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Fatal Occupational Injuries— United States, 1980-1994

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2 figures, 1 table omitted

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 Bureau of Labor Statistics (BLS).⁴ Deaths among military workers were excluded from the analyses because the employment data do not include military employment numbers. Crude death rates per 100,000 workers were calculated as the number of deaths among civilian workers for each year divided by the number of employed civilians for each year. Because published estimates for employment by state exclude self-employed workers and report government workers separately, computerized data files obtained from the 1990-1994 BLS Current Population Survey monthly employment files,⁵ which include self-employed and government workers by industry categories, were used to calculate death rates by state.

National Estimates, 1980-1994

From 1980 through 1994, a total of 88,622 civilian workers died in the United States from occupational injuries, an average of 16 work-related deaths per day. The annual total number of deaths declined 27%, from 7405 in 1980 to 5406 in 1994. The average rate for occupational

injury deaths for all workers decreased 41%, from 7.5 per 100,000 workers in 1980 to 4.4 per 100,000 workers in 1994. Motor-vehicle-related deaths,[†] the leading cause of death for U.S. workers since 1980, accounted for 23.1% of deaths during the 15-year period. Homicides became the second leading cause of occupational injury deaths in 1990 (13.5% of occupation-related deaths), surpassing machine-related deaths (13.3% of total).

The industries in which the largest numbers of deaths occurred during this period were construction (16,091 deaths [18.2%]), transportation/communication/public utilities (15,668 [17.7%]), and manufacturing (12,371 [14.0%]). Industries with the highest death rates per 100,000 workers were mining (30.5), agriculture/forestry/fishing (20.5), and construction (15.5). The occupation categories in which the largest numbers of deaths occurred were precision production/crafts/repairers (17,392 [19.6%]), transportation/material movers (16,134 [18.2%]), and farmers/foresters/fishers (10,960 [12.4%]). Occupation categories with the highest death rates per 100,000 workers were transportation/material movers (23.0), farmers/foresters/fishers (20.7), and handlers/equipment cleaners/helpers/laborers (15.1).

State Estimates, 1990-1994

From 1990 through 1994, motor-vehicle-related incidents were the leading cause of occupational death in 38 states. Machine-related incidents were the leading cause of death in five states; homicides, in three states and the District of Columbia; falls, in two states; and water transport and struck by falling objects, one state each. The construction industry accounted for the largest number of work-related deaths in 19 states; manufacturing, in 12 states; agriculture/forestry/fishing, in 11 states; transportation/communication/public utilities, in five states; retail trade, in one state and the District of Columbia; services, in one state; and mining, in one state. Mining was the highest risk industry in 26 states; agriculture/forestry/fishing, in 19 states; construction, in three states and

the District of Columbia; and transportation/communication/public utilities, in two states.

The largest numbers of deaths, by occupation, were among precision production/crafts/repairers in 29 states; farmers/foresters/fishers in 14 states; transportation/material movers in eight states; and service workers in the District of Columbia. Occupation categories with the highest rates were farmers/foresters/fishers in 28 states; transportation/material movers in 20 states; handlers/equipment cleaners/helpers/laborers in one state and the District of Columbia; and technicians and related technical support occupations in one state.

Reported by: Div of Safety Research, National Institute for Occupational Safety and Health, CDC.

CDC Editorial Note: The findings in this report indicate a general decrease in occupational injury deaths in the United States during 1980-1994. The decreases include the total numbers and average crude rates of deaths over the years and the average number of work-related deaths per year from the 1980s (6359) through 1994 (5267). In addition, the leading causes of death have changed through the 1990s. Although surveillance data cannot identify the reasons for these changes over time, there have been many changes in the workplace that may have contributed to these changes (e.g., increased regulations and hazard awareness and new technology and mechanization) as well as changes in the economy, the industrial mix, and the distribution of the workforce.³

The findings of this analysis are subject to at least two limitations. First, only 67%-90% of all fatal occupational injuries can be identified through death certificates.¹ Second, classification of "on-the-job" differs among medical examiners and coroners.⁶ Because of these limitations, the numbers presented in this report should be considered as minimum values.

The NTOF surveillance system, the most comprehensive source of surveillance data for fatal work-related injuries during 1980-1991, allows examination of trends over time and analysis of data

within states, useful tools for identifying injury patterns and suggesting targets for preventive interventions. To address the limitations of death certificates and other existing data sources in the surveillance of fatal occupational injuries, in 1992 the BLS began collecting national work-related death data through the Census of Fatal Occupational Injuries (CFOI). CFOI is a multi-source surveillance system that typically requires at least two source documents[‡] to verify work-relatedness.⁷⁻¹⁰ Although CFOI and NTOF identified similar patterns for industry and occupation in 1994, NTOF captured 5406 civilian deaths and CFOI captured 6528.¹⁰ Another difference between the two surveillance systems is that the coding systems used to specify cause of death differ: NTOF uses E-codes from the *International Classification of Diseases, Ninth Revision*¹; CFOI uses the BLS-designed Occupational Injury and Illness Classification System.⁷⁻¹⁰ Direct comparisons of the two systems are complicated, but broad results on cause of death appear to be similar.

The data presented in this report provide the basis for strategies to prevent traumatic work-related injury deaths by taking into account high-risk industries and occupations and the varying patterns of fatal injuries identified in these data. In particular, state health departments and others involved in prevention of occupational injuries can use the state-specific data to identify high-priority areas for intervention. Additional state-specific data and information about NTOF are available from NIOSH; telephone (800) 356-4674 or (513) 533-8328.

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*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.

† The category of motor-vehicle-related deaths includes crashes occurring on and off the roadway, pedestrians struck by motor vehicles, noncollision incidents (e.g., falls from buses or cars), incidents involving off-road motor vehicles (e.g., snowmobiles or all-terrain vehicles), and incidents involving other road vehicles (e.g., bicycles).

‡ CFOI source documents include death certificates, Workers' Compensation records, and reports to federal and state agencies.

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

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2 tables omitted

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 1983¹ 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 estimates. 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). 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. 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%). Physician-diagnosed sprains and strains accounted for 27% of the injuries, followed 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.

Reported by: Div of Safety Research, National Institute for Occupational Safety and Health, CDC.

CDC 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 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 re-

search 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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*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.

‡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

Demographic Characteristics of Persons Without a Regular Source of Medical Care—Selected States, 1995

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2 tables omitted

Having a regular source of medical care (i.e., a regular provider or site) is one of the strongest predictors of access to health-care services,^{1,2} which has been associated with greater use of preventive health services.^{3,4} This report summarizes state-specific data from the 1995 Behavioral Risk Factor Surveillance System (BRFSS) and examines demographic factors associated with not having a regular source of medical care among adults in the 10 states for which this information was available. The findings indicate that certain demographic characteristics are associated with lack of a regular source of medical care.

The BRFSS is a state-based, random-digit-dialed telephone survey of the non-institutionalized U.S. population aged ≥ 18 years.⁵ The 1995 BRFSS collected information about source of medical care from 15,989 survey respondents in 10 states (Alaska, Arizona, Illinois, Kansas, Louisiana, Mississippi, New Jersey, North Carolina, Oklahoma, and Virginia). Participants were asked, "Is there one particular clinic, health center, doctor's office, or other place that you usually go to if you are sick or need advice about your health?" Prevalence estimates were calculated for persons who reported not having a regular source of medical care, and the reasons given for not having a regular source of medical care were examined. Sample estimates were weighted to represent the civilian population of each state, and SUDAAN[®] (Software for the Statistical Analysis of Correlated Data) was used to calculate 95% confidence intervals.⁶ Response rates ranged from 61.6% in Illinois to 76.2% in Oklahoma⁷ (overall response rate: 68.4%).

State-specific estimates of persons who lacked a regular source of medical care ranged from 11.0% in Oklahoma to 20.4% in Arizona (median: 14.4%). Among men, the prevalence of not having a regular source of medical care ranged from 13.5% in Oklahoma and New Jersey to 25.1% in Alaska (median: 20.3%). Among women, the prevalence of not having a regular source of medical care was lower and ranged from 8.5% in Illinois and North Carolina to 16.2% in Arizona (median: 9.5%). In most states, both white and black adults were more

likely than Hispanics to have a regular source of medical care.

In all states, as age increased, the likelihood of having a regular source of medical care also increased. The prevalence of not having a regular source of medical care was highest among persons aged 18-29 years (range: 16.6%-31.4%; median: 25.5%), and lowest among persons aged ≥ 65 years (range: 2.0%-10.2%; median: 4.1%). In all states except North Carolina, persons with annual household incomes $< \$15,000$ were more likely to not have a regular source of medical care than those with incomes $\geq \$50,000$.

Persons without health-care insurance were more likely to not have a regular source of care than those who did have health-care coverage. Among persons who were uninsured, the prevalence of not having a regular source of medical care ranged from 24.7% in Louisiana to 55.4% in Arizona (median: 34.7%); and for those who were insured, from 6.6% in Oklahoma to 14.8% in Virginia (median: 12.0%).

When persons who did not have a regular source of health care were asked why, most (43.2%) reported that they did not need a doctor (range: 38.5% in New Jersey to 55.2% in Mississippi). More than 18% reported that they either had no health-care insurance or could not afford to visit a doctor.

Reported by the following BRFSS coordinators: P Owen, Alaska; B Bender, Arizona; B Steiner, MS, Illinois; M Perry, Kansas; R Meriwether, MD, Louisiana; P Arbutnot, Mississippi; G Boeselager, MS, New Jersey; K Passaro, PhD, North Carolina; N Hann, MPH, Oklahoma; L Redman, Virginia. S Bland, MS, TRW Inc., Atlanta, Georgia. Behavioral Surveillance Br, Div of Adult and Community Health, National Center for Chronic Disease Prevention and Health Promotion, CDC.

CDC Editorial Note: The findings in this report indicate that persons without a regular source of medical care are more likely to be young, male, Hispanic, and uninsured and to have a low household income. Most persons who did not have a regular source of medical care did not think they needed a regular source. The results suggest the need for education about the health benefits of having a primary source of medical care, including early identification of health problems and increased access to and use of preventive health services. In addition, the results provided information about factors, such as lack of health-care coverage and cost considerations, that might pre-

vent access to preventive care and other appropriate health services.

The findings in this report are subject to at least two limitations. First, because households without telephones were not surveyed, the findings might underrepresent persons who have less education, have a lower annual household income, or are unemployed—all of which have been associated with increased likelihood of not having a regular source of health care.⁸ Second, because the estimates were based on self-reported data, they may be subject to recall bias.

Having a regular source of medical care is one of the strongest predictors of access to health services.² Persons who lack a regular source for medical care have less access to primary care² and are more likely to experience a delay in seeking preventive health care and services⁴; such persons, therefore, are at greater risk for chronic health conditions. Identification of subgroups at increased risk (i.e., young adults, males, Hispanics, persons with low incomes, and uninsured persons) is important in targeting prevention strategies to ensure greater access to and use of preventive health services. These results suggest that a policy of promoting a regular source of medical care is likely to facilitate access to health-care services for adults. At the state level, information about regular source of medical care can be used to develop policies promoting better access to health-care services, thereby lowering the prevalence of chronic health problems and associated economic costs.

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