Scientific worker and licensed professional deaths in Alaska, 1990-2002

George A. Conway, Katherine A. Moran, Nicolle A. Mode

CDC/NIOSH/DSR Alaska Field Station, Anchorage, USA

ABSTRACT

Objectives. Between 1990-2002, 797 Alaskans died while working. After a scientific survey team member drowned, we examined the hazards of traumatic death to scientific and professional workers in Alaska. Study design. Surveillance and analysis methods for acute traumatic occupational injuries: The Alaska Occupational Injury Surveillance System (AOISS) uses direct investigation, jurisdictional agency reports, and death certificates to gather data for active surveillance on occupational injury deaths in Alaska. We searched AOISS for deaths which occurred while engaged in scientific or professional work. Commercial pilots, fishermen, loggers, taxi drivers and miners were excluded, as these have been previously studied. Results. During 1990-2002, 85 scientific/professional worker deaths (including 2 suicides) occurred. Fish, game, and mountaineering guides accounted for 28 (33%) of the worker deaths, followed by biologists, who accounted for 11 (13%). Aircraft crashes accounted for 42 (49%) of all these deaths, followed by drownings, 12 (14%), and falls, 9 (11%). A seismologist was fatally mauled by a bear. Of the 14 hunting guide fatalities, 11 were the result of aircraft crashes, one was a suicide, one was a drowning, and one resulted from a motor vehicle crash. Of the 11 hunting guide fatalities, eight died in aircraft crashes, one drowned, one walked into an aircraft prop, and one sustained a fatal head injury in a fall. Conclusions. Scientific and professional workers in Alaska experienced a substantial number of fatalities from traumatic injury. Nearly half of these deaths occurred in aircraft crashes.

Keywords: aircraft crash, drowning, hunting, mountaineering

INTRODUCTION

Alaska is known for its fishing and logging industries, and not surprisingly, many of its work-related fatalities occur in fishing and logging occupations. While research has focused primarily on fishing, logging and air transportation occupations (1,2,3,4), other occupations which make up a smaller but substantial proportion of the total work-related deaths have not been reported on independently for Alaska (1).

Alaska’s mountain and tundra terrain and severe winters creates unique working conditions and hazards for its workers. Nationally the leading cause of all occupational fatalities during 1985 – 2000 was motor vehicle incidents, with 28% of occupational fatalities in 1997 caused by highway and non-highway crashes (5). Covering over 570,000 square miles (1,476,00 km²) (6), Alaska has more than twice the land area of Texas, but only 12,000 miles (19,520 km) of public roads – approximately the same mileage as Vermont – with no roads connecting the state’s largest city, Anchorage, and the state capital, Juneau. Possibly because of this, motor vehicle related incidents are not the leading event in Alaskan occupational fatalities. During 1990-
1999 the major circumstances of death for all workers were drowning (34%) and aircraft crash (30%), with motor vehicle crash being listed fifth, accounting for only 4% of all events (1).

Scientific and professional workers have not been studied previously as a group, but national annual rates indicate that scientific and technical fields are relatively safe worker environments (8). Professional specialists, technicians and related support, and other service industries had an average annual rate of 1.6, 4.5, and 2.8 fatal occupational injuries per 100,000 workers in 2000. These rates were much lower than high-risk occupations such as transportation and material moving (22.7/100,000/yr), and farming, forestry and fishing (20.5/100,000/yr). Alaskan high-risk occupations vary somewhat from those nationally and have much higher rates. The occupation with the highest fatality rate in Alaska is piloting aircraft, with rates (410/100,000/yr) far surpassing the next two high-rate occupations, logging (150/100,000/yr) and commercial fishing (125/100,000/yr) (2).

This study examined a previously overlooked group of workers. Scientific and professional workers in Alaska face unique challenges which before now had not been investigated. In the current study we sought to determine the rates and causes of scientific and professional work-related deaths in Alaska during 1990-2002. By enumerating and investigating scientific and professional worker deaths we hoped to find ways to educate workers and employers and thus decrease worker fatalities in these fields.

METHODS
For the purpose of this study, we defined a "scientific worker" as a person who is working in Alaska as physical or life scientist, scientific technician, or data analyst. We defined a "licensed professional" as any person whose occupation requires licensing either by state (9) or federal agencies (1) or one who is registered with the Alaska Department of Fish and Game as a Hunting and/or Fishing Guide. We excluded commercial pilots, fishermen, miners, loggers, and taxi drivers from this study: although they also require occupational licensing, these Alaskan workers have been the subjects of previously published studies. Deaths were included in this study if a person died while working as a scientific or professional worker at the time of his/her death. The following data were compiled using the Alaska Occupational Injury Surveillance System (AOISS), which uses direct investigation, jurisdictional agency reports, death certificates, and media sources to gather data for active surveillance on occupational injury deaths in Alaska. This archival dataset permitted rapid analysis for this novel category of worker deaths.

RESULTS
Between the years 1990 and 2002, there were 71 work-related events that resulted in 85 scientific/professional worker deaths (including 2 suicides). Fish, game, and mountaineering guides accounted for 28 (33%) of the worker deaths, followed by biologists, who accounted for 11 (13%) (See Table I). In addition to these scientific/professional worker deaths, a total of 40 non-scientific/professional workers were also killed as a result of these events (those fatalities included 13 pilots, 5 passengers, 5 miners, 7 hunters, 3 deckhands, 2 vessel skippers, 2 climbers, a repairperson, a secretary, and a land squatter). Aircraft crashes (most of which occur-

| Occupation               | Number of Fatalities (%) |
|--------------------------|--------------------------|
| Guide                    | 28 (33%)                 |
| Biologist                | 11 (13%)                 |
| Park Ranger/Forestry     | 9 (11%)                  |
| Engineer                 | 7 (8%)                   |
| Ship’s Officer           | 6 (7%)                   |
| Electrician              | 5 (6%)                   |
| Geologist/Seismologist   | 4 (5%)                   |
| Healthcare Providers*    | 4 (5%)                   |
| Other                    | 11 (13%)                 |
| Total                    | 85 (100%)                |

Percentages do not total 100 due to rounding.
* physician, pharmacist, health practitioner.
red in single-engine aircraft, most commonly by flying into terrain in poor visibility conditions) accounted for 42 (49%) of all scientific/professional worker deaths, followed by drownings, both vessel-related and non-vessel related, which resulted in 12 (14%) fatalities, and falls, which accounted for 9 (11%) fatalities (Tables II and III). One seismologist was fatally mauled by a bear. Cases involving guides fell into three categories: hunting (14 deaths, 50%), fishing (11 deaths, 39%), and mountaineering (3 deaths, 11%). The three mountaineering deaths all resulted from falls either from a cliff or into a crevasse. Of the 14 hunting guide fatalities, 11 were the result of aircraft crashes, one was a suicide, one was a drowning, and one resulted from a motor vehicle crash. Of the 11 hunting guide fatalities, eight died in aircraft crashes, one drowned, one walked into an aircraft prop, and one sustained a fatal head injury in a fall.

**Table II. Manner of Death of Scientific Workers in Alaska, 1990-2002.**

| Manner of Death                  | Number of Fatalities (%) |
|---------------------------------|--------------------------|
| Aircraft Crash                  | 42 (49%)                 |
| Fall                            | 9 (11%)                  |
| Drowned                         | 7 (8%)                   |
| Struck by Object / Crushed      | 6 (7%)                   |
| Vessel Related Drowning         | 5 (6%)                   |
| Vehicle Crash                   | 5 (6%)                   |
| Suicide                         | 2 (2%)                   |
| Other                           | 9 (11%)                  |
| **Total**                       | **85 (100%)**            |

**Table III. Manner of Death for Selected Scientific Workers in Alaska, 1990-2002.**

| Manner of Death                  | Guide | Biologist | Park Ranger / Forestry | Engineer | Total |
|----------------------------------|-------|-----------|------------------------|----------|-------|
| Aircraft Crash                   | 19    | 6         | 3                      | 6        | 34    |
| Fall                             | 4     | 2         | 2                      |          | 8     |
| Drowned                          | 2     | 1         |                        |          | 3     |
| Struck by Object / Crushed       |       | 1         | 1                      | 1        | 2     |
| Vessel Related Drowning          |       |           |                        | 1        | 1     |
| Vehicle Crash                    | 1     | 1         |                        | 2        | 2     |
| Suicide                          | 1     |           |                        |          | 1     |
| Other                            | 1     | 1         | 2                      |          | 4     |

**CONCLUSIONS**

Scientific and professional workers in Alaska experienced a substantial number of fatalities from traumatic injury. Nearly half of these deaths occurred in aircraft crashes. The 85 scientific and professional workers who died in Alaska during 1990-2002 were engaged in a wide variety of professional disciplines: engineers (mechanical, systems, chemical, civil, aerospace, marine), geologists, seismologist, biologists, fishing, mountaineering, and hunting guides, park rangers, and ship’s officers. Although this group is somewhat artificial, based upon state licensing requirements, what they all have in common are jobs that are not commonly regarded as dangerous. In Alaska, however, the hazards of working in the rugged terrain and harsh climate are the same for this group as they are for other high-risk occupations studied thus far, and would thus appear to warrant similar precautions as those taken by occupations more widely regarded as hazardous.

Avoiding flying into limited visibility conditions, refraining from pressuring charter or air taxi pilots to fly into marginal conditions, and exercising caution during fish and wildlife spotting (to avoid mid-air collisions and "moose stalls") might improve one’s chances of surviving such trips. Workers should consider enplaning only aircraft with shoulder harness restraint systems and should wear the harness during all phases of flight (2). Those workers who will be flying in helicopters, or flying in fixed-wing aircraft in rough conditions, should consider wearing crash helmets at all times that the vehicle is in motion and/or airborne (10). All workers should wear flotation devices when wading or operating or riding in boats and marine vessels (1). All workers who will be climbing should obtain and use adequate equipment and assure that they are trained in proper climbing and rescue techniques.
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George Conway
CDC/NIOSH/DSR Alaska Field Station
4230 University Dr. Suite 310
Anchorage, AK 99508
USA

Email: gconway@cdc.gov