.5	4.0	2.8	5.7
Cerebrovascular disease	430-438	1	0.3	0.0	1.8	3.0	0.8	0.3	1.7
Respiratory system	460-519	9	2.1	1.1	4.1	5.5	1.4	0.8	2.6
Upper respiratory	460-465, 470-478	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pneumonia/bronchitis	466, 480-487	4	0.9	0.3	2.4	3.0	0.8	0.3	1.7
Chronic respiratory conditions	490-496	5	1.2	0.5	3.0	1.0	0.3	0.1	1.1
Digestive system	520-579	10	3.5	1.7	7.4	17.0	4.6	3.2	6.7
Hernias	550-553	2	0.5	0.1	1.8	5.5	1.4	0.8	2.5
Gall bladder disease	574-575	3	0.7	0.2	2.2	6.0	1.5	0.9	2.7
Genitourinary system	580-629	4	0.9	0.3	2.4	11.0	2.9	1.9	4.4
Benign prostatic hypertrophy	600	0	0.0	0.0	0.0	3.0	0.9	0.4	1.9
Endometriosis	617	0	0.0	0.0	0.0	2.0	0.5	0.2	1.3
Ovarian cysts	620.0-620.2	1	0.2	0.0	1.5	1.0	0.2	0.1	1.0
Female genital pain/bleeding	625-626	0	0.0	0.0	0.0	0.5	0.1	0.0	0.9
Pregnancy & childbirth	630-676	22	6.5	3.9	10.9	11.5	4.9	3.0	8.1
Skin & subcutaneous tissue	680-709	1	0.2	0.0	1.7	1.0	0.3	0.1	1.1
Musculoskeletal system	710-739	18	4.9	3.0	8.3	16.0	4.0	2.9	5.7
Dorsopathies	720-724	6	1.4	0.6	3.1	5.5	1.4	0.8	2.6
Congenital anomalies**	740-759	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Conditions in perinatal period**	760-779	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Symptoms, signs & ill-defined cond.	780-799	10	2.3	1.2	4.3	6.5	2.0	1.1	3.7
External causes of injury	E800-999	46	13.7	9.7	19.2	42.0	13.5	10.5	17.4
Transport accidents	E800-849	6	2.5	0.9	6.6	9.0	3.1	1.8	5.5
Medical accidents	E870-879	0	0.0	0.0	0.0	0.5	0.1	0.0	0.9
Accidental falls	E880-888	11	3.2	1.6	6.3	6.5	1.9	1.0	3.6
Accidents-struck by objects	E916-918	3	0.7	0.2	2.3	2.0	0.5	0.2	1.3
Accidents-machinery	E919	0	0.0	0.0	0.0	1.0	0.3	0.1	1.1
Total minus pregnancies		**148**	**40.4**	**33.7**	**48.4**	**188.0**	**52.2**	**46.8**	**58.3**
TOTAL		**170**	**46.9**	**39.5**	**55.7**	**199.5**	**57.1**	**51.2**	**63.7**

Includes all diagnoses reported with an absence of 21 or more days.
*Standardized to age distribution of 1970 U.S. population.
** Occurring in infants born to female employees.

Table 4. Diseases and Injuries by Diagnostic Category: Males

Category of Diagnoses	ICD9-CM Code	1992				Yearly Average 1990-1991			
		Number of Diagnoses	Age-Adjusted Rate per 1,000*	Lower 95% Confidence Limit per 1,000	Upper 95% Confidence Limit per 1,000	Average Number of Diagnoses	Age-Adjusted Rate per 1,000*	Lower 95% Confidence Limit per 1,000	Upper 95% Confidence Limit per 1,000
Infections & parasitic diseases	001-139	3	1.9	0.5	7.6	6.5	2.0	1.2	3.5
Malignant neoplasms	140-208, 230-234	1	0.3	0.0	2.3	6.5	2.0	1.2	3.4
Digestive organs	150-159	1	0.3	0.0	2.3	2.0	0.6	0.2	1.6
Respiratory system	160-165	0	0.0	0.0	0.0	1.0	0.3	0.1	1.2
Breast	174-175	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Genitourinary	179-185	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Nervous system	191-192	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Leukemia, lymphoma	200-208	0	0.0	0.0	0.0	0.5	0.2	0.0	1.1
Benign neoplasms & other	210-229, 235-239	0	0.0	0.0	0.0	1.0	0.3	0.1	1.2
Endocrine & metabolic diseases	240-279	4	1.2	0.4	3.1	7.0	2.2	1.3	3.7
Blood & blood-forming organs	280-289	1	0.3	0.0	2.0	2.0	0.6	0.2	1.7
Mental disorders	290-319	2	0.6	0.1	2.3	7.0	2.7	1.5	5.1
Alcoholism	303	2	0.6	0.1	2.3	3.5	1.6	0.6	4.1
Drug abuse	304-305	0	0.0	0.0	0.0	0.5	0.2	0.0	1.1
Nervous system & sense organs	320-389	2	0.6	0.1	2.3	2.0	0.6	0.2	1.7
Circulatory system	390-459	26	7.7	5.2	11.3	40.0	12.4	10.0	15.4
Acute myocardial infarction	410	5	1.5	0.6	3.5	6.0	1.9	1.1	3.3
Ischemic disease, not M.I.	411-414	9	2.7	1.4	5.2	15.0	4.6	3.2	6.6
Cerebrovascular disease	430-438	1	0.3	0.0	2.1	1.5	0.4	0.1	1.4
Respiratory system	460-519	4	1.2	0.4	3.1	3.5	1.1	0.5	2.3
Upper respiratory	460-465, 470-478	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pneumonia/bronchitis	466, 480-487	1	0.3	0.0	2.0	1.0	0.3	0.1	1.2
Chronic respiratory conditions	490-496	3	0.9	0.3	2.7	1.0	0.3	0.1	1.3
Digestive system	520-579	10	4.9	2.2	10.7	13.0	4.1	2.8	6.0
Hernias	550-553	2	0.6	0.2	2.4	5.5	1.7	0.9	3.1
Gall bladder disease	574-575	3	0.9	0.3	2.7	4.0	1.3	0.6	2.5
Genitourinary system	580-629	3	0.9	0.3	2.8	6.0	2.0	1.1	3.5
Benign prostatic hypertrophy	600	0	0.0	0.0	0.0	3.0	1.0	0.4	2.2
Endometriosis	617	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ovarian cysts	620.0-620.2	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Female genital pain/bleeding	625-626	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pregnancy & childbirth	630-676	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Skin & subcutaneous tissue	680-709	1	0.3	0.0	2.0	1.0	0.3	0.1	1.3
Musculoskeletal system	710-739	15	5.3	2.9	9.9	13.0	4.1	2.8	6.0
Dorsopathies	720-724	4	1.2	0.4	3.1	4.5	1.4	0.8	2.8
Congenital anomalies	740-759	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Conditions in perinatal period	760-779	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Symptoms, signs & ill-defined cond.	780-799	9	2.8	1.4	5.3	4.5	1.9	0.8	4.3
External causes of injury	E800-999	37	14.9	10.0	22.3	33.0	13.3	9.9	17.9
Transport accidents	E800-849	4	2.1	0.6	7.4	5.0	1.6	0.8	2.9
Medical accidents	E870-879	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Accidental falls	E880-888	9	3.7	1.6	8.3	6.0	2.4	1.2	4.8
Accidents-struck by objects	E916-918	3	0.9	0.3	2.8	2.0	0.6	0.2	1.6
Accidents-machinery	E919	0	0.0	0.0	0.0	1.0	0.3	0.1	1.3
Total minus pregnancies		**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**
TOTAL		**118**	**42.6**	**34.3**	**53.0**	**146.0**	**49.8**	**43.8**	**56.5**

Includes all diagnoses reported with an absence of 21 or more days.
*Standardized to age distribution of 1970 U.S. population.

Table 5. Diseases and Injuries by Diagnostic Category: Females

		1992				Yearly Average 1990-1991			
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	Average Number of Diagnoses	Age-Adjusted Rate per 1,000*	Lower 95% Confidence Limit per 1,000	Upper 95% Confidence Limit per 1,000
Infections & parasitic diseases	001-139	1	0.9	0.1	6.5	0.5	1.1	0.2	7.9
Malignant neoplasms	140-208, 230-234	1	0.9	0.1	6.5	2.0	2.9	1.1	7.9
Digestive organs	150-159	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Respiratory system	160-165	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Breast	174-175	1	0.9	0.1	6.5	1.0	1.6	0.4	6.5
Genitourinary	179-185	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Nervous system	191-192	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Leukemia, lymphoma	200-208	0	0.0	0.0	0.0	0.5	0.8	0.1	5.8
Benign neoplasms & other	210-229, 235-239	1	0.9	0.1	6.2	3.5	3.4	1.6	7.2
Endocrine & metabolic diseases	240-279	2	2.3	0.6	9.8	1.5	1.5	0.5	4.6
Blood & blood-forming organs	280-289	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mental disorders	290-319	1	0.9	0.1	6.5	3.5	4.9	2.2	11.0
Alcoholism	303	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Drug abuse	304-305	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Nervous system & sense organs	320-389	1	1.5	0.2	10.4	0.5	0.5	0.1	3.2
Circulatory system	390-459	4	6.4	2.4	17.2	5.5	7.6	4.0	14.4
Acute myocardial infarction	410	0	0.0	0.0	0.0	1.0	1.0	0.2	4.0
Ischemic disease, not M.I.	411-414	0	0.0	0.0	0.0	0.5	0.5	0.1	3.5
Cerebrovascular disease	430-438	0	0.0	0.0	0.0	1.5	2.4	0.7	7.9
Respiratory system	460-519	5	5.6	2.3	13.9	2.0	2.9	1.0	8.2
Upper respiratory	460-465, 470-478	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pneumonia/bronchitis	466, 480-487	3	3.3	1.0	10.5	2.0	2.9	1.0	8.2
Chronic respiratory conditions	490-496	2	2.4	0.6	9.9	0.0	0.0	0.0	0.0
Digestive system	520-579	0	0.0	0.0	0.0	4.0	5.1	2.4	11.0
Hernias	550-553	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gall bladder disease	574-575	0	0.0	0.0	0.0	2.0	2.0	0.7	5.3
Genitourinary system	580-629	1	0.9	0.1	6.2	5.0	4.9	2.6	9.1
Benign prostatic hypertrophy	600	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Endometriosis	617	0	0.0	0.0	0.0	2.0	1.9	0.7	5.2
Ovarian cysts	620.0-620.2	1	0.9	0.1	6.2	1.0	1.0	0.2	4.0
Female genital pain/bleeding	625-626	0	0.0	0.0	0.0	0.5	0.5	0.1	3.5
Pregnancy & childbirth	630-676	22	23.7	14.9	37.6	11.5	16.7	10.4	26.8
Skin & subcutaneous tissue	680-709	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Musculoskeletal system	710-739	3	3.8	1.1	12.8	3.0	3.6	1.6	8.2
Dorsopathies	720-724	2	1.8	0.4	7.2	1.0	1.0	0.2	4.0
Congenital anomalies**	740-759	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Conditions in perinatal period**	760-779	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Symptoms, signs & ill-defined cond.	780-799	1	0.9	0.1	6.2	2.0	3.5	1.2	9.7
External causes of injury	E800-999	9	10.1	5.0	20.4	9.0	13.3	8.0	22.2
Transport accidents	E800-849	2	3.2	0.7	14.8	4.0	6.4	2.9	14.0
Medical accidents	E870-879	0	0.0	0.0	0.0	0.5	0.5	0.1	3.5
Accidental falls	E880-888	2	2.3	0.6	9.8	0.5	0.5	0.1	3.5
Accidents-struck by objects	E916-918	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Accidents-machinery	E919	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total minus pregnancies		**30**	**35.0**	**24.0**	**51.2**	**42.0**	**55.3**	**43.9**	**69.7**
TOTAL		**52**	**58.7**	**43.8**	**78.7**	**53.5**	**72.0**	**58.4**	**88.7**

Includes all diagnoses reported with an absence of 21 or more days.
*Standardized to age distribution of 1970 U.S. population.
**Occurring in infants born to female employees.

Twenty-two diagnoses associated with pregnancy and childbirth were reported during 1992, compared with an average of 11.5 during each of the previous 2 years (Table 6). For 15 of these diagnoses, a complication of labor, delivery, or the puerperium was noted. Eight of these complications were cesarean sections. There were no absences associated with conditions of newborns born to female employees.

Although the complications rate for 1992 was almost twice that for 1990-1991, the differences were not large enough to conclude that the 1992 rate is statistically different.

Table 6. Diagnoses Associated with Pregnancy, Delivery, and Conditions of Newborn

			1992				Yearly Average 1990-1991			
	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	Average Number of Diagnoses	Age-Adjusted Rate per 1,000*	Lower 95% Confidence Limit per 1,000	Upper 95% Confidence Limit per 1,000
Employee	Complications of pregnancy	630-648	6	5.3	2.4	11.7	3.5	4.1	1.8	9.5
	Normal delivery	650	1	0.9	0.1	6.2	3.0	3.6	1.4	9.0
	Complications of labor/delivery/puerperium	651-676	15	17.6	10.0	30.9	5.0	9.0	4.5	18.0
Newborn	Congenital anomalies**	740-759	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Conditions in perinatal period**	760-779	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	TOTAL		**22**	**23.7**	**14.9**	**37.6**	**11.5**	**16.7**	**10.4**	**26.8**

Includes all diagnoses reported with an absence of 21 or more days.
*Standardized to age distribution of 1970 U.S. population.
Includes delivery by cesarean section.
**Occurring in newborns born to female employees.

Diagnoses by Occupational Category, 1992 and 1990–1991

During 1992 and the previous 2 years, the age-adjusted diagnosis rate among persons working in white collar fields was substantially lower than those in blue collar fields. Table 7 shows that the highest rates were among craftsmen and manual laborers (116.7/1,000) and service workers (115.5/1,000), whereas the lowest rate (20.9/1,000) was among professional workers. This pattern was evident among both males and females (Tables 8 and 9).

Table 7. Diagnoses by Occupational Category: Males and Females

		1992				Yearly Average 1990-1991			
	Occupational Category	Number of Diagnoses*	Age-Adjusted Rate per 1,000**	Lower 95% Confidence Limit	Upper 95% Confidence Limit	Average Number of Diagnoses*	Age-Adjusted Rate per 1,000**	Lower 95% Confidence Limit	Upper 95% Confidence Limit
White Collar	Administration	33	47.2	32.4	68.5	37.5	59.1	45.8	76.3
	Professional	30	20.9	13.3	32.8	32.5	19.3	15.1	24.6
	Technical	45	59.0	42.6	81.7	62.0	78.0	64.8	93.9
	Subtotal	**108**	**37.3**	**29.9**	**46.5**	**132.0**	**46.2**	**40.4**	**53.0**
Blue Collar	Service	26	115.5	74.6	178.6	27.5	130.3	98.4	172.5
	Craftsmen and Manual Laborers	34	116.7	68.0	200.4	39.5	102.2	77.7	134.4
	Nuclear	2	47.1	11.4	193.8	0.5	27.1	3.8	192.1
	Other	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Subtotal	**62**	**97.1**	**74.2**	**127.2**	**67.5**	**107.3**	**89.4**	**128.8**
	TOTAL	**170**	**46.9**	**39.5**	**55.7**	**199.5**	**57.1**	**51.2**	**63.7**

*Includes all diagnoses reported with an absence of 21 or more days, including absences for pregnancy and delivery.
**Standardized to age distribution of 1970 U.S. population.

Table 8. Diagnoses by Occupational Category: Males

		1992				Yearly Average 1990-1991			
	Occupational Category	Number of Diagnoses	Age-Adjusted Rate per 1,000*	Lower 95% Confidence Limit	Upper 95% Confidence Limit	Average Number of Diagnoses	Age-Adjusted Rate per 1,000*	Lower 95% Confidence Limit	Upper 95% Confidence Limit
White Collar	Administration	7	50.7	16.1	159.5	6.5	42.7	20.0	90.9
	Professional	16	9.8	6.0	16.1	27.5	18.2	14.0	23.7
	Technical	42	60.5	43.2	84.8	54.5	73.1	60.0	89.0
	Subtotal	**65**	**30.3**	**22.3**	**41.1**	**88.5**	**38.2**	**32.3**	**45.1**
Blue Collar	Service	17	107.3	64.6	178.3	17.5	107.5	76.0	152.1
	Craftsmen and Manual Laborers	34	117.5	68.6	201.2	39.5	103.2	78.3	136.0
	Nuclear	2	48.4	11.9	197.6	0.5	27.1	3.8	192.1
	Other	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Subtotal	**53**	**94.2**	**69.9**	**127.0**	**57.5**	**95.5**	**78.5**	**116.0**
	TOTAL	**118**	**42.6**	**34.3**	**53.0**	**146.0**	**49.8**	**43.8**	**56.5**

Includes all diagnoses reported with an absence of 21 or more days.
*Standardized to age distribution of 1970 U.S. population.

Table 9. Diagnoses by Occupational Category: Females

		1992				Yearly Average 1990-1991			
	Occupational Category	Number of Diagnoses*	Age-Adjusted Rate per 1,000**	Lower 95% Confidence Limit	Upper 95% Confidence Limit	Average Number of Diagnoses*	Age-Adjusted Rate per 1,000**	Lower 95% Confidence Limit	Upper 95% Confidence Limit
White Collar	Administration	26	52.6	35.0	79.1	31.0	69.1	52.5	91.1
	Professional	14	67.4	36.6	124.2	5.0	22.3	11.7	42.4
	Technical	3	26.5	8.6	82.3	7.5	137.0	78.1	240.2
	Subtotal	**43**	**54.3**	**39.2**	**75.2**	**43.5**	**62.7**	**49.7**	**79.1**
Blue Collar	Service	9	135.4	69.3	264.6	10.0	228.9	147.1	356.3
	Craftsmen and Manual Laborers	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Nuclear	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Other	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Subtotal	**9**	**122.9**	**63.4**	**238.2**	**10.0**	**188.3**	**121.1**	**292.8**
	TOTAL	**52**	**58.7**	**43.8**	**78.7**	**53.5**	**72.0**	**58.4**	**88.7**

*Includes all diagnoses reported with an absence of 21 or more days, including absences for pregnancy and delivery.
**Standardized to age distribution of 1970 U.S. population.

Deaths Among Active Workers, 1990–1992

During the first 3 years of participation in epidemiologic surveillance, 20 deaths were reported among active workers. Malignant neoplasms were noted for 12 of the workers. These occurred at the following sites: gastrointestinal system - 5; respiratory system - 1; breast - 2; prostate - 1; lymphoma - 1; and unknown - 2. Cardiovascular disease, including myocardial infarction, was mentioned on eight reports, three of which also noted malignancies.

Relative Risk for Selected Disease Categories by Occupation

In Tables 10A through 10J, the risk of at least one absence associated with selected diagnoses categories for specific occupational groups are compared with that for the entire work force. This comparison 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 in a diagnoses category during the 3-year time period. This was done to minimize the problem associated with one person having multiple absences for the same condition. Multiple absences for the same diagnoses category were counted only once in these analyses.

The statistical methods used to compare rates of absence are the relative risk and the 95% confidence interval. The relative risk is the rate of an absence in one group divided by the rate in another group. A relative risk of *1.0* indicates that both groups have the same risk of absence. A relative risk of *2.0* indicates that a group has twice the risk of the comparison group, whereas a relative risk of *0.5* implies that a group has one-half the risk of the comparison group. The confidence interval represents the range of values for the relative risk that are consistent with the observed data. A 95% confidence interval implies that there is a 95% chance that the true relative risk lies within the interval. If the confidence interval includes the value *1.0,* then the observed difference in absence rates is likely to have occurred by chance; in other words, the relative risk is not statistically significant. For example, a relative risk with a confidence interval of *0.8 to 4.4* would not be considered statistically significantly different from a relative risk of *1.0,* whereas a relative risk with an interval of *1.7 to 4.2* is statistically significant.

Relative to the entire BNL work force, persons classified as working in service occupations were found to have significantly elevated risk of absence associated with infectious diseases (Table 10A), endocrine and metabolic diseases (Table 10C), diseases of the circulatory system (Table 10E), diseases of the respiratory system (Table 10F), and injuries (Tables 10A, C, E, F, and J). Similarly, persons working in crafts and as manual laborers were at increased risk for absences associated with diseases of the circulatory system, genitourinary system, musculoskeletal system, and for external causes of injury (Tables 10E, H, I, and J). The reason(s) for these patterns of elevated risk cannot be deduced from these statistics. They may be real; they may be an artifact of more complete reporting of absences for service workers, crafts workers, and other blue collar occupational groups; or they may be due to the broad range of diseases within each diagnostic category.

Technical workers were approximately twice as likely to be absent for 21 or more days due to a mental disorder, although this was only of borderline statistical significance (Table 10D). They were also 50% more likely to have an absence associated with diseases of the circulatory system and twice as likely to have an absence due to digestive system problems (Tables 10E and G).

In contrast, professional workers were less likely than the BNL work force as a whole to experience an absence associated with any of the nine diagnostic categories examined. The statistically significant decreases in risk were for the circulatory system, the digestive system, the musculoskeletal system, and injuries (Tables 10E, G, I, and J).

Table 10A. Infections

Occupational Category	Person-Years	# Persons with at Least One Event*	Relative Risk**	Lower 95% Confidence Limit	Upper 95% Confidence Limit
Administration	1,910	4	1.7	0.5	5.7
Professional	3,973	2	0.3	0.1	1.3
Technical	2,245	3	0.7	0.2	2.6
Service	651	5	5.2	1.9	14.5
Craftsmen and Manual Laborers	907	2	1.1	0.3	5.1
Nuclear	169	0	0.0	0.0	0.0
TOTAL (Reference Group)	**9,855**	**16**	**1.0**		

Table 10B. Malignant Neoplasms

Occupational Category	Person-Years	# Persons with at Least One Event*	Relative Risk**	Lower 95% Confidence Limit	Upper 95% Confidence Limit
Administration	1,910	4	0.8	0.2	3.0
Professional	3,973	6	0.8	0.3	1.9
Technical	2,245	6	1.6	0.6	4.0
Service	651	0	0.0	0.0	0.0
Craftsmen and Manual Laborers	907	3	1.6	0.5	5.6
Nuclear	169	0	0.0	0.0	0.0
TOTAL (Reference Group)	**9,855**	**19**	**1.0**		

*Persons with multiple absences during time period counted only once.
**Adjusted for age and gender - compared with all occupational categories.

Table 10C. Endocrine and Metabolic Diseases

Occupational Category	Person-Years	# Persons with at Least One Event*	Relative Risk**	Lower 95% Confidence Limit	Upper 95% Confidence Limit
Administration	1,910	2	0.4	0.1	2.4
Professional	3,973	2	0.2	0.0	1.6
Technical	2,245	8	1.9	0.8	4.4
Service	651	4	4.2	1.4	12.2
Craftsmen and Manual Laborers	907	4	2.0	0.7	6.0
Nuclear	169	0	0.0	0.0	0.0
TOTAL (Reference Group)	**9,855**	**20**	**1.0**		

Table 10D. Mental Disorders

Occupational Category	Person-Years	# Persons with at Least One Event*	Relative Risk**	Lower 95% Confidence Limit	Upper 95% Confidence Limit
Administration	1,910	2	0.5	0.1	2.0
Professional	3,973	4	0.5	0.2	1.5
Technical	2,245	9	2.2	1.0	4.9
Service	651	2	1.5	0.3	6.3
Craftsmen and Manual Laborers	907	3	1.9	0.5	6.7
Nuclear	169	0	0.0	0.0	0.0
TOTAL (Reference Group)	**9,855**	**20**	**1.0**		

Table 10E. Diseases of Circulatory System

Occupational Category	Person-Years	# Persons with at Least One Event*	Relative Risk**	Lower 95% Confidence Limit	Upper 95% Confidence Limit
Administration	1,910	8	0.7	0.3	1.5
Professional	3,973	16	0.5	0.3	0.9
Technical	2,245	24	1.5	1.0	2.5
Service	651	7	2.1	1.7	4.6
Craftsmen and Manual Laborers	907	15	2.0	1.1	3.6
Nuclear	169	0	0.0	0.0	0.0
TOTAL (Reference Group)	**9,855**	**70**	**1.0**		

*Persons with multiple absences during time period counted only once.
**Adjusted for age and gender - compared with all occupational categories.

Table 10F. Diseases of Respiratory System

Occupational Category	Person-Years	# Persons with at Least One Event*	Relative Risk**	Lower 95% Confidence Limit	Upper 95% Confidence Limit
Administration	1,910	5	0.8	0.3	2.5
Professional	3,973	2	0.3	0.1	1.2
Technical	2,245	3	0.9	0.3	3.1
Service	651	6	6.1	2.4	15.4
Craftsmen and Manual Laborers	907	3	2.2	0.6	7.9
Nuclear	169	0	0.0	0.0	0.0
TOTAL (Reference Group)	**9,855**	**19**	**1.0**		

Table 10G. Diseases of Digestive System

Occupational Category	Person-Years	# Persons with at Least One Event*	Relative Risk**	Lower 95% Confidence Limit	Upper 95% Confidence Limit
Administration	1,910	5	0.7	0.2	2.1
Professional	3,973	5	0.3	0.1	0.8
Technical	2,245	17	2.1	1.2	3.7
Service	651	3	1.5	0.4	5.0
Craftsmen and Manual Laborers	907	7	1.8	0.8	4.1
Nuclear	169	0	0.0	0.0	0.0
TOTAL (Reference Group)	**9,855**	**37**	**1.0**		

Table 10H. Diseases of Genitourinary System

Occupational Category	Person-Years	# Persons with at Least One Event*	Relative Risk**	Lower 95% Confidence Limit	Upper 95% Confidence Limit
Administration	1,910	6	1.2	0.4	3.5
Professional	3,973	4	0.5	0.2	1.5
Technical	2,245	2	0.6	0.1	2.6
Service	651	1	1.2	0.2	9.4
Craftsmen and Manual Laborers	907	5	3.7	1.3	10.5
Nuclear	169	0	0.0	0.0	0.0
TOTAL (Reference Group)	**9,855**	**18**	**1.0**		

*Persons with multiple absences during time period counted only once.
**Adjusted for age and gender - compared with all occupational categories.

Table 10I. Diseases of Musculoskeletal System

Occupational Category	Person-Years	# Persons with at Least One Event*	Relative Risk**	Lower 95% Confidence Limit	Upper 95% Confidence Limit
Administration	1,910	9	1.2	0.5	2.7
Professional	3,973	7	0.4	0.2	0.8
Technical	2,245	11	1.1	0.6	2.2
Service	651	5	2.2	0.8	5.6
Craftsmen and Manual Laborers	907	9	2.0	1.7	4.2
Nuclear	169	2	3.3	0.8	13.4
TOTAL (Reference Group)	**9,855**	**43**	**1.0**		

Table 10J. External Causes of Injury

Occupational Category	Person-Years	# Persons with at Least One Event*	Relative Risk**	Lower 95% Confidence Limit	Upper 95% Confidence Limit
Administration	1,910	17	0.8	0.5	1.4
Professional	3,973	15	0.3	0.2	0.6
Technical	2,245	34	1.3	0.9	1.9
Service	651	20	2.6	1.6	4.2
Craftsmen and Manual Laborers	907	28	2.6	1.7	4.0
Nuclear	169	1	0.5	0.1	3.6
TOTAL (Reference Group)	**9,855**	**115**	**1.0**		

*Persons with multiple absences during time period counted only once.
**Adjusted for age and gender - compared with all occupational categories.

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 prostate, 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 orginating 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 (external)	E810-E819	Includes accidents involving motor vehicles alone or with other motor vehicles, pedestrians, or vehicles operated by pedals.
Other accidents (external)	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.

GLOSSARY

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.

STATISTICAL NOTE

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 1992 or 1990-1991 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 21 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.