

The Financial Burden of Injury-Related Hospitalizations to an Alaska Native Health System

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ABSTRACT

The injury death rate in Alaska for American Indians and Alaska Natives is more than triple the injury death rate for the United States. We examined the direct medical expenditures for injury-related hospitalizations to one Alaska Native health care system, the Tanana Chiefs Conference in Interior Alaska, to identify priorities for injury prevention and to promote efforts at prevention. The total expenditure for the 511 injuries resulting in hospitalizations from 1994-1998 was \$4,145,440. Suicide attempts, falls, and acts of violence were the most frequent causes of injury hospitalization. Injuries caused by acts of violence, suicide attempts, and falls had the highest overall expenditures. On a per-victim basis, unintentional injuries involving the use of firearms and snowmobile/all-terrain vehicle injuries were the most expensive. We hope this report will raise the visibility of injuries as a prevention priority for Alaska Native communities, Native health systems, and community action programs.

INTRODUCTION

In Alaska, the age-adjusted injury death rate (1995-1998) for American Indians/Alaska Natives is 166.5 per 100,000 population. This rate is more than double the injury mortality rate for all races in Alaska (78.2 per 100,000) and more than triple the

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injury death rate for the United States (49.7 per 100,000) (1). Alaska's injury death rate among children and youth, snowmobile-related death rate, and waterborne fatality rate are the highest in the nation (2-4). Alaska's occupational injury fatality rate is five times higher than the U.S. average (5). In addition to suffering and loss of life, injuries impose an enormous financial burden to individuals and society. A Report to Congress estimated that the aggregate lifetime cost to the U.S. economy for persons injured in 1985 was \$158 billion (6).

Despite the high rate of injuries among Alaska Natives, there has been no previously-published estimate of the expenditure for injuries by an Alaska Native health system. Estimates of expenditures are vital, both to identify priorities for injury prevention and to convince decision-makers to allocate additional resources for prevention. We examined the direct medical expenditures for injury-related hospitalizations by one Alaska Native health care system, the Tanana Chiefs Conference in Interior Alaska.

BACKGROUND

The Tanana Chiefs Conference (TCC) Department of Health Services provides comprehensive health care to nearly 14,000 Alaska Natives and American Indians living in a 225,000 square mile region in the interior of Alaska. Over half of this service population is located in or around Fairbanks, Alaska. The remaining population lives in 43 villages, most of which are located along rivers (including the Yukon) and lack access to highways (7). Intentional and unintentional injuries are the leading cause of death among this population, with a crude death rate of 172 per 100,000 population (1995-1997). Heart disease (136 per 100,000) and cancer (101 per 100,000) are the second and third leading causes of death (8).

TCC is a non-profit corporation with 650 employees, a 43-member board of directors, and an 8-member health board. Funding for health care comes primarily through an Indian Health Service contract

(almost \$28 million in FY 1999) and a State of Alaska Health Grant (\$1.3 million in FY 1999). In addition to its 27 village clinics, TCC administers two primary care health centers, a mental health counseling center, dental and eye clinics, a substance abuse treatment center, and several other health programs.

Injured TCC patients receive emergency health care from the nearest medical facility. This might be a village clinic operated by a health aide, a regional clinic staffed by a physician's assistant, or a regional hospital with an emergency room. TCC does not own or operate an inpatient facility. Patients requiring hospitalization are transported to either the privately-owned Fairbanks Memorial Hospital (FMH), the Alaska Native Medical Center (ANMC) in Anchorage (approximately 360 miles south of Fairbanks), or the Harborview Medical Center in Seattle.

Medical expenses associated with injury hospitalization at FMH, including inpatient physician visits and follow-up outpatient clinic visits, are paid by TCC's Department of Health Services. All other medical services not directly available from TCC (such as ambulance transports, emergency room visits, radiology, physical therapy, and visits to specialist physicians) are paid by TCC's Contract Health Services (CHS). Indian Health Service (IHS) regulations require that alternative funding resources be billed before TCC can pay for medical services. These alternative resources include self-pay, Medicaid, Medicare, Workers' Compensation, the US Veterans Administration, private insurance, and military benefits. Typically, these alternative funding and medical care resources cover up to 80% of accrued medical costs. The remaining charges and medical expenses are paid by TCC. Approximately 60% of TCC's service population has access to at least one form of alternative funding.

Transport and medical expenses accrued by injured patients that are referred to ANMC are absorbed by ANMC's health care system. Patients requiring medical services not available at the ANMC are referred by ANMC to an alternate health care facility, primarily Harborview Hospital. The patient's medical expenses, including all transportation costs resulting from ANMC's referral, are then covered by ANMC's contract health care system.

Because of these alternative funding streams, the TCC health system is only responsible for the medical costs of injury hospitalizations at FMH. The medical expenditures we sought to quantify therefore included contracted hospital charges for injured patients at FMH, TCC payments for other contracted health services (such as ambulance service,

ER visits, x-ray, surgery, and physical therapy), and the expenditure for health services provided to these injured patients directly by TCC (such as inpatient visits by TCC physicians and TCC outpatient clinic visits post-hospitalization).

METHODS

We use the terms "expenditures" and "costs" interchangeably to refer to the dollar amounts actually paid by the TCC health system for injury-related hospitalizations and follow-up care. To obtain the list of patients eligible for this study, the Health Information and Record Services Department of FMH conducted a computerized search for injury-related hospitalizations. The search included all age groups and both sexes of Alaska Natives and American Indians admitted to FMH between January 1, 1994 and December 31, 1998. Injury patients were identified by using International Classification of Diseases, 9th Revision, Clinical Modification (ICD-9-CM) E-Codes (external cause of injury codes). All hospitalizations having E-codes between 800 and 999 were included, with the exception of E-codes 870-876 (injuries "due to misadventures to patients during surgical and medical care"). For each injury hospitalization, we received the admission date or date of service, the patient's name and social security number, the primary external cause of injury (E-code), and the hospital charges paid by TCC to FMH.

Payments made for other medical services (such as ambulance transports, emergency room visits, and radiology services) associated with specific injury hospitalizations were retrieved from TCC's internal health care database. TCC uses a computerized patient information system called the Resource and Patient Management System (RPMS). Approximately 300 Indian Health Service and Tribal Hospitals and clinics throughout the continental U.S. and Alaska use the RPMS database. Using names and social security numbers from the FMH records, we obtained individual patient accounts through RPMS. Individual contract health patient accounts do not include E-Codes. We therefore linked these payments to injury hospitalizations by date of service and relation to the type of injury. For example, a date of admission for an injury hospitalization E-coded as "collision on snowmobile" would be linked to TCC contract health service payments sharing the same or adjacent dates. We tested this method of linking associated contract health payments to injury hospitalizations by examining a ten percent sample of patient medical records (51 charts from 511 total patients). Physician notes and clinical

summaries included in these files were used to confirm each contract health expenditure. The RPMS expenditures matched the services documented in the medical records in 91% of instances. Most inaccuracies stemmed from incorrect E-code assignments.

The remaining costs associated with injury hospitalizations involved services provided directly by TCC. These consisted of inpatient visits from TCC employed physicians; follow-up visits to TCC's outpatient clinic; pharmacy, dental, and optometry services; and psychiatric counseling. Payment records for these services was also obtained using the (RPMS) database. Unlike contract health payment records, these could be queried by E-code and then matched by patient name to injury hospitalizations.

The data was analyzed using standard spreadsheet software (Microsoft Excel). Approval for this study was provided by the President of the Tanana Chiefs Conference.

RESULTS

The total amount paid by the Tanana Chiefs Conference for the 511 injuries resulting in hospitalization at FMH for the five-year period 1994-1998 was \$4,145,440 (Table 1). Hospital charges, other contracted services (such as ambulance transports and emergency room visits), and TCC-provided medical services are included in this total. Suicide attempts were the most frequent cause of injury hospitalizations (143), followed by falls (91), acts of violence (80), and motor vehicle crashes (52). These four causes accounted for 72% of all injury hospitalizations.

Injuries caused by acts of violence had the highest overall expenditure, amounting to \$816,000 or 20% of the total spent by TCC for injuries during the

5 years of the study. Suicide attempts (\$655,000), falls (\$652,000), motor vehicle crashes (\$600,000), and snowmobile/ATV injuries (\$508,000) were the other injury causes each accounting for over one-half million dollars in expenditures.

On a per-victim basis, unintentional injuries involving the use of firearms proved to be the most expensive cause of injury hospitalizations. The average expenditure for hospitalizations caused by unintentional firearm injuries was \$17,250. This category of injuries included hunting injuries and the mishandling of firearms, but not suicide attempts or acts of violence. Injuries from snowmobile and all-terrain vehicles (ATV's) were second, with a per-victim expenditure of \$16,933. Suicide attempts, which were the most frequent cause of hospitalized injury in this series, had the lowest average expenditure per victim (\$4,580).

Between 1994 and 1998, the annual expenditure for injury hospitalizations to TCC rose from \$452,000 to \$1,124,000 (Table 2). This 250% increase in annual expenditures occurred because of both an increase in the number of injury hospitalizations (63 in 1994 versus 125 in 1998) and an increase in the average expenditure per victim (from \$7,200 in 1994 to \$9,000) in 1998.

DISCUSSION

The \$4.1 million expenditure for injury hospitalizations during this five-year period represents 8.5% of the \$48.8 million total Federal dollars spent by TCC for health care over the same time period (9). While \$4.1 million is obviously a major expense, it represents only a small proportion of the total medical costs associated with injuries to the TCC service

population. We did not examine the medical costs covered by third-party programs (such as Medicare, Medicaid, and private insurance), nor the costs absorbed by the Alaska Native Tribal Health system, Veterans Administration, or Workmen's Compensation. Over 50% of TCC's service population has access to one or more forms of this financial medical assistance (10). The overall figure for expenditures is an under-estimate even

Cause	Total Number (%)	Total Expenditures by TCC	Expenditures Per Victim
Suicide attempt	143 (28)	\$655,000	\$ 4,580
Fall	91 (18)	\$652,000	\$ 7,164
Violent act	80 (16)	\$816,000	\$10,200
Motor vehicle	52 (10)	\$600,000	\$11,538
Miscellaneous other causes	32 (6)	\$282,000	\$ 8,057
Snowmobile/ATV	30 (6)	\$508,000	\$16,933
Unintentional poisoning	30 (6)	\$142,000	\$ 4,733
Sports/recreation	25 (5)	\$135,000	\$ 5,400
Environmental hazard	16 (3)	\$149,000	\$ 9,313
Firearm	12 (2)	\$207,000	\$17,250
TOTAL	511 (100)	\$4,145,000	\$ 8,112

	1994	1995	1996	1997	1998	Total 1994-98
Total number of injury hospitalizations	63	84	97	142	125	511
Average TCC expenditure per injury victim	\$7,200	\$6,300	\$9,600	\$8,500	\$9,000	\$8,100
Total TCC expenditures for injury hospitalizations	\$452,000	\$528,000	\$836,000	\$1,205,000	\$1,124,000	\$4,145,000

with regard to injury patients hospitalized at FMH. We do not know, for example, how many patients with injuries were missing E-codes and therefore would not be included in our study. Furthermore, only 4% of all injuries in the U.S. result in hospitalization (6). We did not include the costs of injuries resulting only in a visit to the emergency room or outpatient clinic, nor did we attempt to estimate the enormous costs associated with injury-related deaths.

The causes of injury that deserve priority for intervention vary, depending on the criterion chosen for decision-making.(11) By frequency and total expenditures by TCC, the priority injury types are suicide attempts, falls, and acts of violence. However, the injury types that have the highest expenditure-per-victim are unintentional firearm injuries (\$17,250), injuries from snowmobiles and ATV's (\$16,933), and motor vehicle crashes (\$11,538).

Injury rates for specific types of injury vary widely by geographic area. Firearm related death rates (1990-1992) for Alaska Natives, for example, range from 18.5 per 100,000 population in Southeast Alaska, to 36.8 in Interior Alaska, to 85.8 in Barrow (12). Therefore, other Alaska Native health systems must analyze the data for their own service populations to set priorities for injury prevention, rather than generalizing the results from TCC.

Many interventions to reduce injuries have been shown to be highly cost effective.(6,13-17). Yet a great disparity exists between the amount of money spent for the treatment of injuries compared to the amount spent on prevention. During the five years of this study, expenditures by TCC for their Injury Prevention Program equaled \$550,000, 13% of the expenditures associated with injury hospitalizations during the same time period. We hope this report will raise the visibility of injuries as a prevention

priority for Alaska Native communities, Native health systems, and community action programs (18,19).

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