

Traumatic Fatalities at Work

American Indians and Alaska Natives, 1980 through 1988

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To define the rates and characteristics of fatal occupational injuries among American Indians and Alaska Natives (AI/AN) in the United States, we examined death certificates included in the National Traumatic Occupational Fatalities data base for deaths occurring from 1980 to 1988. Two hundred and seventy-four work-related deaths among AI/AN civilians (259 men, 15 women) were identified. In 1980, the fatality rate among employed AI/AN was 5.5/100,000 workers compared with 7.7/100,000 workers for the United States. Ninety percent of the AI/AN deaths were from unintentional injury, 6% from homicide, and 3% from suicide. The pattern of fatal occupational injuries among AI/AN differs from that for all races combined, especially with regard to the larger percent of AI/AN fatalities in the agriculture, forestry, and fishing industry and the high proportion of water transportation incidents.

American Indians and Alaska Natives (AI/AN) experience a disproportionate burden of injury-related morbidity and mortality compared with the general US population.¹ Despite this burden, little attention has been directed toward the study of occupational injury and mortality among AI/AN. Few studies have analyzed occupational injuries by racial groups, and occupational injury data sets do not regularly provide detailed information about race and ethnicity. Even in recent reviews specifically addressing occupational hazards among minority workers, data describing the experience of AI/AN workers have generally been omitted,^{2,3} although it has been suggested that the adverse occupational experience of blacks probably reflects the occupational experience of other minorities.² Several reports have described unusual aspects of occupational mortality among AI/AN, such as radon-associated lung cancer in Navajo uranium miners^{4,5} and a cluster of mesothelioma among Pueblo jewelry makers.⁶ However, the occupational injury and fatality risks encountered by AI/AN are largely unexplored.

In Healthy People 2000, the Department of Health and Human Services established two objectives pertinent to this issue.⁷ The first objective is to reduce deaths from work-related injuries to no more than 4/100,000 full-time workers (Objective 10.1). The second includes the identification of significant gaps in the nation's health promotion data on racial and ethnic minorities (Objective 22.4). Because of the paucity of data regarding AI/AN occupational injury and mortality, we examined a national surveillance system—the National Traumatic Occupational Fatalities (NTOF) data base—to describe AI/AN occupa-

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The opinions expressed in this paper are those of the authors and do not necessarily reflect the views of the Indian Health Service or the Centers for Disease Control and Prevention.

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tional fatalities from 1980 through 1988.

Methods

The NTOF surveillance project is a census of US fatal occupational injuries that is described in detail elsewhere.⁸ Briefly, the Division of Safety Research of the National Institute for Occupational Safety and Health, Centers for Disease Control and Prevention, receives from each state, New York City, and the District of Columbia copies of death certificates meeting the following criteria: (1) age at death 16 years or older; (2) an external cause of death (E code) derived from the International Classification of Diseases, 9th Edition within the range of codes E800 through E999, reported as immediate, underlying, or contributory; and (3) a positive response to the "injury at work" item on the certificate. The data are compiled in a national database. Industry and occupation divisions are classified using standard systems, described in detail elsewhere.⁸⁻¹⁰

We selected cases from the NTOF data base that occurred from 1980 through 1988 for which race was designated on the death certificate as American Indian, Aleut, or Eskimo. No annual sources of national denominator data of workers in specific occupations or industries include racial identification adequate to identify AI/AN. Therefore, estimates from the 1980 Census of Population were used in calculating rates. To obtain an estimate of the rate of occupational fatalities of AI/AN, the number of AI/AN occupational fatalities in 1980 were used as the numerator, and the estimated number of employed American Indians, Eskimos, and Aleuts in 1980 as the denominator.¹¹ Because it was not possible to ascertain accurately the number of working AI/AN in subsequent years, rates were calculated for 1980 only. The distribution of fatal occupational injuries among AI/AN for 1980 to 1988 was compared with that of the US civilian labor force for demographic and employment characteristics and cause of death.

Results

From 1980 through 1988, 274 work-related deaths among AI/AN civilians (259 men, 15 women), were identified in the NTOF data base. AI/AN accounted for 0.5% of all occupational injury deaths during the period. In 1980, there were 28 deaths among 507,614 employed AI/AN aged 16 years and older, for a fatality rate of 5.5/100,000 workers. The rate for the US civilian labor force for 1980 was 7.7/100,000 workers (7,509 deaths among 97,639,355 workers). Men accounted for 95% of the AI/AN fatalities, similar to that for the general work force.⁸ AI/AN workers in the younger age groups accounted for a higher proportion of fatalities than the same age groups in the general work force, as shown in Fig. 1. Sixty percent of deaths occurred among persons 20 to 39 years of age compared with approximately 50% in the United States.

Examination of International Classification of Disease codes revealed that among the AI/AN deaths, 90% were from unintentional injury, 6% were from homicide, and 3% were from suicide at work compared with the entire work force proportions of 82% unintentional injury, 12% homicide, and 3% suicide. The distribution of the 12 leading causes of occu-

pational fatalities among AI/AN compared with all races is shown in Fig. 2. Of the leading causes of death, motor vehicle crashes (18%), machine-related injuries (14%), and water transportation incidents (13%) accounted for almost half of all AI/AN deaths. For the entire civilian work force, motor vehicle crashes (23%) and machine-related injuries (13%) were also the two leading causes of death. However, water transportation deaths accounted for only 2% of the total injury deaths. The large proportion of AI/AN water transportation deaths were incurred primarily in the agriculture, forestry, and fishing industry, which comprised 75% of all the AI/AN water transportation deaths. Among the AI/AN, the proportion of occupational homicide was about half that for the entire US work force. The proportion of occupational homicide among the AI/AN women (33%) was higher than that for AI/AN men (4%).

The distribution of AI/AN fatalities by occupational division is shown in Fig. 3. In the general work force, the highest proportion of fatalities occurred in craftsmen and kindred workers (20%) and transportation operatives (19%). Among AI/AN, the greatest proportions of fatalities occurred among farmers, fishers, and foresters (26%), and laborers (19%).

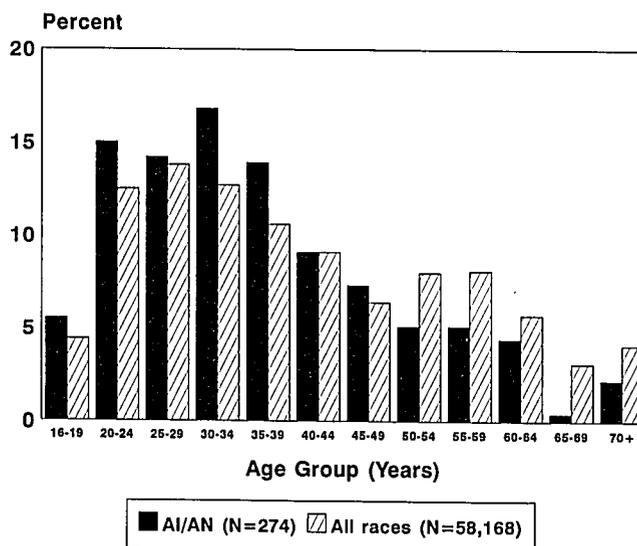
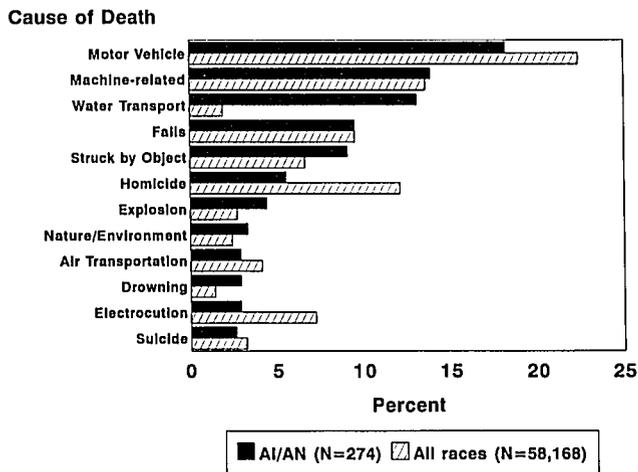


Fig. 1. Distribution of age groups of fatal occupational injuries for American Indians and Alaska Natives and all races, United States, 1980 to 1988.



Other causes of death AI/AN (12%) and all races (13%) not shown

Fig. 2. Distributions of 12 leading causes of fatal occupational injuries for American Indians and Alaska Natives compared to all races, United States, 1980 to 1988.

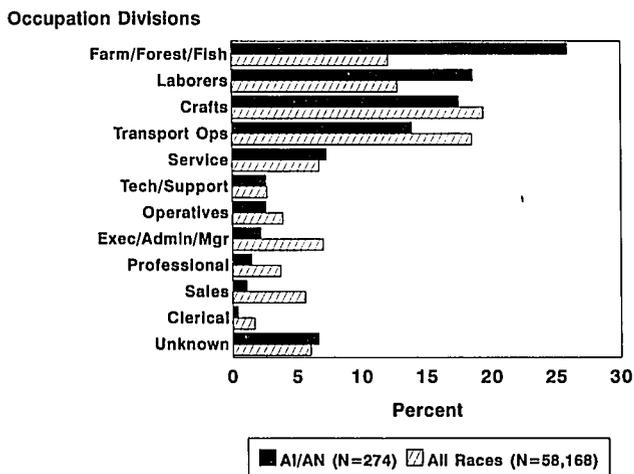


Fig. 3. Distribution of fatal occupational injuries by occupational division for American Indians and Alaska Natives compared with all races, United States, 1980 to 1988.

Of the fatalities incurred to farmers, fishers, and foresters, 54% were classified as fisherman.

The distribution of fatalities by industrial division is shown in Fig. 4. The greatest proportion of deaths among AI/AN occurred in the agriculture, forestry, and fishing industry (25%) compared with 12% of injury deaths among US workers. This disparity may not be due solely to the higher proportion of AI/AN working in the agriculture, forestry, and fishing industry. Although a larger proportion of AI/AN reported themselves to be working in agriculture, forestry, and fishing in the 1980 Census (3.5% vs 2.9% of the total work force), this

difference is not large enough to account for the disparity in the proportion of fatalities.

The most frequent causes of death in the agriculture, forestry and fishing industry were similar for both the AI/AN and US population with the exception of water transportation. The three leading causes of AI/AN deaths in this industry were water transportation (39%), machine-related (15%), and motor vehicles (12%). The leading causes of death among all workers in this industry were machine-related (35%), motor vehicles (15%), electrocutions (7%), and struck by falling objects (7%), whereas water transportation accounted for less than 6%. The

large discrepancy between US and AI/AN deaths involving water transportation may be explained by the high proportion of fishing deaths incurred by the AI/AN workers, particularly in Alaska, which accounted for 45% of all water transportation deaths in the agriculture, forestry, and fishing industry.

To examine the AI/AN fatalities incurred in the agriculture, forestry and fishing industry more closely, this industry division was separated into its three components. The agriculture component accounted for 38% (26) of the AI/AN deaths compared with 63% in the United States. Forestry accounted for about 1.5% of the injury deaths in both the AI/AN and US work force. However, the proportion of AI/AN deaths was much higher in the industry component of fishing, which comprised 55% (38) of all AI/AN deaths while accounting for only 8% in the general work force. Although the fishing component includes hunting and trapping, all of the AI/AN deaths in this sector were fishing. The majority of these AI/AN fishing fatalities (84%) were single fatality incidents; the remaining 16% resulted from five separate multiple fatality incidents.

There are substantial intrastate variations in occupational fatality rates among the general US population. Although stable state-specific occupational fatality rates among AI/AN cannot be calculated because of the relatively small number of deaths, we did identify variability in the distribution of AI/AN deaths compared with each state's AI/AN population. For instance, although 4.2% of the estimated AI/AN population during the study period resided in Alaska, 47 (17.2%) of AI/AN occupational fatalities occurred among residents of that state. Conversely, although 11.4% of AI/AN resided in Oklahoma, only 12 (4.4%) deaths at work occurred among AI/AN residents of Oklahoma.

Discussion

Although overall mortality rates from injury among AI/AN far exceed those among the general population,

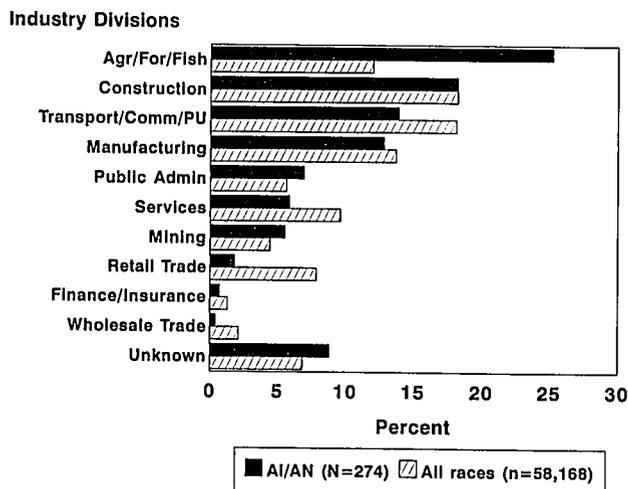


Fig. 4. Distribution of fatal occupational injuries by industrial division for American Indians and Alaska Natives compared with all races, United States, 1980 to 1988.

an excess of work-related traumatic fatalities among AI/AN was not evident in the data we evaluated. Indeed, the overall rate of fatal occupational injuries for AI/AN in 1980 was lower than for the entire US work force. These findings are consistent with those of a recent study in California, which identified a lower rate of fatal injury at work among AI/AN than among whites and blacks.¹²

Factors affecting racial differences in occupational injury mortality experience need to be determined more clearly. Research is urgently needed to examine both the effects of surveillance data limitations on AI/AN occupational mortality rates and differences in work-related injury mortality compared with nonoccupational injury mortality risk among AI/AN.

Lack of race-specific denominator data for employment sectors prohibited calculation of injury- and occupation-specific mortality rates in this national analysis. Differences in fatality distributions may reflect variation in employment, rather than, or in addition to, differences in risk. Moreover, true differences in occupational mortality experience between AI/AN and the general work force may be greater than those observed here because of limitations of death certificate-based surveillance for AI/AN.

In addition to the limitations normally inherent in using death certificates for surveillance of occupational fatalities (such as incomplete ascer-

tainment of the "injury at work" item, incomplete ascertainment of work-related homicides and suicides, and inaccurate employment information^{8,13}), efforts to compile data describing AI/AN suffer from additional problems. Varying degrees of racial misclassification on death certificates in some states result in the exclusion from the numerator of deaths of AI/AN who are included in the denominator. Although the problem has not been studied for occupational fatalities, AI/AN infant mortality rates in some states have been underestimated by as much as 30% unless special attempts have been made to correct for racial misclassification.^{14,15} This phenomenon can have a significant impact on national mortality rates. From 1983 to 1985, 36.6% of infants listed as AI/AN on birth certificates who died in the first year of life were classified as members of another race on their death certificates.¹⁶ In the National Longitudinal Mortality Study, which matched data from 12 Current Population Surveys from the Bureau of the Census to the National Death Index, 24.6% of death certificates of persons identified as AI/AN during a census survey were classified as another race on the death certificate.¹⁷ It is possible that the low proportion of occupational deaths occurring among AI/AN residing in Oklahoma is partially attributable to racial misclassification on death certificates because this phenomenon has been

demonstrated previously on death certificates in that state.¹⁵

Another special difficulty related to AI/AN concerns the potential for amplification of the effects of underreporting agricultural occupational fatalities as work-related. In one state, the agricultural occupational fatalities were undercounted in the NTOF data base by approximately 20%.¹⁸ Because a higher proportion of AI/AN tend to work in this industry, underreporting of work-related fatalities in agriculture will result in a disproportionate undercount of work-related deaths among AI/AN. In many AI/AN communities, fishing and farming are thought of as an integral part of the lifestyle rather than as a specific industry (even though the products are sold for commercial purposes); therefore, there may be an increased tendency to interpret work-related fatalities as recreational. In a study of fishing-related fatalities in Washington, different patterns of mortality were found among AI/AN compared with other races, and a high proportion of occupational fishing fatalities were not listed as work-related on death certificates. AI/AN fishing fatalities tended to occur in inland waterways and were related to small boats capsizing and net fouling, compared with weather-related drownings and explosion of ocean-going fishing vessels for other races¹⁹ (S. Milham, MD, MPH, personal communication).

Another possible limitation of these data is that the impact of seasonal employment is not accounted for in the denominator of number of workers. If a disproportionate number of AI/AN were seasonal employees (for instance, in industries such as fishing and farming), fatality rates may have been underestimated because of inflated denominators, because seasonal or part-time workers do not incur the same amount of exposure to risk. The attribution of data limitations and discrepancies to AI/AN injury mortality rates requires further examination.

To achieve a more complete picture of occupational fatalities among AI/AN, Indian Health Service patient registration files should be linked with vital records or occupational fatality

registries in states with large Indian populations to correct for racial misclassification. Special attempts should be made to ensure complete ascertainment of fatal occupational injury cases of AI/AN, especially in the agriculture, forestry, and fishing industry. Such efforts will allow for a clearer determination of racial differences in fatal occupational injury patterns and risk.

The results of this analysis indicate that the characteristics of AI/AN deaths differ from those of the general work force. Although the numbers of AI/AN included in the NTOF data base are small compared with those for other races, results of this analysis suggest the need for further examination of occupational hazards that are particularly relevant to AI/AN and that may differ from risks to the general work force. For instance, in a previous study using the NTOF data base, patterns of homicide among AI/AN women killed at work were found to differ from those for other races.²⁰ AI/AN women were less likely to be killed from gunshot wounds and more likely to die from trauma involving physical contact than were women of other races.

Death certificate-based analyses have shown AI/AN to be at substantially greater risk than other races for unintentional injury mortality in general, and particularly for motor vehicle-related death. Work-related injury mortality rates for AI/AN were found in this study to be lower than those of the general US work force, both overall and for motor vehicle-related deaths. Further research is required to understand the reasons for these differences. For example, it could be hypothesized that differences in work-related versus nonwork motor vehicle mortality (and perhaps other causes of death) may be associated with alcohol use patterns, which may differ not only between AI/AN and other races, but also between work and nonwork activities among AI/AN. Socioeconomic and behavioral factors that differ between AI/AN and other races should be examined with regard to risk of fatal occupational injury.

Previous reports have shown that the occupational fatality rate in

Alaska is approximately 4.5 times higher than that for the nation.²¹ Much of the excess in occupational deaths in the state is associated with fishing, logging, and air transport.²² The high proportion of occupational fatalities among AI/AN residents of Alaska is consistent with these reports. Forty-five percent of water transportation deaths among AI/AN were associated with the fishing industry in Alaska. Although the distribution of occupational fatalities among AI/AN in Alaska has been reported to be proportional to their distribution in the state's work force,²³ current efforts to reduce occupational fatalities in Alaska²⁴ should include special efforts to address AI/AN workers in the state.

Because the magnitude and types of risk for occupational fatalities faced by AI/AN workers may differ from those for workers of other races, occupational injury prevention programs may require a different focus for AI/AN workers than for the general work force. Intervention programs to prevent occupational fatalities should receive attention from AI/AN communities. Development of AI/AN occupational injury prevention efforts should be directed toward workers in farming and fishing occupations, particularly fishing in Alaska, where cold waters, harsh weather, and short fishing seasons may contribute unique hazards to these workers. Also, although the proportion of AI/AN occupational mortality attributed to motor vehicles was somewhat lower than expected, motor vehicles still accounted for the largest number of AI/AN occupational fatalities. Interventions to improve motor vehicle safety, such as increased use of seatbelts and passive restraints, should be promoted among AI/AN workers.

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Gone Fishing (. . . and Boating . . . and Skiing . . . and . . .)

As you struggle to squeeze in a couple of long weekends this summer, give a thought to Don Taylor, founder and CEO of Personnel Management, a 7-year-old company in Shelbyville, Indiana, with projected sales of \$25 million and 80 employees. It has grown 70% a year for the past 4 years. His secret? "Vacations," says Taylor. "Lots of them. I'm off a week every month—and these aren't working vacations. I go to St Thomas for a week, or to Utah or Colorado for skiing, or to the Upper Peninsula of Michigan to go snowmobiling. Some companies are into corporate diversification. This is personal diversification."

In the beginning, Taylor says, he feared his staff couldn't manage without him. "As a kind of test, I started taking a few days off at a time. You know what? People were so enthusiastic about working on their own that business would pick up. Billings would actually *increase* when I wasn't around." That discovery did, of course, have a downside. "I thought, 'Gee, maybe they don't need me.' But then I realized that if I could take vacations, I could also focus on the real job of a president—planning for the future—rather than worry about whether we're doing things right today."

"I want to tell you," Taylor adds, "this has really been fun, and good for everyone else as well as me. When I come back, I'm on a much more even keel. There are times when my staff practically *tells* me to go on vacation. And I go, with thanks. I mean, this is why I left corporate life and started a company in the first place—to have more control of my time, to have freedom."

From G. Gendron, *FYI Inc*. 1993;15:8, p 11