

## PATTERNS OF INJURY MORTALITY AMONG ATHABASCAN INDIANS IN INTERIOR ALASKA 1977–1987

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*Abstract: It was found that almost one-half of all Interior Alaska rural fatalities from thirty-six villages are due to unintentional and intentional injury. Drowning, motor vehicle crashes, hypothermia, fire, carbon monoxide poisoning and air transport crashes accounted for over 32% of all deaths; suicide and homicide account for over 15%. Many of these deaths are preventable.*

DOYON, Limited is one of twelve regional Alaska Native corporations formed as a result of the Alaska Native Claims Settlement Act of 1971 (ANCSA). As a regional Native corporation, its primary function is to manage the region's monetary settlement of ANCSA and invest in profit-making ventures. Native residents of interior Alaska are, for the most part, enrolled in DOYON, Limited as shareholders of the corporation.

A non-profit social services entity, the Tanana Chiefs Conference, Inc. (TCC), was incorporated in 1971 as well. DOYON shareholders are generally eligible for services provided by TCC.

Tanana Chiefs Conference initiated a health care program in 1973. Passage of the Indian Self-Determination and Educational Assistance ACT (PL 93-638) and the Indian Health Care Improvement Act (PL 94-437) in 1975 and 1976, respectively, expanded available opportunities for local management and control (Tanana Chiefs Conference, 1988–1992). At that time, TCC's Health Services Department changed its emphasis from planning and advocacy to the actual delivery of services.

The first village-oriented Accident Prevention Program, as it was then called, was started by TCC in 1975. That program, now referred to as Community Injury Control (CIC), continues today under the guidance of the Health Education Department, providing services to 30 of 36 villages.

The racial composition of the TCC service delivery area is predominately Athabascan Indian. TCC region villages range from nearly 100% Native to a few villages in which non-natives predominate. A general rule, however, is: the smaller the village, the higher the proportion of Alaska Natives who reside there.

Villages range in size from 37 people (Birch Creek) to over 1,000 (Galena) and are spread over an area larger than the state of Texas. Most of these communities are accessible only by boat or by airplane.

### The Problem

In an effort to guide planning and development, the Tanana Chiefs Conference formulated ten health goals and specific objectives to be achieved during the five-year period, 1988–1992. This study was conducted as part of the implementation of one of those goals: to reduce the accidental death rate among the Tanana Chiefs Conference population.

The specific objective associated with this goal is to reduce the accidental death rate from a five-year (1981–1985) average of 160.7 per 100,000 to 135 per 100,000 by 1992 (Tanana Chiefs Conference, 1988–1992). (This rate includes the urban population).

To meet this objective, specific information concerning the pattern of mortality in the villages had to be obtained. TCC Community Injury Control provides services to thirty villages. The program, however, does not have a reliable injury control surveillance system and it is unknown whether or not the 6,041 Alaska Natives served by TCC exhibit the same mortality patterns as the TCC urban/rural Alaska Native population of approximately 12,000.

Although there are difficulties in presenting crude mortality rates when working with small populations such as TCC's, comparisons will be made between American Indians and Alaskan northern regions. The comparisons are made keeping in mind that isolated incidents have a disproportionate effect on mortality rates (see Table 1).

### Limitations

The Alaska State Bureau of Vital Statistics does not always accurately record the date of death, the village of residence, race or cause of death. By comparing data from Vital Statistics to the regional Native corporation shareholder records, discrepancies were noted and corrected. Appendix A lists instances where data provided by the State do not correspond to the cause of death reported to the author by a Community Health Aide and/or family member.

Additionally, it was often difficult to verify places of residence. There are 178 fatalities on the DOYON deceased rural shareholder records which do not appear on the Bureau of Vital Statistics records. Further inquiry disclosed that 188 of those individuals were not village residents; 38 were, but some died in an Anchorage or Fairbanks facility. In four cases of drowning, bodies were not recovered, and consequently, were not included in the Bureau's report. Of the 22 remaining, the individual's place of residence and place of death could not be verified. To be conservative, they were not included in this study. There were another 20

Table 1  
 Leading Causes of Death in Interior Alaska, by Race,  
 Five Year Average, 1981-1985. Mortality Rates  
 per 100,000 population by Race of Descendent

Cause of Death	Native		Non-Native		Total	
	Rank	Rate	Rank	Rate	Rank	Rate
Heart Disease- Hypertension	2	87.4	1	81.2	1	82.1
Accidents	1	160.7	2	63.3	2	76.9
Malignant Neoplasms	3	77.6	3	62.7	3	64.7
Suicide	5	34.1	4	13.7	4	16.5
Homicide	7	27.9	5	11.2	5	13.4
Alcohol Diseases	4	36.2	7	8.4	6	12.2
Pneumonia & Influenza	6	33.5	6	8.7	7	12.1
Congenital Anomalies	8	18.0	8	7.8	8	9.2
Perinatal Period Conditions	9	9.5	9	5.9	9	6.4
All Causes	—	655.1	—	338.7	—	381.8

Source: Tanana Chiefs Long Range Plan, Book II-87, 1988.

injury deaths for which the cause was unknown, creating the Unspecified and Other Injury category.

Limitations on the completeness and accuracy of Vital Statistics data noted are relevant to this document. Other studies have reported similar limitations when using state statistics. Marshall and Soule (1988) report that of 215 accidental deaths recorded by the Bureau of Vital Statistics, only 164 were actually accidental. Of the disparity (51), forty were mis-recorded, three were double-counted or non-human remains and eight reported as accidents were determined by the authors to be suicides. An additional thirty-seven deaths recorded in the coroner's files (but not reported in the Bureau's printout) were added to the 164 for a total 201. It is likely that errors such as these also occur in the Bureau's report of fatalities within the Tanana Chiefs Conference region.

## Background

### Injury Prevention

The relationship between psychosocial variables and injuries has been examined by Langley (1984) who highlights common methodological problems as well. He argues that research of this nature has little potential for being translated into practical countermeasures and, as such, should be accorded low priority.

Pless and Arsenault (1987) contrast studies that emphasize changes in knowledge or behavior to prevent childhood injuries with studies that report actual reductions in injuries. The most successful programs are those based on social learning principles and those that combine education with legislative change or modifications in regulations.

That a reduction of disability and/or death from childhood injury can be achieved through structural modification by making environments less permissive is argued by Wilson and Baker (1987). The structural approach suggests preventive strategies, but stresses that the strategies must not require frequent individual action and should not depend on the behavior of the children. Because of the high cost of living in Alaska, especially in the rural villages, federal poverty guidelines are unrealistic. A significant proportion of rural Alaskans live in poverty (Northern Alaska Health Resources Association, 1985).

Robertson (1985) states that in exploring risk factors for severe injury among American Indians, one should look to general explanations for severe injury among people with low incomes in rural areas.

Nationally, injuries rank fourth among the leading cause of death after heart disease, cancer and stroke. They represent the leading cause of death for people between 5 and 44 years of age, accounting for the most potential years of life lost to society for those under 65. Motor vehicle crashes are a prominent cause of preventable injuries. Failure to use seat belts, reckless driving, speeding, and substance abuse are the most common and preventable risk factors. But, they are the toughest to change in comparison to vehicular and road design modifications. The 55-mile-per hour speed limit, together with campaigns to raise awareness of the dangers of drinking and driving and to popularize the child restraint laws and seat belt laws reduced the motor vehicle death rate by nearly one-fifth between 1973 and 1987 (McGinnis, 1988).

### **Mortality Patterns**

Literature on injury control and risk factors leading to fatalities in Alaska is virtually non-existent. However, there are publications that do address the mortality patterns.

The Northern Alaska Health Resources Association published an Accident Prevention Plan (1981). It reported the findings of an Accident Prevention Task Force which analyzed statistical indicators of the nature and extent of accidental death in northern Alaska. For the purposes of their work, northern Alaska included the population of the Fairbanks North Star Borough, the interior (Tanana Chiefs Conference region), Maniilaq (Kotzebue and the surrounding area) and the North Slope Borough (virtually the entire population north of the Brooks Range).

Due to the difficulty in obtaining accurate data on non-fatal injuries, the Task Force used mortality statistics because they are more reliable

than injury statistics. "Causes of death and death rates within any population tell a great deal about the health of the people. They are also indicators of larger numbers of people who suffer from the same problems but to degrees which do not cost their lives" (Northern Alaska Health Resources Association, 1985, p. 94). Highlights of their report indicate:

There is a marked variation among regions relating to injury mortality. Maniilaq (Kotzebue area) has an accidental death rate 530% higher than the U.S. rate of 47.9/100,000 and 250% higher than the all-Alaska rate of 92.9. The Tanana Chiefs Conference rate is 480% above the U.S. rate and 220% above the state. The North Slope and Fairbanks North Star Boroughs are similar to the all-Alaska rate, but exceed national averages by over 200%.

In each region, males are more likely than females to suffer accidental death. The male-to-female ratio tends to be approximately four to one (p. 110).

Alaska Natives experience a larger percentage of accidental fatalities than their proportion of the population would suggest. In 1981, Natives accounted for 38.8% of all injury deaths while representing only 20% of the population.

### **Fire Safety**

Homes in interior Alaska are typically of log or frame construction. Bedrooms are built to one side or partitioned from the main living area by curtains. Kitchens are not separated from the living area. Most homes are heated by wood or oil-burning stoves located in the central living area.

The Alaska Council on Science and Technology Fire Safety Task Force conducted a 1982 study of smoke detectors in rural areas. The purpose was to identify the best detector for rural homes. Ionization and photoelectric detectors were placed in six villages. Five homes in each village tested three different types of detectors. In total, ninety were considered.

No one type tested superior to another. The ionization detectors tended to respond to cooking activities more often than those of the photoelectric variety. It was found that attitude was the overriding factor in determining the acceptance and effectiveness of the units. That is, type was not as important as the feelings of the household relative to fire, false alarms and smoke detectors in general. It was apparent that residents were willing to tolerate a large number of false alarms because of their belief in the life-saving value of the detectors (Alaska Council on Science and Technology, 1982).

The Task Force recommended that smoke detector portions of future fire safety programs emphasize both education and instruction. Village coordinators of the project, however, did not believe their programs had much effect in heightening the awareness of the general populace to

the usefulness of the instruments (Alaska Council on Science and Technology, 1982).

### **Violent Deaths**

Suicide and homicide comprise the category of violent death, or intentional injury. The implementation of strategies that automatically protect people can be extended to intentional injuries as well as unintentional (accidental) injuries. Many, perhaps the majority, of homicides and suicides are impulsive acts which would not necessarily be repeated. It is the lethal nature of the method at hand more than the planned intent of the people involved that results in death (Robertson, 1983).

*Suicide.* A comparison of 1970 and 1980 data related to the suicide rate of Alaska Natives indicated an average annual *increase* of 58% (Institute of Social and Economic Research, 1986). This too is a continuing and growing concern.

Travis (1983) reported that the Alaska Native suicide rate (90.9 per 100,000) between 1975 and 1979 in Northwest Alaska was more than seven times the national average. Factors related to this behavior were identified as alienation, loss of family, low income, alcohol abuse, high unemployment and lack of education. The average age of victims was 22.5 years.

According to Fisher (1981), Alaska has one of the highest rates in the nation for depression, alcohol, drug abuse, and adolescent suicide. A study of forty adolescents referred to a treatment center was conducted by Fisher. The report maintains that a rapid change of lifestyle has resulted in a loss of community and cultural identity. Additionally, a disintegration of family life affects both Native and non-native children. The transient population and harsh climate were also factors in suicidal behavior.

Marshall and Soule (1988), in their study of suicides in southwest Alaska, found the population most at risk to be single males between the ages of fifteen to twenty-nine. They account for 73% of thirty-eight cases of suicide studies.

A study by the Alaska Native Health Board found that during the 1960s, 25–34 year old males were the highest at-risk group for suicide. During the early 1970s, the same group remained highest, but the 15–24 year old males increased disproportionately. By the early 1980s, the highest at-risk group had become the 15–24 year old Alaska Native male (Alaska Native Health Board, 1985).

*Homicide.* The 1987 National Adolescent Student Health Survey assessed the extent to which adolescent U.S. students may be at risk for several health problems as well as their perceptions of those risks. The survey included questions on unintentional injuries, fighting and violence, and suicide. Although it does not address homicide, it points to activity which could lead to homicide.

Forty-nine percent of the boys and 28% of the girls reported having been in at least one physical fight during the past year. Twenty-three percent of the boys said they had carried a knife at least once during the past year, and 7% daily (Morbidity and Mortality Weekly Report, 1989).

During the years 1979-1983, homicide was the sixth leading cause of death in Alaska. Homicide rates in the rural areas of the TCC regional are 50% higher than those in the urbanized Fairbanks North Star Borough and nearly 50% higher than the statewide average (Northern Alaska Health Resources Association, 1985).

*Alcohol.* Alcohol was directly involved in two-thirds of the suicides for both sexes in the Marshall and Soule (1988) study. Abusive use of alcohol, while not the topic of this report, must be considered a causal factor in many of Alaska's accidental or intentional injury and/or self-destruction.

Waller (1984) suggests the use and abuse of alcohol is probably the most consistent human factor identified in serious unintentional injury, whether it takes place on a road, in the home, at public places, or during recreational activity. It also contributes heavily to the occurrence of assault, homicide, and suicide.

However, an emphasis on alcohol as the single cause of injury may be counterproductive. Robertson (1985) states there is no objective evidence which supports the claims that the excess of injuries among American Indians is almost totally the result of heavy use of alcohol. Although alcohol impairment may increase the probability of drowning, starting a fire or being unable to escape a fire, falling, or being injured while using mechanical items, alcohol is not a complete explanation of these forms of injury.

In alcohol and motor vehicle crash studies, it was found that alcohol does contribute to incidence but plays a larger role in severity of injury. Possible reasons are: (a) alcohol increases reaction time to hazards, (b) alcohol increases aggression in driving, and (c) the probability of surviving the crash is reduced by alcohol's effect on resilience or medical treatment. How much each contributes to the alcohol-related crash is unknown (Robertson, 1985).

In Alaska, alcohol involvement in fatal motor vehicle accidents ranged from 52% to 73% between 1979 and 1982, averaging 66% for the period. For juveniles, 74% of all motor vehicle fatalities were alcohol related. In addition, almost 84% of all 1980 homicides in the state were alcohol-related (Northern Alaska Health Resource Association, 1985).



## Methods

### **DOYON, Limited**

Confidential records relating to existing and deceased shareholders maintained by DOYON, Limited were analyzed. Data contained information on: (a) name of shareholder, (b) name of deceased, (c) address, (d) social security number, (e) birth date, (f) date of death, (g) sex, (h) status within the corporation, (i) Native status, and (j) village enrollment.

The entire listing served as the denominator population. After manually eliminating out-of-region and non-Native shareholders, the 1981 population, ages 5–65 was calculated to be 6,041. This is very close to the 1980 census information (which includes ages 0–4) of 6,600 rural residents.

### **Bureau of Vital Statistics**

Vital Statistics provided computer information listing all deaths, Native and non-Native, by year (1977–1987) within the DOYON/Tanana Chiefs Conference region. The information contained ICD E codes for external causes of injury. Data for 1987 were provisional, however, and did not include fatality coding.

### **TCC Community Health Aides**

After comparing the DOYON, Limited and Vital Statistics information, there were 289 cases which required clarification or additional information:

1. Place of actual residence versus place of death. If the person was a DOYON shareholder and not residing in a village, they were not included in the study.
2. Clarification on fatality incidents such as “environmental cold.”
3. Clarification of deaths listed as “other cause.”

Tanana Chiefs Conference has Community Health Aides in many of its villages who were especially helpful in providing or corroborating much of the information required.

### **Assessment**

Mortality patterns were assessed according to gender, age, cause of death, and, in the violent and drowning cases, the residence of



the deceased. To provide consistency, the following age groupings used were: (a) 5-14, (b) 15-24, (c) 25-44, (d) 45-64, and (e) 65+ (Tanana Chiefs Conference, 1988-1992).

Fatalities were then grouped into categories for ease of data handling and reporting: (a) violent death; (b) homicide; (c) suicide; (d) unintentional [accidental] death; (e) drowning; (f) hypothermia with and without ETOH; (g) vehicle; (h) fire; and (i) unspecified, including firearms and air transport.

**Results—Mortality Pattern**

The Tanana Chiefs Conference mortality pattern from 1977-1987 is divided into three categories: non-injury, unintentional, and violent. Almost one-half of all deaths are caused by intentional or unintentional injuries (see Figure 1).

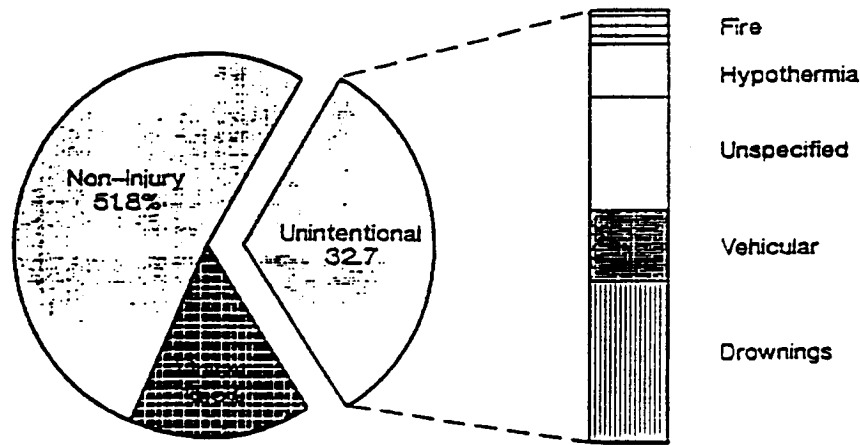


Figure 1  
Mortality Pattern—Tanana Chiefs Conference Region, 1977-1987.

The Northern Alaska Health Resources reported a male/female accidental death ratio of four to one. The DOYON/TCC 15-24 and 25-44 age groups exhibit the same ratio for all reported deaths. However, the 5-14, 45-64 and 65+ age groups present a male/female death ratio of approximately one and one-half to one (see Figure 2).

**Injury Deaths**

Unintentional deaths examined by age indicate that the 25-44 age group is most at-risk for injury-related fatalities, with the 15-24 age

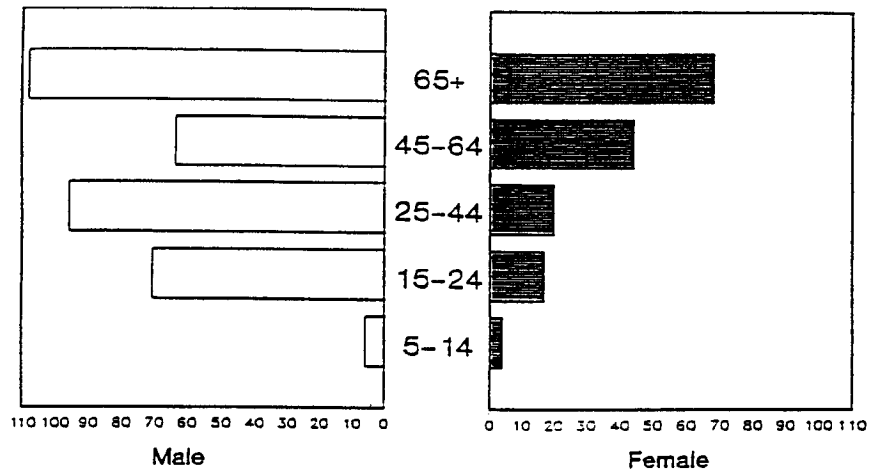


Figure 2.  
Number of Deaths from 1977-1987 DOYON Limited,  
Interior Alaska Shareholders.

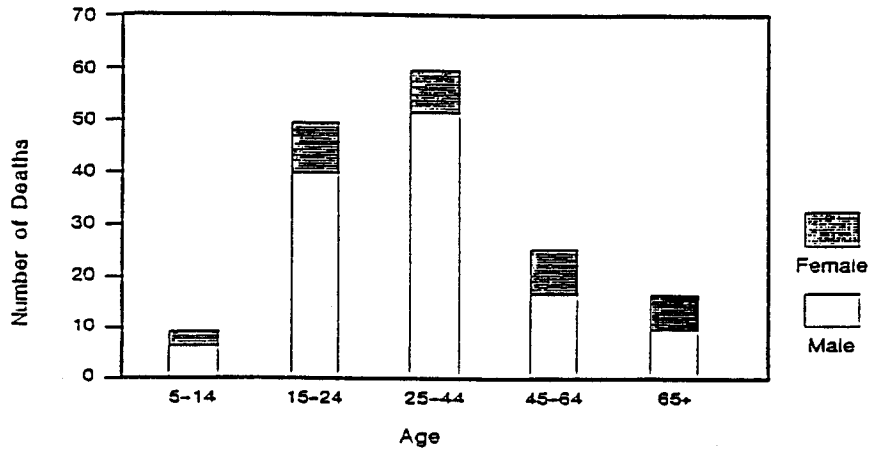


Figure 3  
Unintentional Injury - Tanana Chiefs Conference Region, 1977-1987.

group a close second. As expected, there is a considerable decrease in injury deaths among the 45-65+ age bracket (see Figure 3).

Drowning claimed 54 males and 12 females, resulting in a rate of 121.3 per 100,000. No other unintentional injury claimed as many lives (see Figure 4).

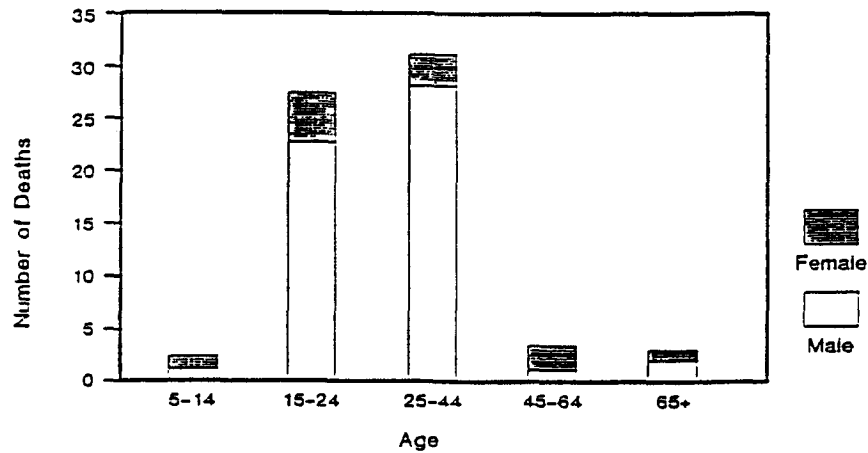


Figure 4  
Drownings—Tanana Chiefs Conference Region, 1977-1987.

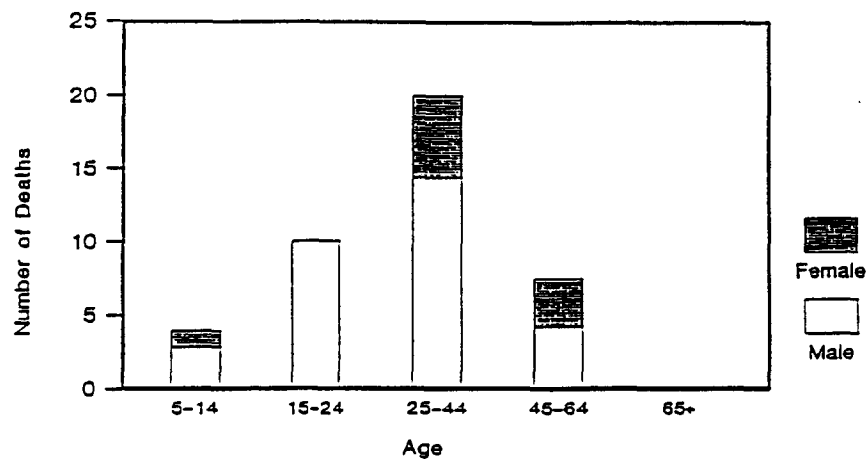


Figure 5  
Unspecified Injury Deaths—Tanana Chiefs Conference Region, 1977-1987.

The second category, unspecified and other injury deaths, includes one firearm accident, one hypothermia without ETOH, five gas or vapors poisoning and fourteen air transport deaths. Twenty-seven deaths were due to an unspecified injury (see Figure 5).

Vehicular-related deaths among eighteen males and seven females was the third category. Pedestrians hit by a motor vehicle (including snowmachines) accounted for seven deaths. There were no pedestrian

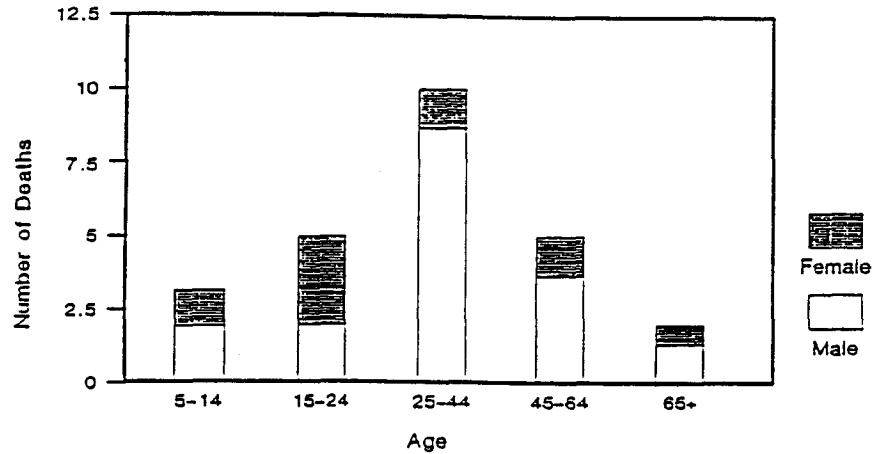


Figure 6  
Motor Vehicle Deaths—Tanana Chiefs Conference Region, 1977–1987.

fatalities between ages 11–33 during the study period. The occupant mortality rate was 38.6 per 100,000 and the pedestrian rate was 5.5 per 100,000. Both occupant and pedestrian fatalities are presented on the above chart (see Figure 6).

Hypothermia fatalities are listed by Vital Statistics as “environmental-cold.” Because Alaska Native people have developed successful cold weather survival skills which are learned by children at an early age, cold-related deaths required further investigation. Community Health Aides indicated that in every instance except one, hypothermia fatalities were alcohol-related. Of 20 cases, 19 people were observed drinking and later found dead by exposure to cold. The one non-ETOH hypothermia death occurred on a trapline. The hypothermia rate was 16.5 per 100,000 (see Figure 7).

Fire-related deaths claimed nine males and one female, resulting in a rate of 27.5/100,000. The ten deaths occurred in five villages: Allakaket, Nikolai, Northway, Shageluk and Telida. Thirty percent of the male deaths occurred in one village, twenty percent in another. One incident claimed three lives. The deaths occurred in each year of this study except 1979 and 1987. It is unknown whether or not the homes were equipped with smoke detectors (see Figure 8).

### Violent Deaths

Homicide and suicide claimed 65 males and 11 females. The 15–24 and 25–44 age groups both had 33 deaths; 28 and 29 males, respectively, during the 11 year period of this study (see Figure 9). Of 77 violent

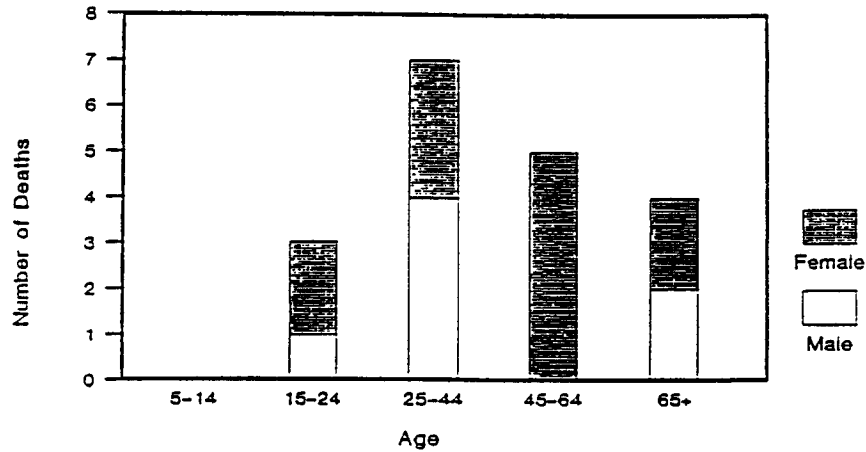


Figure 7  
Hypothermia with ETOH—Tanana Chiefs Conference Region, 1977-1987.

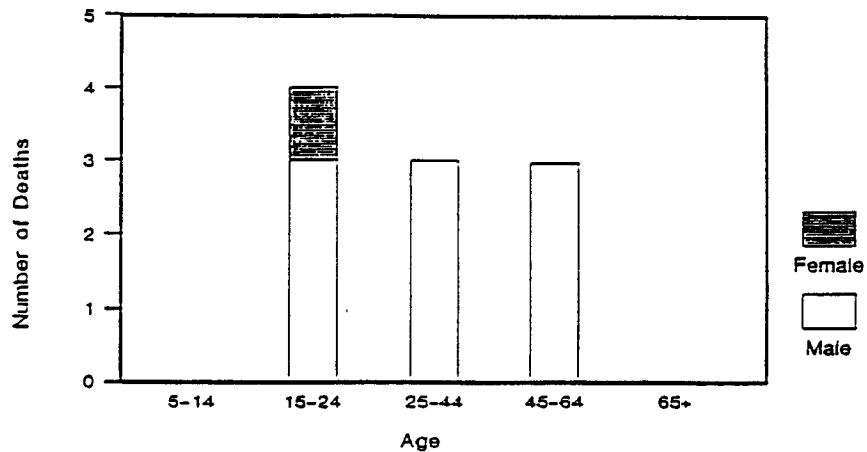


Figure 8  
Fire-Related Deaths—Tanana Chiefs Conference Region, 1977-1987.

deaths, 36 were due to homicide, resulting in a rate of 71.7/100,000. The 25-44 age group is most at-risk (see Figure 10).

Forty violent deaths were the result of suicide. Contrary to the Alaska Native Health Board findings that 25-34 year old males remained the highest at-risk group throughout the 1970s, this study indicates that of sixteen suicides in that age group, only three occurred prior to 1980. The remaining thirteen suicides took place during the 1980s. The 15-24 age

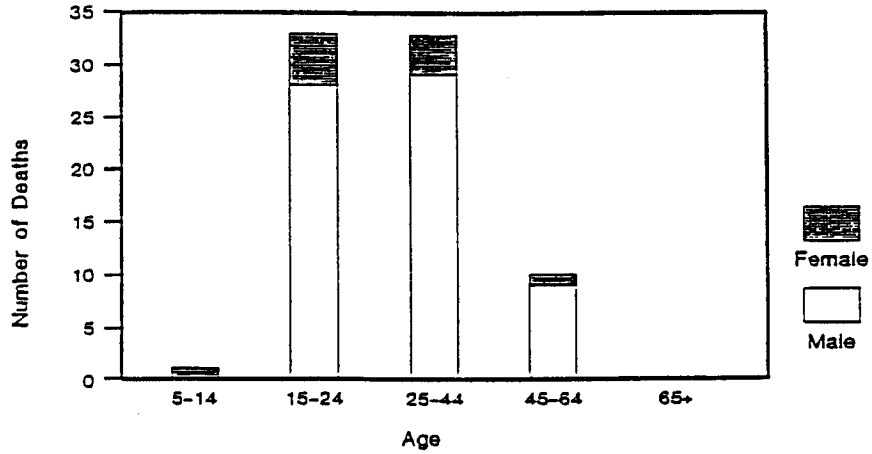


Figure 9  
Violent Deaths—Tanana Chiefs Conference Region, 1977–1987.

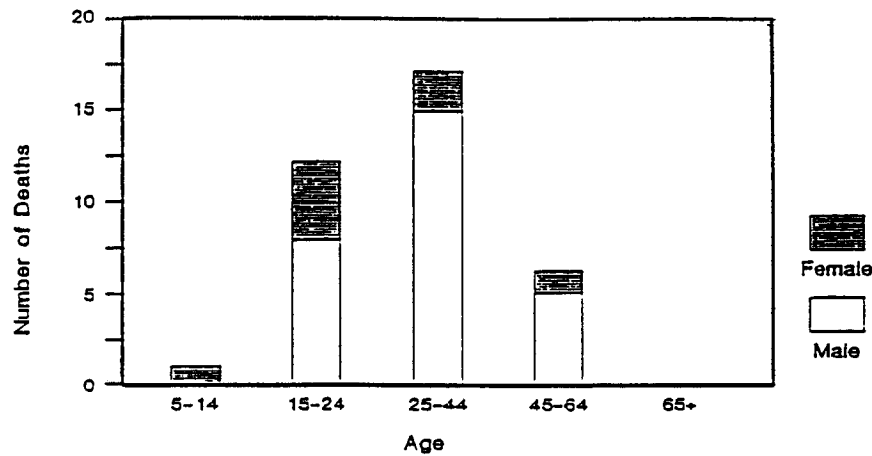


Figure 10  
Homicide Deaths—Tanana Chiefs Conference Region, 1977–1987.

group has been the highest at-risk group during this study period resulting in a DOYON/TCC region suicide rate of 55.1/100,000 (see Figure 11).

A comparison of the violent and injury fatalities reveals that violent deaths are the leading cause of fatalities within the TCC region. Drowning is second, followed by unspecified and other, motor vehicle, hypothermia with ETOH and fire (see Figure 12).

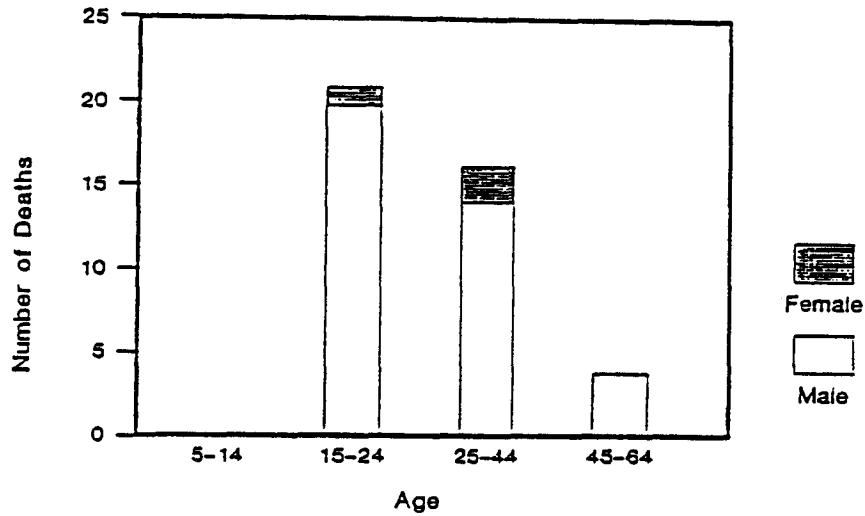


Figure 11  
Suicides—Tanana Chiefs Conference Region, 1977-1987.

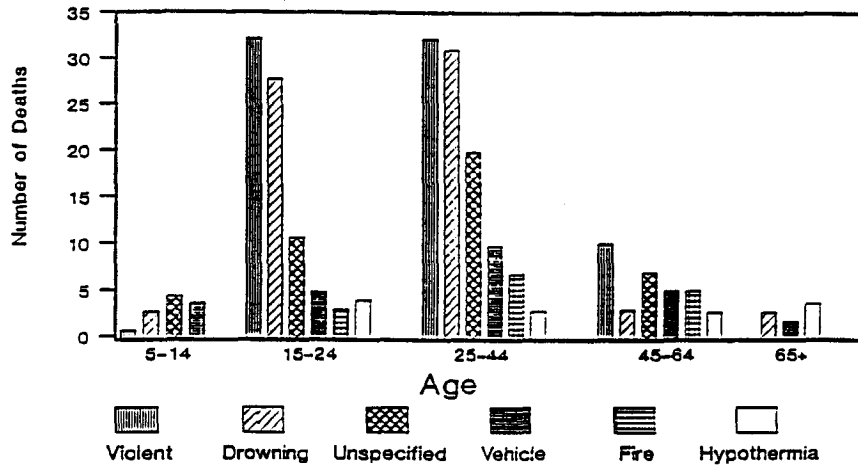


Figure 12  
Violent and Injury Fatalities—Tanana Chiefs Conference Region, 1977-1987.

Unintentional injury, homicide and suicide death rates were compared for DOYON/TCC and American Indians. If one assumes similarities between the two in areas such as cultural beliefs and practices,



unemployment rates, poverty levels, educational achievement, and rural lifestyle, then it would seem likely that the rates would be comparable. That, however, is not the case. DOYON/TCC residents exhibit a higher mortality rate in all areas except the American Indian motor vehicle occupant rate. Interior villages are connected by rivers rather than roads. This transportation system is reflected in a very high drowning rate of 121.3 compared to the American Indian rate of 8.5/100,000, a factor of 14.27 to 1 (See Table 2).

Table 2  
Death Rate by Category of Injury, 1977–1987 (per 100,000)

Category	DOYON/TCC	American Indian	Factor
Motor Vehicle			
Occupant	38.6	36.6	1.05:1
Pedestrian	5.5	12.9	0.43:1
Drowning	121.3	8.5	14.27:1
Fire	27.5	5.7	4.82:1
Falls	5.5	4.1	1.34:1
Excessive Cold	16.5	3.1	5.32:1
Firearm Accident	0.0	2.2	n/a
All Others	55.7	18.6	2.99:1
Total Unintentional	264.8	91.7	2.89:1
Suicide	55.1	13.0	4.24:1
Homicide	71.7	15.3	4.69:1

Sources:

American Indian data: Epidemiological Assessment of the Contributing Factors of Injury Mortality and Morbidity among American Indians. L.S. Robertson, Ph.D., Indian Health Service. p. 2, 1985.

DOYON/TCC data: Alaska Department of Health and Social Services. Vital Statistics. Computer print-out. 1977–1979. DOYON, Limited computer print-out.

In addition to comparing the TCC region to the American Indian population, a comparison of unintentional injury, suicide, and homicide was made between TCC and two other distinct Alaska Native regions, the NANA/Maniilaq region (Kotzebue and surrounding areas, composed of an Inupiat Eskimo population) and the North Slope Borough (an Inupiat Eskimo population north of the Brooks Range). Between 1979 and 1983 DOYON/TCC again exhibited the highest mortality rates for all categories except the NANA region's suicide rate of 76/100,000 (compared to the TCC rate of 46.34). (See Table 3).

Table 3  
 Causes of Death and Mortality Rates in Northern Alaska, 1979-1983  
 (Mortality rates per 100,000 population by residence of decedent)

CAUSE	DOYON/TCC	NANA/MANIILAQ	NORTH SLOPE
Unintentional Injury	241.68	186.20	165.34
Suicide	46.34	76.00	13.05
Homicide	62.90	3.80	43.51

Sources:

NANA/Maniilaq and North Slope data: Health Systems Plan for Northern Alaska 1985-1989. Table 50. Fairbanks, Alaska, p. 109, 1985.

DOYON/TCC data: Alaska Department of Health and Social Services. Vital statistics; computer printout. DOYON, Limited; computer print-out.

Trend Analysis plotting injury deaths reveals little change from year to year. Although a Community Injury Control program has been in effect throughout the period of this study, there has not been a reduction of injury-related fatalities. These data suggest that educational programs, such as TCC's, which do not incorporate environmental or legislative strategies are not effective for injury prevention. However, the trends are not conclusive and it is entirely possible that the rates could have been higher without the injury prevention program. It must also be noted that data to compute a trend line for the previous ten years (1967-1977) are not available (See Appendix B) and one cannot determine if there was an increase or decrease of injury deaths (see Figure 13).

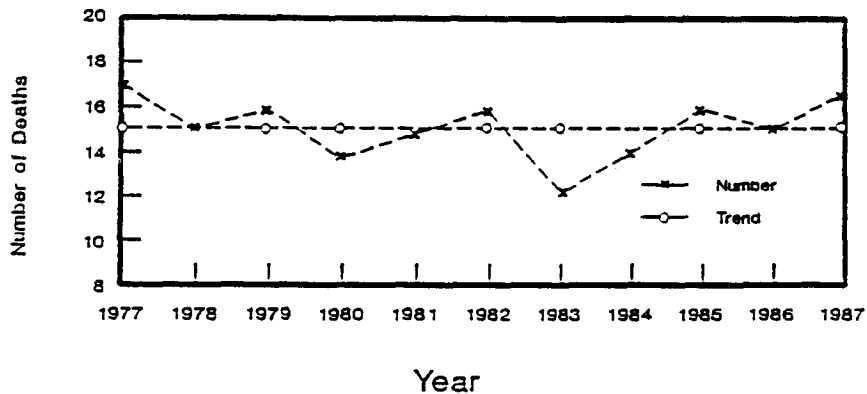


Figure 13  
 Trend Analysis—Unintentional Deaths TCC Region, 1977-1987.

A three year moving average of injury mortality rates was calculated to conform with an Alaska Area Native Health Service chart. The TCC region mortality rate exceeds the Alaska Native rate for each year presented. The region does follow the slight down-swing in accidental deaths from 1977–83, but shows an increase in 1987 which corresponds to the 1977 mortality rate of 281/100,000 (see Figure 14).

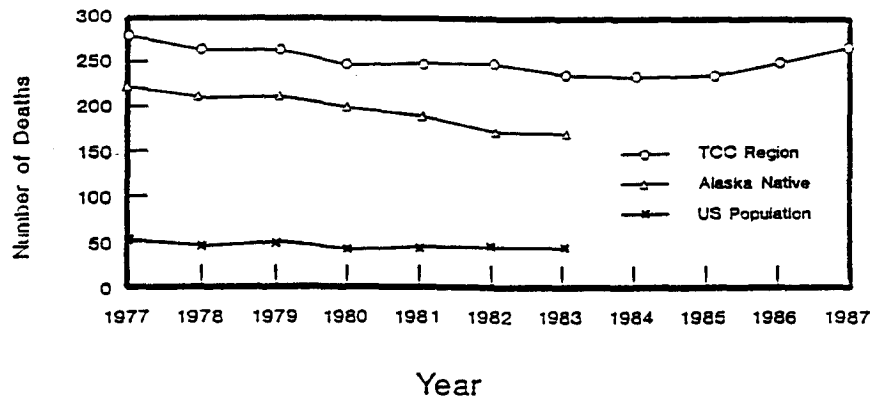


Figure 14  
Accidental Deaths—Athabaskan vs Alaska Natives vs  
U.S. (Per 100,000 population).

Galena and Fort Yukon are the two largest villages within the DOYON/TCC region; 1,038 and 840 population, respectively. In 1980 Galena was 74.40% and Ft. Yukon was 75.40% Native. Galena is the sub-regional center for the following villages: Hughes, Huslia, Kaltag, Koyukuk, Nulato and Ruby. Eighty-four percent of the people in the sub-region are Native. A majority of the non-Native population are Air Force residents at the Galena base.

Ft. Yukon is the sub-regional Center for Arctic Village, Beaver, Birch Creek, Chalkyitsik, Circle, and Venetie. Natives comprise 82.89% of the sub-region's population (Tanana Chiefs Conference, 1988–1992).

Each village is located either on the Yukon River or one of its tributaries. In spite of the population and lifestyle similarities between the sub-regions, particularly the outlying villages, there is a marked difference between the two in drowning and violent deaths. The Galena sub-region had 27 drownings and 29 violent deaths whereas the Ft. Yukon area had 8 drownings and 9 violent deaths. Each of the seven villages in the Galena area experienced drowning and violent deaths; four of the Ft. Yukon area villages experienced neither a drowning nor a violent death during the period of this study. The reason for the disparity is unknown and further research is warranted (see Figure 15).

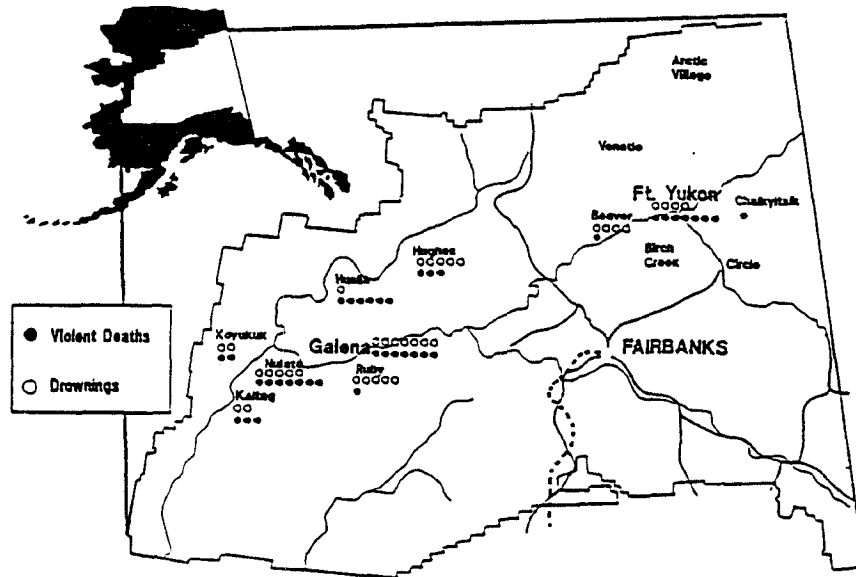


Figure 15  
DOYON/TCC Region Map.

#### Recommendations

This study was undertaken in an attempt to reveal patterns of mortality within the DOYON/Tanana Chiefs Conference region. It was found that almost *one-half* of the TCC rural fatalities are due to *unintentional and intentional injury*. Drowning, motor vehicle crashes, hypothermia, fire, carbon monoxide poisoning and air transport crashes account for over 32% of the deaths; suicide and homicide account for over 15%. Many of these deaths are preventable.

Although there was a slight decrease in injury fatalities from 1977 to 1985 (followed by an increase to the former level), one cannot attribute it to the prevention efforts of the Community Injury Control program. There are no data to support a correlation between the program and the decrease.

A return to the 1977 mortality rate of 281/100,000 in 1987 could be the result of one incident which claimed seven lives. Generally, injury fatalities in the DOYON/TCC region occur in single-death incidents. This could also be an example of how multiple-death incidents have an effect on mortality rates for small populations.

As recommended by Robertson (1985), we need to know the details of circumstances surrounding injury fatalities to effectively design prevention strategies. An effective and reliable injury surveillance system would require working cooperatively with Community Health Aides, law

enforcement agencies, and local health clinics. Coordination between the agencies could be organized by one person who would then gather the injury-related data. This would ensure consistency of reports, in addition to providing the injury prevention program information with which to design prevention strategies. Directing injury prevention programs to implement environmental and legislative change strategies could bring concrete results.

The Indian Health Service's recent change from a poster contest to an injury prevention project contest for youth has resulted in positive prevention strategies for one village. Ft. Yukon youth identified a dangerous road area where three pedestrian deaths occurred. They worked cooperatively with city policy and the city manager to design a walkway which would separate the pedestrians from the roadway. As a result of the youth group's research, planning and intervention strategy, the city has built the walkway. Observations, during the author's visits to Ft. Yukon, reveal that the walkway is being used routinely by pedestrians.

On the basis of this successful intervention, it is hoped that other injury prevention programs will take an active role in working with village councils and residents to implement additional injury prevention strategies. A new direction for programs may involve promoting strategies which do not rely upon a voluntary change in behavior for success.

For example, one may want to explore the possibility of a BWI (boating while intoxicated) law. Although alcohol was not documented as a factor in the drowning deaths, the author was told that its use was a factor in many incidents. The Alaska legislature has shown a willingness to introduce bills which limit the effects of substance abuse in villages. It has stiffened penalties for bootlegging, and driving while intoxicated. Therefore, it might be beneficial to present the legislature with information on boating fatalities which would support enforcing boating regulations.

In addition, since fire-related deaths continue to be a problem, it would be beneficial to conduct a smoke detector survey in all DOYON/TCC villages. One could identify homes that do not have detectors, install them, and then maintain a register. The program could then determine the effect smoke detectors have in villages by keeping track of fires, smoke detector warnings, property damage, and fatalities.

Furthermore, although there are not many miles of road in the interior, motor vehicle-related deaths claimed 25 lives. We need to examine the facts surrounding the fatalities. Could the fatalities be reduced by installing street lights, cutting brush along the roads, installing stop signs, strict enforcement of a speed limit which does not exclude snow machines or all-terrain vehicles, use of reflective tape on winter clothing, and/or providing child safety seats?

In spite of the high usage of all-terrain vehicles and snow machines, helmet use is generally not practiced in rural areas. Additionally, although 3-wheelers may no longer be sold, there are numerous such

vehicles still in use in the villages. With the funds allocated for injury prevention, one may wish to examine the possibility of buying and removing the 3-wheelers from Alaskan villages.

This study has raised additional questions which need to be addressed. But it has also provided information for future injury prevention planning.

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#### Appendix A

Discrepancies noted during the comparison of data obtained from Alaska State Bureau of Vital Statistics and DOYON, Limited.

ICD Code	Description	Actual Cause
927	Overexertion	Drowning in the winter
985 (2 incidents)	Injury by firearm undetermined if accidental or purposeful	Suicide
922 (2 incidents)	Accident caused by firearm missile	Suicide
928 (2 incidents)	Unspecified environmental and accidental cause	Airplane crash and hit/run by snowmachine
532	Other cause	Snowmachine injury
983	Strangulation undetermined if accidental or purposeful	Homicide
799	Other	Homicide
345	Other	Hypothermia w/ETOH
305	Other	Hypothermia w/ETOH
0	Other	Hypothermia w/ETOH
819	Motor Vehicle	Drowning
0	Other	Drowning
0	Other	Suicide



## Appendix B

Calculation: Trend Analysis—Unintentional deaths within the Tanana Chiefs Conference region for the period, 1977–1987.

Year	Deaths	Y Estimates	Regression Report	
1977	17	15.318181	Y Intercept (CO)	69.0
1978	15	15.290909	Std Y Est Error	1.0
1979	16	15.263636	R Squared [0..1]	0.0
1980	14	15.236363	Number of Samples	11.0
1981	15	15.209090	Degrees of Freedom	9.0
1982	16	15.181818		
1983	12	15.154545	X Coeffs (C1–0.02727)	
1984	14	15.127272	Std Coeff Er 0.147554	
1985	16	15.100000		
1986	15	15.072727		
1987	17	15.045454		