

MMWR

MORBIDITY AND MORTALITY WEEKLY REPORT

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Workers' Memorial Day — April 28, 1998

April 28, 1998, has been designated Workers' Memorial Day to recognize persons who have died from occupational injuries or diseases and opportunities to prevent these deaths. During 1980–1994, a total of 88,622 workers in the United States died from work-related injuries; in 1992, costs of such injuries were an estimated \$145 billion (1). An estimated additional 60,000 workers died from occupational diseases.

Additional information about causes and prevention of work-related injury and disease is available from CDC's National Institute for Occupational Safety and Health (NIOSH), telephone (800) 356-4674; or on the World-Wide Web <http://www.cdc.gov/niosh/homepage.html>.

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Fatal Occupational Injuries — United States, 1980–1994

CDC's National Institute for Occupational Safety and Health (NIOSH) monitors occupational injury deaths through death certificates compiled for the National Traumatic Occupational Fatalities (NTOF) surveillance system* (1). Previous reports analyzed data from 1980–1989 (1–3). This report updates these estimates on the magnitude of work-related injury deaths for the United States from 1980 through 1994, the most recent year for which data are available from this system, and identifies high-risk industries and occupations at national and state-specific levels. The findings indicate that the annual total number of deaths and crude death rates decreased from 7405 (7.5 per 100,000 workers) in 1980 to 5406 (4.4 per 100,000 workers) in 1994.

National death rates were calculated using denominators from employment data from the Current Population Survey, a population-based household survey of the Bu-

*NTOF is based on death certificates compiled from 52 vital statistics reporting units in the United States. Inclusion criteria for death certificate submission to the NTOF database include 1) age ≥16 years; 2) external cause of death (*International Classification of Diseases, Ninth Revision*, codes E800–E999); and 3) "injury at work" designation.

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tional state-specific data and information about NTOF are available from NIOSH; telephone (800) 356-4674 or (513) 533-8328.

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Surveillance for Nonfatal Occupational Injuries Treated in Hospital Emergency Departments — United States, 1996

CDC's National Institute for Occupational Safety and Health (NIOSH) uses the National Electronic Injury Surveillance System (NEISS) for surveillance of nonfatal occupational injuries treated in hospital emergency departments (EDs).^{*} This report, based on 1996 NEISS data, is the first since 1983 (1) to provide updated national estimates of the magnitude and risk for nonfatal occupational injuries treated in EDs; the findings indicate that the workers at highest risk are young and male.

The Consumer Product Safety Commission (CPSC) developed NEISS to monitor injuries involving consumer products and to serve as a source for follow-up investigation of selected product-related injuries (2). Data are collected at 91 hospitals selected from a stratified probability sample of all hospitals in the United States and its territories. The sampling frame was stratified by hospital size (determined by the annual total of ED visits) and geographic region, and the final sample of 91 hospitals was then selected. NIOSH used 65 of the 91 hospitals to collect work-related injury data.[†] Each injury case in the sample was assigned a statistical weight based on the inverse of the hospital's probability of selection, and this weight was used to calculate national esti-

^{*}The National Electronic Injury Surveillance System (NEISS), which is maintained by the Consumer Product Safety Commission (CPSC), was first modified to collect data about work-related injuries in 1981 and was used for surveillance of work-related injuries treated in EDs until this use was discontinued in 1986. Since 1992, the NEISS program has been gradually reinstated. Beginning in October 1995, data were collected for all workers, regardless of age or industry, in 65 of the 91 hospitals that CPSC includes in the NEISS surveillance program.

[†]Collection of work-related data was limited to the 65 hospital subsample because of budgetary constraints.

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mates. Confidence intervals (CIs) were calculated using methods described in detail elsewhere (3).

A work-related case was defined as any injury sustained during performance of 1) work for compensation, 2) volunteer work for an organized group, or 3) a work task on a farm. The "Operational Guidelines for Determination of Injury at Work" were provided to hospital coders to assist in identifying work-related injuries (4). Unlike the CPSC consumer product data, the work-related data collected for NIOSH included all cases regardless of whether a consumer product was involved in the injury event.

Estimates of numbers of employed workers, used to calculate injury rates, were derived from the Current Population Survey (CPS) of the Bureau of Labor Statistics (BLS) (5), a national population-based household survey that includes approximately 60,000 households each month. For this report, injury rates or risk estimates were calculated using two different estimates of employment as denominators. The first method was based on numbers of workers, which were extracted directly from published BLS data; injury rates using these denominators are referred to as "employee-based" and are presented as numbers of injuries per 100 workers. The second approach was based on actual numbers of hours worked, and the corresponding rates are referred to as "hour-based." CPS monthly public use micro data files were used to generate the hour-based employment estimates, which were calculated by dividing the actual hours worked per week (as reported by the household respondent) by 40 hours, then multiplying by the weighted estimate of the number of working persons; these rates are presented as numbers of injuries per 100 full-time equivalents (FTEs). All injury rates presented in this report are crude rates. Ninety-five percent CIs and injury rate ratios were calculated from the hour-based rates. Injured persons aged ≤ 15 years were excluded from this analysis because employment data used to calculate rates were unavailable for this age group.

An estimated 3.3 million persons aged ≥ 16 years were treated for occupational injuries in EDs in the United States during 1996, yielding an average crude annual rate of 2.8 injuries per 100 FTEs (95% CI=2.2–3.3). Of those persons injured, 23.2% (765,762) were workers aged 16–24 years, 70.8% (2,337,412) were aged 25–54 years, and 6.0% (198,477) were aged ≥ 55 years. The rates were 3.3 per 100 FTEs for men (69% of total injuries) and 2.1 per 100 FTEs for women (31% of total injuries) (Table 1). Hour-based injury rates were higher than employee-based rates for women and for the youngest and oldest workers. The overall male:female rate ratio (based on the FTE employment estimates) was 1.6:1, but this ratio decreased with increasing age. The ratio was 1.5:1 for workers aged 16–17 years and 2.0 for workers aged 18–19 and 20–24 years, decreasing to 0.9:1 for workers aged 65–74 years and 0.7:1 for workers aged ≥ 75 years.

Persons aged 18–19 years had the highest injury rates for both men and women (Table 1). Excluding workers aged 16–17 years, injury rates decreased with increasing age. Men aged < 25 years had a significantly higher injury rate (6.7 per 100 FTEs; 95% CI=4.8–8.6) than all men (3.3 per 100 FTEs; 95% CI=2.6–4.0) and men aged ≥ 45 years had a significantly lower rate (1.7 per 100 FTEs; 95% CI=1.4–2.1). Women aged < 20 years had a significantly higher rate (4.2 per 100 FTEs; 95% CI=3.1–5.3) than all women (2.1 per 100 FTEs; 95% CI=1.7–2.5), and those aged 65–74 years had a significantly lower rate (1.2 per 100 FTEs; 95% CI=0.8–1.7).

Hands and fingers were the anatomic sites sustaining the most injuries (30%) (Table 2). Physician-diagnosed sprains and strains accounted for 27% of the injuries, fol-

TABLE 1. Estimated incidence of occupational injuries treated in hospital emergency departments, by sex and age group of worker — United States, 1996

Age group (yrs)	Male				Female				M:F RR [†]
	No.	R(e)*	R(h) [†]	(95% CI) [§]	No.	R(e)	R(h)	(95% CI)	
16–17	38,547	2.9	6.0**	4.1– 8.0	22,620	1.7	3.9**	2.8–5.0	1.5
18–19	124,266	6.2	8.5**	6.0–11.0	51,170	2.7	4.3**	3.1–5.4	2.0
20–24	381,561	5.9	6.4**	4.5– 8.2	147,598	2.6	3.2	2.4–4.0	2.0
25–34	775,698	4.4	4.2	3.3– 5.0	292,740	2.0	2.3	1.9–2.7	1.8
35–44	567,351	3.0	2.8	2.3– 3.3	265,132	1.6	1.9	1.5–2.2	1.5
45–54	276,075	2.0	1.9**	1.6– 2.3	160,416	1.3	1.5	1.2–1.8	1.3
55–64	103,867	1.6	1.6**	1.3– 2.0	66,067	1.3	1.5	1.2–1.9	1.1
65–74	14,457	0.8	1.1**	0.8– 1.3	9,089	0.7	1.2**	0.8–1.6	0.9
≥75	2,795	0.8	1.1**	0.7– 1.6	2,202	0.9	1.6	0.7–2.6	0.7
Total	2,284,617	3.3	3.3	2.6– 4.0	1,017,035	1.7	2.1	1.7–2.5	1.6

*Employee-based rate.

[†]Hour-based rate; Bureau of Labor Statistics Current Population Survey data used in the rate calculations.[§]Confidence interval (calculated for the hour-based rate).[†]Rate ratio for male:female (based on hour-based rate).

**Age group rate significantly different (p<0.05) from the respective sex-specific overall rate.

TABLE 2. Estimated incidence of occupational injuries treated in hospital emergency departments, by anatomic site and physician diagnosis — United States, 1996

Anatomic site	Sprain/Strain		Laceration		Contusion/ Abrasion/ Hematoma		Dislocation fracture		Burn		Other		Total	
	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)
Hand/Finger	39,321	(1.2)	496,811	(15.1)	138,598	(4.2)	74,185	(2.3)	33,846	(1.0)	196,573	(6.0)	979,336	(29.7)
Trunk/Back/Groin	390,428	(11.8)	3,993	(0.1)	93,585	(2.8)	24,032	(0.7)	6,316	(0.2)	66,190	(2.0)	585,543	(17.7)
Head/Face/Neck	55,220	(1.7)	107,465	(3.3)	139,213	(4.2)	8,151	(0.3)	49,464	(1.5)	193,976	(5.9)	553,490	(16.8)
Arm/Wrist/Shoulder	176,191	(5.3)	73,921	(2.2)	101,853	(3.1)	48,900	(1.5)	24,170	(0.7)	64,297	(1.9)	489,332	(14.8)
Leg/Knee/Ankle	198,251	(6.0)	42,466	(1.3)	109,084	(3.3)	31,870	(1.0)	10,066	(0.3)	34,531	(1.1)	426,268	(12.9)
Others	25,485	(0.8)	6,597	(0.2)	78,083	(2.4)	32,935	(1.0)	7,744	(0.2)	118,268	(3.6)	269,112	(8.2)
Total	884,896	(26.8)	731,253	(22.2)	660,417	(20.0)	220,073	(6.7)	131,606	(4.0)	673,835	(20.4)	3,302,080	(100.0)

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lowed by lacerations (22%) and contusions/abrasions/hematomas (20%). Lacerations to the hands and fingers accounted for 15% of all injuries, and sprains and strains to the back, groin, and trunk accounted for an additional 12% of all cases treated in hospital EDs.

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Editorial Note: In 1983, NIOSH reported findings on the magnitude of nonfatal occupational injury using the 1982 NEISS data (1). This report examining data from 1996 is the first since then to provide national estimates, by age and sex, of the risk for occupational injuries treated in hospital EDs. These data provide a unique perspective on the study of work-related nonfatal injuries because many of the case-capture restrictions common to other sources of occupational injury surveillance data have been removed. In the NEISS, theoretically all nonfatal occupational injuries treated in participating hospital EDs are captured, irrespective of involvement of a consumer product or the worker's eligibility for Workers' Compensation.

In contrast to the system for surveillance of fatal occupational injuries, a single surveillance system capable of capturing a substantial proportion of nonfatal occupational injuries is not available (4,6). Analysis of the 1988 National Health Interview Survey Occupational Health Supplement indicates that approximately 34% of all occupational injuries were first treated in hospital EDs.[§] Another hospital-based surveillance system used to generate national estimates for occupational injuries is the National Hospital Ambulatory Medical Care Survey (NHAMCS). According to NHAMCS data, an estimated 4.2 million occupational injuries were treated in hospital EDs in 1996, accounting for 12% of all injuries treated in the EDs[¶] (7). Although the NHAMCS provides for comparisons between work-related and other injuries treated in hospital EDs, it lacks information about industry and occupation. NEISS is a continuous, ongoing surveillance system that includes industry and occupation information and readily provides a mechanism for timely telephone follow-up interviews with injured workers (2). Differences in the estimates produced using the NHAMCS and NEISS data may result, in part, from sensitivity or reporting differences, but additional research is necessary to clarify this issue.

Another occupational injury morbidity surveillance system is the annual survey maintained by the BLS. The annual survey is a private sector establishment-based system that collects nonfatal injury data as reported by the employers. In 1996, data from the annual survey show that 6.2 million injuries and illnesses occurred in the private sector (8). Although the annual survey is not limited by source of medical treatment, some categories of workers (e.g., the self-employed or farms with <11 employees) are excluded from the data, and age-specific injury rates cannot be calculated (9).

Overall, estimates of the national magnitude of and risk for nonfatal occupational injury and the age group distributions reported here are similar to those in the 1982 ED data (1). Workers at highest risk, as described in this report, are males and aged <20 years. Differences between the employee-based and hour-based injury rates were most pronounced for women and younger and older workers; these groups are more

[§]Other sources of "first medical treatment" for a work-related injury include doctors' offices/clinics (34%), worksite health clinics (14%), and walk-in clinics (9%) (NIOSH, unpublished data, 1998).

[¶]This figure may underestimate this proportion because information was missing for "work-relatedness" in 26% of the cases (7).

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likely to be part-time workers, and the use of an employee-based measure tends to overestimate their true exposure to work hazards. Overestimates of exposure (the denominator of the injury rate formula) produce artificially low injury rates (10). Further research is needed to examine the distributions of injured workers in various sex and age groups by occupation and industry. Although information about the industry and occupation of injured workers and characteristics of the injury events is available in the 1996 NEISS data, this information is in narrative format. Coding of these data is under way and will provide the basis for future, more detailed analysis by NIOSH. NIOSH currently uses the NEISS follow-up capabilities to conduct telephone interview studies with adolescents in the retail trades and services industries, workers aged <20 years injured on farms, and for construction workers injured in fall-related incidents. The detailed epidemiologic information that can be collected through the telephone investigations is a valuable aspect of this injury surveillance system for development of injury intervention strategies.

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Corneal Decompensation After Intraocular Ophthalmic Surgery — Missouri, 1998

During January 8–14, 1998, six of eight patients undergoing elective intraocular surgery at a Veterans Affairs medical center (VAMC) in St. Louis, Missouri, developed corneal endothelial decompensation (corneal edema and opacification) ≤ 24 hours after surgery. All had been operated on with instruments sterilized by the Abtox Plazlyte system (Abtox, Inc., Chicago, Illinois) (1). This report summarizes the results of the