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Fatal occupational injuries in the United States in 1980—1984

Results of the first national census of traumatic occupational fatalities

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Estimates of the number of workers killed on the job in the United States (US) vary widely and are based on a variety of incomplete data sources (1). Because of the large discrepancies between these sources of information and because the existing sources do not provide detailed information on characteristics of fatally injured workers, the National Institute for Occupational Health and Safety (NIOSH) initiated a national traumatic occupational fatality surveillance project to fill this critical knowledge gap. The objective of the project was to compile a complete census of fatal occupational injuries in the United States from the death certificates of US workers who died as a consequence of an injury at work. The data base includes demographic characteristics of the decedents and information about the injury and cause of death. This paper describes characteristics of these fatal occupational injuries from a national perspective for the five-year period 1980 through 1984.

Methods

In 1983, NIOSH began acquiring death certificates for fatal occupational injuries from the entire United States in order to obtain a reliable count of the annual number of work-related traumatic deaths in the nation. To identify cases of fatal occupational injuries, death certificates had to meet the following criteria: age at death, 16 years or older; a positive response to the "injury at work" item on the certificate; and cause of death "external" (codes of E800-E999 of the ninth revision of the International Classification of Diseases). Certificates meeting these criteria were purchased from the states, and the case information was entered into the computer data bank of NIOSH. All US units reporting vital statistics are cooperating in this project, and the data base currently contains five years of data on traumatic occupational fatalities from all 50 states and the District of Columbia.

Because no single source of employment data provides information on both geographic location and the demographic characteristics of workers, several sources of denominator data were used in the calculation of rates (1). For fatality rates by demographic characteristics — age, sex, race, occupation — the source of employment data was the current population survey of the Bureau of Labor Statistics (6). Industry- and state-specific rates were calculated with data from the *County Business Patterns Bulletin* of the Bureau of the Census as the denominator (4), supplemented by information from the *1982 Census of Agriculture* (5). Annual rates per 100 000 workers are calculated as the number of fatalities per number of workers times 100 000.

Results

The data base contains 33 666 records for 1980 through 1984 or about 7 000 traumatic occupational fatalities each year. Of these, 94 % involved male workers, and 6 % concerned female employees. The fatality rate for men was 11.2 per 100 000 workers, or more than ten times higher than that for women (0.9). Unintentional injuries accounted for 84 % of the cases, 13 % were the result of occupational homicides, and 3 % were suicides at work. Distributions by race indicate that 82 % of the victims were white, 10 % were black, 5 % were hispanic, and 3 % were other races. The fatality rate for blacks was slightly higher (7.7/100 000) than for whites (6.2/100 000); however, the rate among "other races" was three times higher than for whites (19.0/100 000). The age distribution for traumatic fatalities showed that the greatest number of work-related deaths occurred among 25- to 34-year-olds. However, the highest fatality rate was among those over the age of 64 years. In the examination of geographic distributions of fatalities, states were grouped into five categories from high to low for both frequencies and rate of traumatic fatalities. (The categories were based on the following percentile ranges: low 0—5, low-middle 6—25, middle 26—75, high-middle 76—95, high 95—100). As figure 1 shows, the states with the greatest number of fatalities were California and Texas. The lowest numbers occurred in Connecticut and Rhode Island. The distribution of fatality rates by state is shown in figure 2. Alaska and Wyoming had the highest rates of fatal occupational injuries, while the lowest rates were recorded for Massachusetts and Rhode Island.

The numbers and rates of traumatic occupational fatalities were also examined by industrial sector and by occupational category. The greatest annual number of work-related deaths occurred in the transpor-

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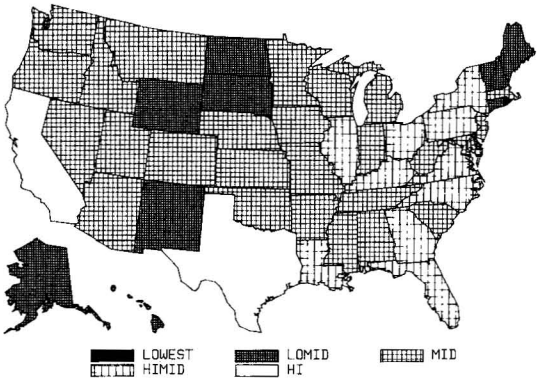

Figure 1. Frequency of traumatic occupational fatalities by state, 1980—1984. (HIMID = high-middle, LOMID = low-middle, HI = high, MID = middle)

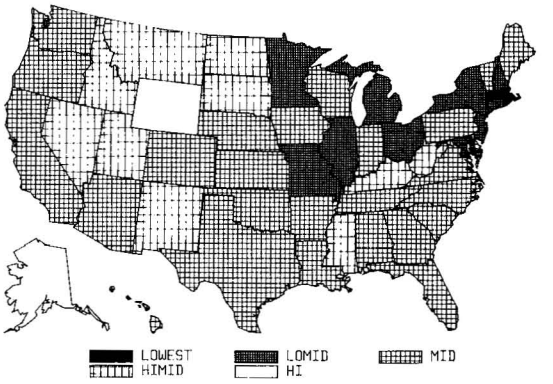

Figure 2. Traumatic occupational fatality rates per 100 000 workers by state, 1980—1984. (HIMID = high-middle, LOMID = low-middle, HI = high, MID = middle)

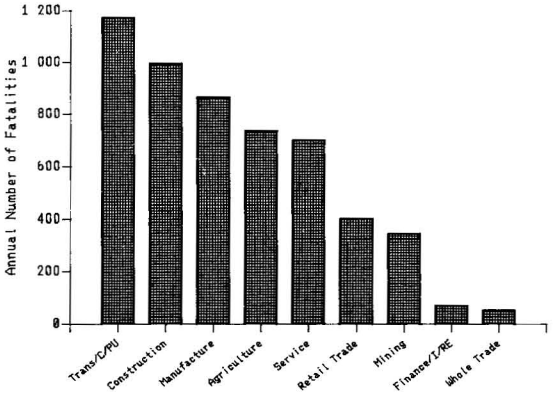

Figure 3. Annual averages of national traumatic occupational fatalities by industry, 1980—1984. (Trans = transportation, C = communication, PU = public utilities, I = insurance, RE = real estate)

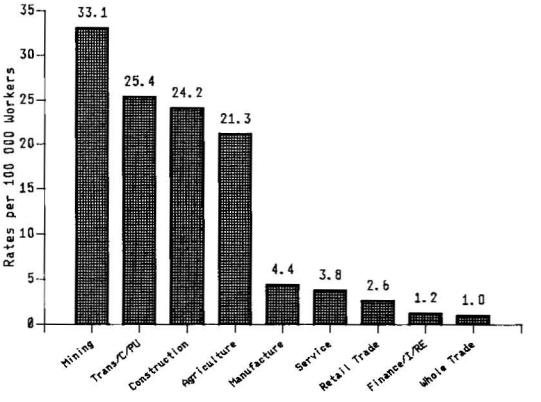

Figure 4. National traumatic occupational fatality rates by industry, 1980—1984. (Trans = transportation, C = communication, PU = public utilities, I = insurance, RE = real estate)

tation, communication and public utility industry, followed by construction, manufacturing, and agriculture, forestry and fishing (figure 3). The highest fatality rates per 100 000 workers was recorded for the mining industry, followed by transportation, communication and public utilities, construction, and agriculture, forestry and fishing (figure 4). (For a comparison of these findings with other data, see reference 3.)

The occupational group that experienced the most fatalities per year was craftsmen and kindred workers. Transportation operatives, farmers, and nonfarm laborers also had high frequencies of fatal work injuries (figure 5). The highest rates of occupational fatalities occurred among transportation operatives, followed by farmers, nonfarm laborers, and craftsmen and kindred workers (figure 6).

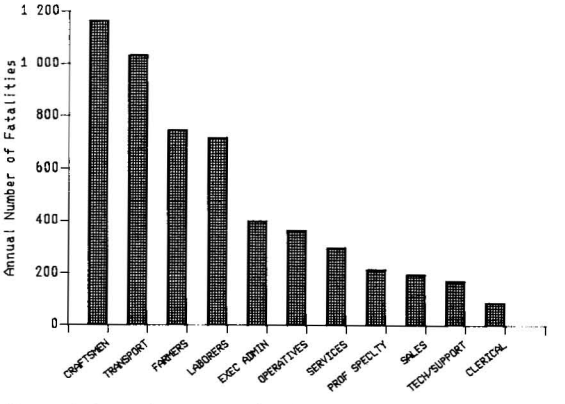

Figure 5. Annual averages of national traumatic occupational fatalities by occupation, 1980—1984.

Discussion

This analysis identifies worker groups at elevated risk of suffering a fatal injury on the job. These findings should be useful in prioritizing and targeting safety research and prevention efforts.

With regard to demographic characteristics, higher fatality rates are found among men, races other than

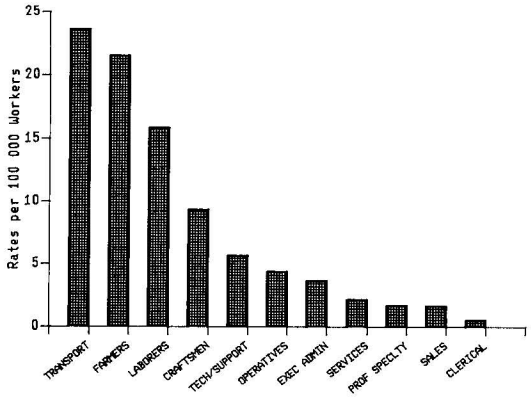

Figure 6. National traumatic occupational fatality rates by occupation, 1980—1984.

black or white, and older workers. In terms of sheer numbers, however, fatalities are more likely to involve men, whites, and 25- to 34-year-olds. Workers in Alaska and Wyoming have the highest fatality rates, but the highest frequencies of fatal injuries occur in California and Texas.

Workers in the industries of mining and transportation and in occupations of transportation operatives and farmers are at greater risk of suffering a fatal injury in terms of rates per 100 000 workers. The greatest number of traumatic deaths occurs in the transportation and construction industries and the craftsmen and transportation operatives occupations.

Both rates and frequencies of traumatic occupational fatalities are useful methods of identifying worker groups on which to focus injury prevention efforts. While rates are an indication of the probability or risk of a worker being killed, frequency distributions indicate the number of workers potentially affected. Methods of prioritizing safety research and prevention strategies should take into consideration both the probability and the number of workers in a given target group.

Another factor worth considering in priority determination is years of potential life lost. This is an index of premature mortality that emphasizes deaths of younger workers. The computation of years of potential life lost can complement traditional methods of quantitating occupational mortality by identifying groups in which the probability of a traumatic death is greater among younger workers (2). Priority setting strategies based only on fatality rates would not result in the most effective targeting of worker groups with regard to the number of lives or years of life at risk.

The most effective strategy for prioritizing the allocation of injury prevention resources would be one that takes into consideration frequencies, rates, and years of potential life lost. Such a strategy requires two sources of data, a numerator of fatality cases, and an employment denominator. Both of these sources must include the demographic and employment characteristics of workers.

Currently, no single, annual source of employment information is available that provides all the necessary descriptive characteristics of the US labor force (1). Various sources of denominator data must be pieced together to calculate various rates, and age-adjusted rates for detailed occupations and industries are not currently possible. With regard to fatality data however, the national traumatic occupational fatality project provides the necessary information with which to enumerate fatal work injuries nationwide and to calculate fatality rates and years of potential life lost among specific worker groups. Because the accuracy and completeness of the data are dependent to a degree on the knowledge and accuracy of those who fill out death certificates, there are probably some exclusions. It is suspected, for example, that the project is missing some occupational motor-vehicle fatalities and some homicides at work. Despite limitations, the project provides the most comprehensive information to date on traumatic occupational fatalities in the United States.

As these analyses have shown, the data base allows groups of workers at high risk of suffering a work fatality to be identified. It also allows for the monitoring of trends in occupational mortality and, thereby, the evaluation of the effectiveness of prevention efforts. The next step is to begin examining more specific worker groups, such as detailed occupations within high-risk industries, and to utilize this information in setting research priorities and developing methods of preventing these needless deaths.

References

1. Center for Disease Control. Traumatic occupational fatalities — United States, 1980—1984. Morb Mort Wkly Rep 36 (1987): 28, 461—470.
2. Center for Disease Control. Premature mortality in the United States: Public health issues in the use of years of potential life lost. Morb Mort Wkly Rep 35 (1986): suppl 25, 15—115.
3. Stout-Wiegand, N. Fatal occupational injuries in US industries, 1984: Comparison of two national surveillance systems. Am J Public Health (in press).
4. US Department of Commerce, Bureau of the Census. Cty Bus Patterns Bull 1980, 1981, 1982, 1983, 1984.
5. US Department of Commerce, Bureau of the Census. 1982 census of agriculture.
6. US Department of Labor, Bureau of Labor Statistics. Employment Earnings 28 (1981): 1; 29 (1982): 1; 30 (1983): 1; 31 (1984): 1; 32 (1985): 1.