Injury mortality among the Cree of northern Quebec, 1982-91

by

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Abstract

This study describes the mortality from injuries in the Cree communities of northern Quebec for the period 1982-91. Comparison of different data sources for the completeness of ascertainment of injury mortality showed that no single source of information provided a complete count of deaths. Coroners' reports provided some details on the circumstances of fatal events but would gain usefulness if police and coroners employed a more structured approach to the collection of information on the circumstances of injury deaths. Circumstances of deaths were obtained from mortality interviews with relatives of victims. Drownings were the most common cause of injury death. Groups at high risk of drowning were adult males during boating and snowmobile transport for hunting and toddlers not supervised during their play near the water. None of the victims had worn a personal flotation device. Motor vehicle fatalities affected adult males and were often associated with acute alcohol ingestion. Few victims wore safety belts. Suicides affected mostly males. Half of the suicides resulted from gunshot wounds and 70 percent of victims had ingested alcohol prior to the event. Detailed information on the determinants of injury mortality should help in establishing injury prevention strategies.

Résumé

Cette étude décrit la mortalité par traumatismes chez les Cris du nord Québécois de 1982 à 1991. Différentes sources de données furent évaluées pour comparer leur capacité à fournir un compte exact des décès par traumatismes dans cette région. Aucune source de données n'était complète à cet égard. Les rapports du Coroner offrent certains détails sur les circonstances de ces décès, mais leur utilité serait accrue si la collecte des détails entourant chaque décès était uniformisée. Les circonstances entourant ces décès furent obtenues par entrevues auprès des membres de la famille des victimes. Les noyades furent la cause de décès par traumatismes la plus commune. Les groupes les plus à risque sont les jeunes enfants et les hommes adultes. Ces derniers sont victimes durant les transport par bateau ou par motoneige liés aux activités de chasse. Aucune victime ne portait de vêtement de flottaison individuel. Les traumatismes routiers affligeaient surtout les hommes adultes et étaient associés à l'ingestion d'alcool. Le port de la ceinture de sécurité était rare. Les suicides affectaient surtout les hommes. La moitié des suicides étaient perpétrés à l'aide d'une arme à feu et 70 % des victimes avaient consommé de l'alcool avant de passer à l'acte. Ces informations sur les déterminants de la mortalité par traumatismes permettront d'établir des programmes de prévention.

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SUMMARY

Injury mortality among the Cree of northern Quebec 1982-91

Goal: Prevention of fatal injuries among the Cree of northern Quebec.

Objectives:

1. To describe and compare the completeness of reporting of injury mortality by different data sources to define their strengths and limitations for injury mortality surveillance in Cree aboriginal communities in northern Quebec.
2. To determine the acceptability and usefulness of mortality interviews for assessing the circumstances of injury mortality in Cree communities.
3. To determine the incidence, the public health impact and the circumstances of mortality from specific injuries in the remote Cree communities of northern Quebec.
4. To identify priorities for prevention of mortality from injuries in the Cree communities.

Methods: The study population included the 10,000 Cree residents of eight villages of the James Bay area of northern Quebec, Canada, from January 1, 1982 to December 31, 1991. Deaths were counted using routine clinic reports, death certificates, coroners' reports, lists of deaths to beneficiaries of the James Bay Agreement, and interviews with key informants in each village. Causes and circumstances of deaths were obtained from special mortality interviews with relatives of victims, supplemented by coroners' reports and interviews with key informants.

Comparison of the different data sources for the completeness of ascertainment of injury mortality was made. Comparison of coroners' reports with mortality interviews was made for the completeness of details provided by each source of information for the circumstances of the injuries. This comparison was made for the 36 % of deaths for which both a coroners' report and a mortality interview were available.

The acceptance rate of interviews among the families who were approached and the variation in the proportion of complete responses for key variables in the interviews with different intervals between the deaths and the interview (range: 13 to 124 months)

were used to assess the acceptability of mortality interviews in the communities.

The health impact of injury mortality in the Cree communities was measured using age and sex specific mortality rates for all intentional and unintentional injuries. Cause specific injury mortality rates were calculated. Potential years of life lost to injuries and proportionate mortality from injuries as compared with other leading causes of death were used to describe the relative importance of injuries in the Cree communities. Standardized mortality ratios were used to compare the impact of injuries among the Cree with several other populations. Circumstances of fatal injuries were described.

Results: No single data source provided complete reporting of injury fatalities. Completeness of reporting varied between 46 and 82 % for different sources for the ten year period. Vital statistics identified 62 % of injury fatalities while coroner's reports identified 74 % of victims during the last 5 years of the study.

Both coroners' reports and mortality interviews reported the activity associated with the injury in more than 80 % of deaths. Coroners' reports provided information on the presence or absence of acute alcohol consumption for only 39 % of adults $\geq$ 15 years while mortality interviews provided this for 89 %. Information on safety equipment including use or non-use of safety belts for motor vehicle fatalities, personal flotation devices for drownings and smoke detectors for burns was available for 29 % of victims in coroners' reports as compared with 94 % in mortality interviews.

Mortality interviews were well accepted by the communities with an 86 % acceptance rate. There was no influence of the delay between the death and the interview on the amount of useful information gathered by the interview.

A total of 72 deaths were identified during the study period. The overall injury mortality rate in the Cree was 88/100,000 person-years (95 % CI: 68-108). Cause specific mortality rates were: 18/100,000 person-years for road traffic fatalities (95 % CI: 10-30), 18/100,000 person-years for drownings (95 % CI: 10-30), excluding snowmobile drownings and 26/100,000 (95 % CI: 16-39) when snowmobile drownings were included. The suicide rate was 12/100,000 person-years (95 % CI: 6-22).

Road traffic fatalities accounted for 21 % of all injury deaths, and off road vehicle

fatalities for 11 %. Drownings accounted for 21 % of all injury deaths. Drownings occurring from snowmobiles going through the ice are usually classified as off-road vehicle deaths. When these deaths were reclassified as drownings, the later accounted for 29 % of Cree injury deaths over the 10 year period. Suicides accounted for 14 % of all injury deaths in the Cree. In Canada, 30 % of injury deaths in 1986 were motor vehicle fatalities, 4 % were drownings, and 27 % were suicides.

Injuries, including all intentional and unintentional injuries, were the leading cause of potential years of life lost between birth and age 65 for the Cree communities, followed by respiratory and circulatory diseases.

Standardized mortality ratios (SMR) were computed to provide an age-adjusted comparison of injury death rates in the Cree with several other populations. These SMR were: 2 (95 % CI: 1.6-2.5) when using the 1986 Canadian population as standard, 1.4 (95 % CI: 1.1-1.8) when using rural Quebec (Abitibi-Temiscamingue and Côte Nord regions) as standard, 0.5 (95 % CI: 0.4-0.6) when using other Canadian aboriginal communities and 0.7 (95 % CI: 0.5-0 9) when using Northwest Territories as standard.

Age specific injury mortality rate ratios were several times higher among Cree children 0-4 years of age than in Canada and rural Quebec, but this difference was based upon a relatively small number of deaths. The injury mortality rate for Cree adults was about twice that for Canada, but almost half that in other Canadian aboriginal communities.

Information on the circumstances of the deaths was available for 92 % (66/72) of victims. Most of this information (70 %) was provided by mortality interviews. For those deaths for which no interview was available, information from coroners' reports or key informants was used. Overall, risk factors identified were: frequent exposure to travel over water, acute alcohol use (of the 94 % of victims 15 years and older for whom information was available, 57 % had consumed alcohol at the time of the incident) and lack of use of personal safety equipment.

Of the 73 % of road traffic victims for whom information was known, 82 % had consumed alcohol prior to the incident. Of the 69 % of road traffic victims in cars for whom information was available, 86 % were not wearing safety belts.

None of the 71 % of drowning victims for whom information was available were wearing a personal flotation device at the time of the incident. However, of the 9 drownings known to have occurred during wilderness travel, hunting or fishing (including snowmobile drownings), only 11 % were associated with acute alcohol consumption.

Suicide victims were males in 90 % of incidents and 56 % of these males were aged between 25 and 39 years old. Half of the eight suicide deaths for which information was available (80 % of suicides) were caused by gunshot wounds. Circumstances surrounding 7 suicide deaths (70 % of all suicides during the study period) were as follows: 86 % suicides were associated with acute alcohol ingestion, 86 % victims had personal problems at the time of the death and 29 % victims suffered from depression.

Information on the sequence of events after the injury was available for 60 % of incidents; 74 % of those injury deaths occurred within minutes of the event. Information on the post-traumatic treatment received was available for 81 % of deaths; 23 % of those victims received cardiopulmonary resuscitation or other treatments prior to death.

Conclusion: Neither coroners' reports nor vital statistics provide a complete count of all injuries. Vital statistics can provide the external cause and nature of injury, but do not include the circumstances of injuries. Standardization of coroners' reports to ensure routine inquiry about personal factors such as acute alcohol ingestion, use of safety equipment as well as environmental factors pertinent to the specific injury, would increase their quality and usefulness for injury surveillance. Mortality interviews were well accepted and useful for obtaining information about the circumstances of injuries and for validating the completeness of routine data sources such as coroners' reports.

Injury mortality, especially drowning and motor vehicle related deaths should be a public health priority in Cree communities. Since the effectiveness of treatment appears limited in isolated communities, the emphasis should be on primary and secondary prevention. Acute alcohol ingestion and lack of use of safety belts were associated with traffic fatalities. Identification of the types of drownings and of modifiable determinants such as non use of personal flotation devices and hypothermia jackets or suits, and feedback to the communities will allow the identification of

culturally appropriate prevention strategies. Most suicides appeared to be associated with personal problems and acute alcohol ingestion. Most suicides were caused by gunshot wounds. Identification of the acute stressors and possible coping mechanisms as well as attention to availability of alcohol during times of stress and the practices of home firearm storage could be further explored with the communities.

I. INTRODUCTION

Mortality from injuries is an important public health problem among the general population of Quebec where injuries are the first cause of death between age 1 and 44 years and the first cause of potential years of life lost (Beaulne, 1987).

Injuries have been the leading cause of death in Canadian Aboriginal communities for at least the past two decades, accounting for about one third of all deaths. For example, among Alberta Aboriginals during 1976, injuries caused 32 percent of all deaths (Jarvis and Boldt, 1982), and among all Canadian Aboriginals during 1986-88, 31 percent of deaths (Muir, 1991).

Injury mortality rates in Canadian Aboriginal communities have been 3 to 5 times higher than in the Canadian population during the past (Mao et al., 1986), (Hislop et al., 1987). In 1990, there were 3.9 times more injury deaths in Aboriginal communities than expected if the Canadian injury mortality rate from 1986 had applied (Muir, 1991). The excess mortality among Aboriginal communities varies according to the cause. Hence, drowning rates were 5 to 6 times the Canadian drowning rates and motor vehicle fatality rates were 2.5 to 3 times higher than the Canadian rates in some communities (Mao et al., 1986; Hislop et al., 1987).

In the Cree of northern Quebec, previous studies on mortality have established the importance of injuries in this population. In 1975-82, injuries accounted for 20 percent of deaths (Robinson, 1985), while in 1982-86, injuries again accounted for 20 percent of deaths (Courteau, 1989). Historically, standardized mortality ratios for

injuries among the Cree have been around 2 when compared with the Canadian population. While more frequent than in Canada as a whole, injuries among the Cree have been somewhat less common than in other Aboriginal communities. Drownings are a major contributor to injury mortality among the Cree. In 1975-82, nearly half of the injury deaths were drownings and the Cree drowning rate was 12 times the Canadian rate (Robinson, 1985). In 1982-86, the standardized mortality ratio for drownings was 9.5 as compared to the 1984 Canadian population (Courteau, 1989). For the same period, motor vehicle fatalities and suicides were not significantly higher in the Cree than in Canada.

This thesis research is part of a larger project on the epidemiology of injuries among the Cree of northern Quebec. This project was funded by the Cree Board of Health and Social Services to provide a comprehensive study of mortality and morbidity from all intentional and unintentional injuries in the Cree communities. The objectives were to prioritize specific injuries, to identify their major risk groups and determinants and, ultimately to suggest possible interventions to reduce the burden of mortality and hospitalizations from these injuries.

Although previous general mortality studies had identified injuries as a significant public health problem for the Cree, there had been no detailed study of specific injuries and their determinants. To describe the epidemiological profile of injury mortality in the Cree communities, a complete count of victims was obtained by combining different sources of information. The burden of injury deaths in the Cree communities was compared to the Canadian population and, to control for the rural environment of the

communities, with isolated regions of the province of Quebec and the Northwest Territories. Groups at high risk for specific injuries were described by age and sex. The circumstances for different injuries were classified using the major categories of personal, equipment and environment factors, as adapted from the matrix of Haddon developed for motor vehicle crashes (Haddon, 1972).

The support of this project by the Cree Board of Health and Social Services reflects the appreciation by the community of the importance of reducing the harmful impact of injuries on their families and communities. This study should provide the necessary information to design effective and culturally appropriate preventive interventions for fatal injuries.

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II. COMPLETENESS OF REPORTING OF NUMBERS AND CIRCUMSTANCES OF INJURY DEATHS BY DIFFERENT DATA SOURCES IN ABORIGINAL COMMUNITIES IN NORTHERN QUEBEC, CANADA.

Introduction:

Reporting of fatal injuries is often incomplete in remote populations including Aboriginal communities. This paper compares several data sources for their completeness in enumerating and describing the circumstances of deaths from unintentional and intentional injuries in an Aboriginal population of northern Quebec, Canada.

The objectives of the present study were:

1. To determine the completeness of reporting of injury deaths by several different data sources.
2. To describe the information on specific circumstances of injury deaths in coroners' reports as compared with mortality interviews with family members of the victims.

Methods:

The study population included the 10,000 eastern James Bay Cree people in Northern Quebec, Canada, residing in three inland and five coastal communities along the eastern coast of James Bay (**Figure 2.1.**). Cree people living in one of these communities, but who died outside their home village, were also included in this study.

Mortality from injuries was studied during the ten year period of January 1st, 1982 to December 31st, 1991.

The study considered all deaths from intentional and unintentional injuries, including deaths coded E800 to E999 in the International Classification of Diseases, 9th edition (ICD-9); with the exception of misadventures during surgical or medical care (E870-E876) and adverse effects of drugs, medicaments or biological substances during therapeutic use (E930-E949), (WHO, 1977).

The following data sources were used for a retrospective ascertainment of injury deaths.

1. Clinic files: Health care in the Cree communities is centralized in community clinics under the authority of the Cree Board of Health and Social Services. Public health services are provided by the Northern Quebec Module of the Montreal General Hospital. For surveillance purposes, each community's clinic clerk reports all deaths to the Module. These files included nominal information, the date of birth, date of death, village of residence, place of death and uncoded causes of death as assigned by local health providers.
2. Vital Statistics: A listing of injury deaths was compiled from death certificates

for residents of the Cree communities and territory during the study period. The information was obtained from the Service de documentation, Ministère de la Santé et des Services sociaux, the provincial ministry of health. This listing contained nominal information, the date of birth, date of death, village of origin and the cause of death as coded with the ICD-9 nature of injury and external cause codes.

3. Coroner's files: By provincial law, all deaths from violent or unnatural causes must be reported to the coroner who conducts an investigation. Since 1986 when their mandate was extended to cover prevention, the Quebec coroners have prepared detailed reports on the injury deaths in northern communities. Coroners' reports for injury deaths that occurred prior to 1986 were not available. The coroners' reports on injury deaths were reviewed for residents of the Cree communities during the study period. Coroners may rely on the information provided by the provincial or local police officers, or may investigate the injury deaths reported. Coroners' reports contain nominal information, the date of birth, date and place of death, village of origin as well as a narrative report of the circumstances of the event. A description of the injuries is noted. The listing of coroners' files on injury deaths that occurred during the study period was updated in January 1994 to allow for delay in reporting or in investigating.

4. The Beneficiaries of the James Bay Agreement list: In 1975, the James Bay and northern Quebec Agreement was signed to allow construction of hydro-electric dams on Cree territory. This agreement includes certain rights and privileges for

each party including financial compensation for land use. An administrative listing of Cree people eligible for compensation and other rights and privileges is maintained by a provincial office in Quebec city, and is updated by an employee in each community. Some local agents are also responsible for reporting vital statistics for their community (La Convention de la Baie James et du Nord québécois, 1976). The Beneficiaries list contains nominal information, the date of birth, sex, village of residence, and date of notification of the death of beneficiaries. The cause of death is not included.

5. Key informants: Interviews were conducted with each community clinic clerk/medical record keeper, nurse/physician and/or safety officer or public health officer to validate and complete the listing of local injury deaths by recall. These key informants have been working in the community for many years.

Each community's key informant reviewed the names of victims identified by the vital statistics database to exclude victims who had died in the territory but were not of Cree origin (eg. temporary workers or visitors to the community). They also identified injury deaths among the names from the list of Beneficiaries of the James Bay Agreement for whom the cause of death remained unknown after validation with the clinic reports. Moreover, recall was encouraged for any additional injury deaths that occurred in the village during the study period (especially events that occurred while fishing or hunting in the wilderness).

Deaths identified from the above sources were combined to prepare a master list

of Cree injury deaths. Duplicates, as identified by a combination of name, date of birth, date of death, cause of death and village of origin, were excluded from the list. During a course of injury prevention for public health and safety officers employed by the different Cree communities, a non-nominal listing of injury deaths by community and external cause was also prepared by combining the deaths and preventable factors that participants were able to recall for the previous 10 years in their village. This information was used for comparative purposes.

To gather additional information on the circumstances of the events and to identify possible preventable factors for the death, mortality interviews were conducted with family members of the victims or witnesses of the events in each community. Mortality interviews have been used concurrently in Aboriginal communities in the past for studying the circumstances of injury deaths (Jarvis and Boldt, 1982), and retrospectively in many developing countries for ascertaining the cause of death (Myntti et al., 1991; Snow et al., 1992). For this study, a structured questionnaire was prepared to ascertain risk factors for different types of injury deaths. A common core of questions was prepared for demographics, past medical history and lifestyle of the victim, together with an open-ended narration of the event. Supplementary questionnaires were added for different specific injuries. Details of the circumstances of the injury event were described, including personal, environmental and equipment factors. Information on rescue for victims of selected types of injury was also collected. The study protocol had been approved by the ethics committee of the Montreal General Hospital Department of Community Health, and the Community Health Research and Programming Committee

of the Cree Health Board.

The Quebec coroner provided a list of names of victims as classified by the codes of municipality of residence of the victims. This initial list of victims was supplemented by sending a request for specific names that had been identified through other sources but were not initially provided by the coroner. Coroners' reports were then compared with mortality interviews for the presence or absence of information on location and time of the injury incident, activity prior to the injury and potentially preventable personal, environmental and equipment risk factors. The denominators for each factor of interest were adjusted by considering whether a specific factor was pertinent for the type of injury (eg. the use of a personal flotation device was an equipment factor relevant for boating drownings, a hypothermia/flotation suit for snowmobile drownings, the use of a safety belt for motor vehicle occupants, presence of a functioning smoke detector for house fires, etc.). Deaths at ages less than 15 years old were excluded from consideration for presence or absence of acute alcohol ingestion at the time of the event, since there were no positive reports of alcohol ingestion within this age group.

Results:

2.1. Completeness of reporting of injury deaths by different data sources:

The combination of all data sources allowed the identification of 72 injury deaths including all intentional and unintentional injuries. The percent of all deaths identified by each data source is shown in **Table 2.1.** One death was identified by clinic reports only, one death was identified by coroners' reports only, and two deaths were identified by the James Bay Agreement List of Beneficiaries only. All other deaths were included in two or more data sources (**Figure 2.2**).

Since it was not until 1987 that there was routine reporting by the coroner, the study was divided into two five-year periods to allow comparison of the contribution of coroners' reports relative to other sources during the second half of the study.

Among the 38 injury deaths known to have occurred between 1982-86, 61 percent (23/38) were identified both by clinic reports and by vital statistics.

For the 1987-91 period, 47 percent (16/34) of victims were identified by both the clinic reports and vital statistics. For this period, the coroners' files identified 88 percent (14/16) of the deaths identified by both the clinic reports and vital statistics. Two deaths were identified by the coroner and vital statistics but not by the clinic files. One death was only identified by the coroner during 1987-91.

2.2. Completeness of reporting of deaths from specific injuries by different data sources.

The completeness of death reporting of different data sources for specific injuries

is compared in **Table 2.2.** Most deaths resulting from drownings, motor vehicle crashes or suicides were identified by two data sources (**Figure 2.3**). Vital statistics and clinic reports each identified 88 percent of all drownings, with a complete ascertainment of drowning victims since 1987. For motor vehicle fatalities, clinic reports were the most complete source of data identifying 83 percent of victims, while vital statistics identified only 61 percent of all victims from such events. Clinic reports enumerated 90 percent of the suicide deaths identified in the study. Coroners' reports enumerated 86 percent (6/7) of deaths having occurred between 1986 and 1991, identified as suicides by other sources. However, only 33 percent (2/6) of these deaths were actually reported as suicides by the coroners' reports.

The clinic reports identified all intentional or unintentional injury deaths from firearms (n = 8) for the entire study period. Vital statistics reported only 63 percent (5/8) of intentional or unintentional firearm-related injury deaths for 1982-91, while the coroner ascertained 4 of those deaths for the same period. Coroners' reports identified all firearm-related injury deaths (n = 3) during the 1987-91 period.

2.3. Completeness of data sources after cross-validation:

The above tables summarized the contribution to death ascertainment of each data source as received when the initial requests for data were made. This provides estimates for the completeness of reporting by different data sources when they are used separately. The simultaneous use of several data sources allowed validation of the completeness of reporting by comparing one source against another. Five deaths that were initially

unrecognized as injury-related in the clinic reports due to erroneous coding were later included after comparison with the other data sources. Overall, 17 percent of all deaths in the clinic reports noted only a terminal event such as a cardiac or respiratory arrest rather than the underlying cause of death.

Similarly, the initial list provided by the coroner identified 7 victims who were residents of communities with names similar to Cree communities, but that are actually located in other regions of the province. Eighty-six percent (6/7) of these misclassifications occurred during 1986 and 1987. When the original list was supplemented by asking for coroners' reports of victims identified by other data sources, the reports for an additional 10 Cree victims were retrieved. Their municipality of residence had been misclassified. Seventy percent (7/10) of these additional Cree victims had died during 1986 and 1987.

Neither vital statistics nor coroners' reports routinely code the ethnicity of victims. Thus, data from both sources initially included non-Cree victims residing in the communities under study.

Among the 6 drownings resulting from snowmobiles going through thin ice, 5 were identified by vital statistics. Two of these deaths (1 event) were coded as drownings (E910) while the other three were classified as snowmobile-related non-traffic accidents (E820).

2.4. Completeness of reporting on circumstances of injury deaths in coroners' reports compared with mortality interviews

Both coroners' reports and completed mortality interviews were available for 26 injury deaths between 1986 and 1991, which allowed comparison of the completeness of reporting on circumstances of injuries by the two sources (**Table 2.3.**).

Coroners' reports contained adequate information to identify the activity associated with the injury and the nature of the injuries sustained. Major limitations of coroners' reports were in the identification of certain personal, environmental and equipment factors. These included:

- Presence or absence of acute alcohol ingestion was reported in only 39 percent (7/18) of the victims 15 years and over.
- Experience of the driver (victim or not) or swimming ability were reported in only 8 percent (1/13) of the motor vehicle fatalities or drownings.
- Use or non-use of safety equipment pertinent to the incident, including use of safety belt, personal flotation device, smoke detector or safe storage of firearm was mentioned in only 29 percent (5/17) of coroners' reports.
- Ingestion of alcohol by the driver in motor vehicle fatalities where the victim was either a passenger or a pedestrian was reported in 33 percent (2/6) of coroners' reports as compared with 67 percent (4/6) of mortality interviews.

Discussion:

Combination of different data sources in ascertaining injury mortality among the Cree.

The simultaneous use of five different data sources identified 72 injury deaths. The completeness of reporting for different data sources varied from 46 to 82 percent for the 10 year period, and from 62 to 83 percent for 1987 to 1991. Seventy-six percent of fatalities were described in two or more sources of information (clinic reports, vital statistics or coroners'reports).

The combination of several official data sources has been used frequently for certain populations (Smith and Middaugh, 1989; Marshall and Soule, 1988) or for certain causes of death (van de Voorde et al., 1993) for which completeness of data was uncertain. It has been shown repeatedly that no single source offers a complete ascertainment of deaths (van de Voorde et al., 1993; Marshall and Soule, 1988). Even with a combination of more than one data source, statistical methods such as the capture-recapture method have been recommended (Hook and Regal, 1992; Hook et al., 1980) to evaluate the completeness of ascertainment of cases (for non-fatal diseases), particularly where reporting by different sources is believed to be relatively independent, which it was not in this study.

Nevertheless, as noted by Young (1983), the fact that Aboriginal communities are isolated, receive health care from a single source and have relatively low rates of in and out migration, minimizes the probability that many deaths escape registration. In the present study, reporting of an injury fatality was made by several different sources, such

as physicians for death certification, police officers for coroners' reports and from community key informants. It would be unlikely that a systematic bias in under-reporting of certain categories of injury deaths would have affected all sources. Systematic misclassification of cause of death by informants is possible (Marshall and Soule, 1988; Jarvis et al., 1991) but cannot be estimated. However, misclassification of the intent of injury might have happened, leading to an underascertainment of suicide cases. A total of three deaths assumed to be unintentional by other sources were classified as intentional or "unknown intent" in the vital statistics records.

Completeness of reporting of injury deaths by different data sources.

Clinic files remain the most complete source of information for major causes of injury mortality when compared with vital statistics or coroners' reports. The clinic files offer accessible data but no details on the circumstances of the events are recorded. Moreover, the causes of death are often non-specific.

Death certificates do not offer complete reporting of injury mortality. For 1987-91 period, vital statistics provided incomplete reports of motor vehicle fatalities and suicides. Courteau (1989) demonstrated that between 1982-85, vital statistics enumerated 75 percent of Cree deaths from all causes present in the clinic reports (Courteau, 1989). This incompleteness might be due to misclassification of the municipality of residence of the victims as was the case for coroners' reports. Death certificates include coding of the external cause of death and of the nature of the injury. Romano and McLoughlin (1992) outlined that information on the nature of the injury might be useful to detect the

extent of the protection conferred by safety equipment use. However, the value of death certificates is limited by the non-specific reporting of the nature of injury. Death certificates do not offer enough details about the circumstances of injury deaths to allow the design of comprehensive injury prevention programs.

Coroners' reports do not ensure a complete ascertainment of the number of victims but offer details about the circumstances of injury deaths not provided by other official data sources. However, the misclassification of the intent of the victim prior to the traumatic death leads to underascertainment of specific injuries. Of all suicide victims identified by the combination of data sources, 6 were correctly identified by the coroners' reports but only 2 were reported as suicides.

Although during 1986 and 1987 the community of residence of victims was not reported accurately, this difficulty has disappeared with improved data entry. There could remain a problem with assigning ethnicity for residents of these communities as there is no systematic mention of race on those certificates. For Cree communities, this remains a minor problem since few non-Cree residents die in these territories.

Completeness of reporting on circumstances of injury deaths in coroners' reports compared with mortality interviews

Coroners' reports provided information on the circumstances of the injury death that was not available with other official data sources. However, the details on the events surrounding death were less frequently reported than in the mortality interviews. There was variation between reports in the completeness of information. Reporting on

specific personal risk factors such as alcohol consumption prior to the traumatic event, equipment-related factors such as safety equipment use and environmental risk factors was less than optimal. Mortality interviews allowed supplemental information to be gathered. Coroners' reports thus omitted information that was available.

The usefulness of coroners' reports would be improved if complemented by some standardized questions specific to the identification of preventable risk factors for injury deaths. In 1985, Ing et al. suggested increasing the value of coroners' reports by standardizing the data entered, making blood alcohol measurements standard for all injury-related deaths, and using supplemental forms for gathering information on selected injuries. While limiting the amount of supplemental information to maintain the simplicity and the acceptability of the work to the coroners, some improvements in the identification of specific risk factors by obtaining a careful history or testing (eg. for ingestion of alcohol) should become a priority.

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Fig. 2.1. **Geographical location of Cree communities of northern Quebec**

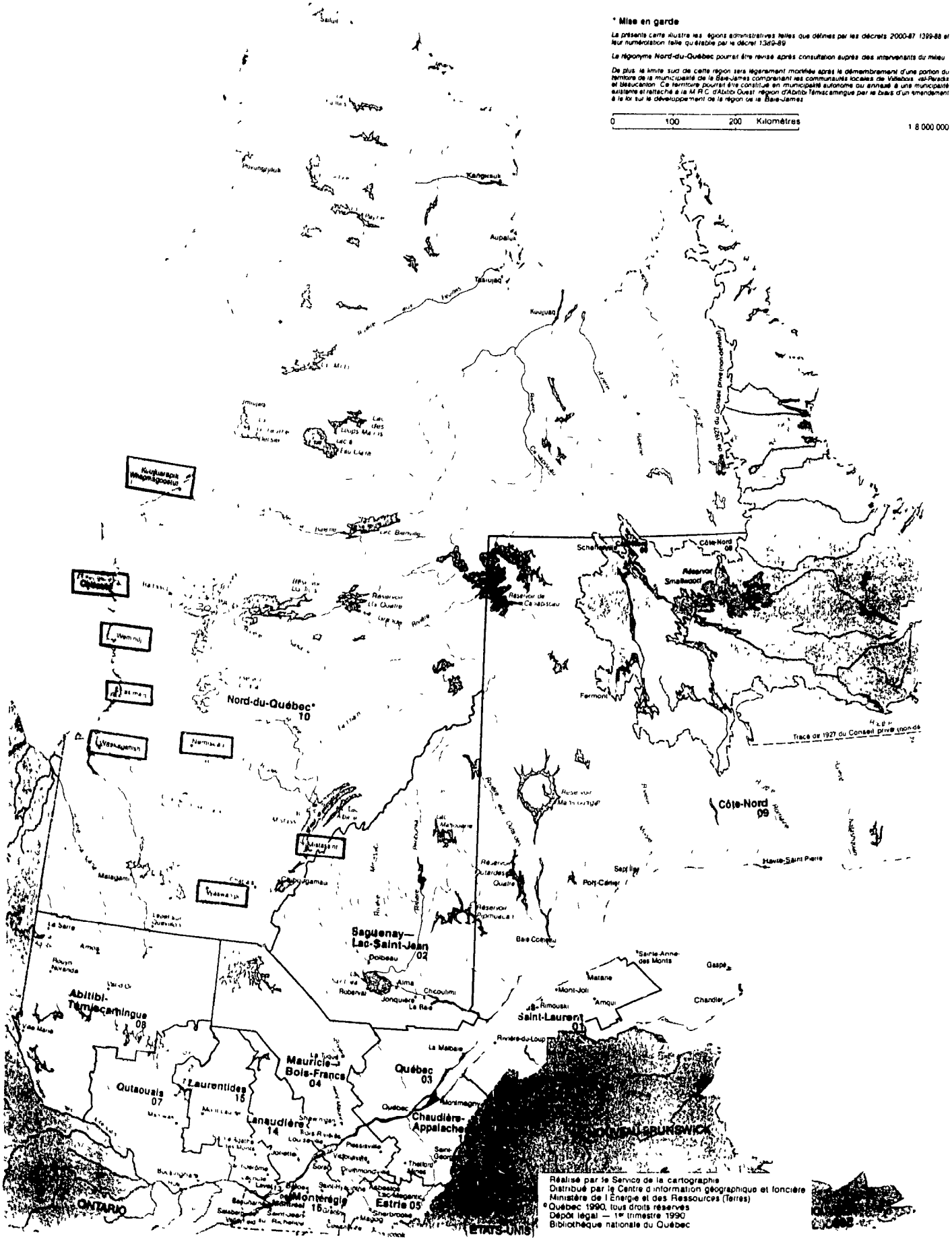


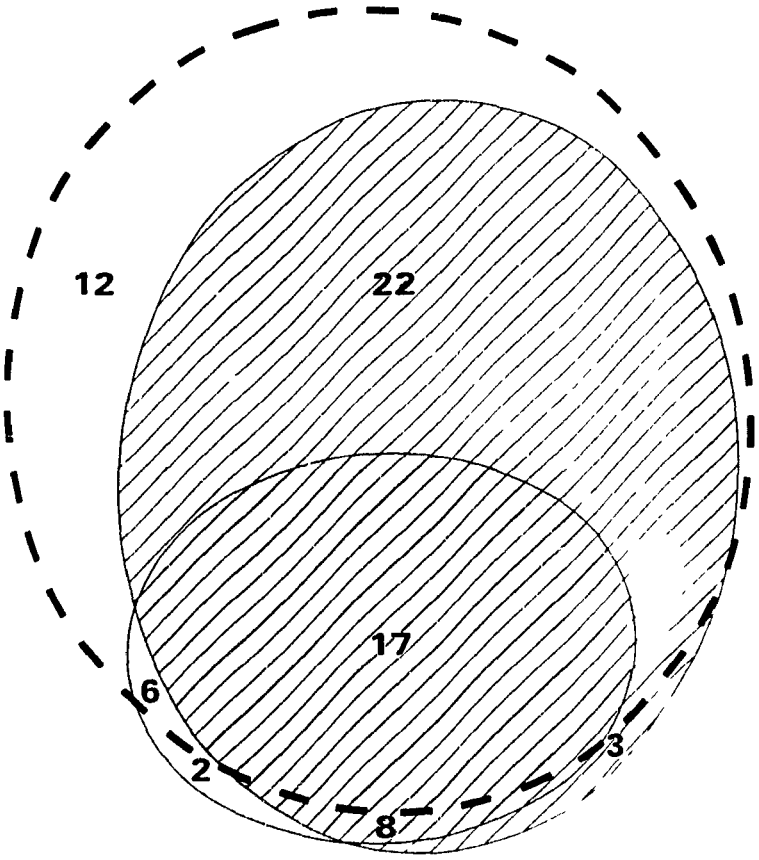
Table 2.1- Comparison of the completeness of reporting of all intentional and unintentional injuries by different sources of mortality data. Cree communities of northern Quebec 1982 - 91 (n = 72)

Number and percent of all injury deaths reported by source						
Data Source	1982 - 86		1987 - 91		Total 1982 - 91	
	No.	%	No.	%	No.	%
Clinic reports	29	76	28	83	57	79
Vital Statistics	29	76	21	62	50	69
Coroners' reports	8	21	25	74	33	46
James Bay Agreement*	33	87	26	76	59	82
Recall of key informants¶	--	--	--	--	46	64
Total	38	100	34	100	72	100

* Deaths reported to the office of the Beneficiaries of the James Bay Agreement

¶ As reported by Cree Safety Officers and Public Health Officers participating in a course, June 1992.

Fig. 2.2. **Relative contribution of major data sources for the identification of injury deaths.**
Cree communities, northern Quebec 1982-91.



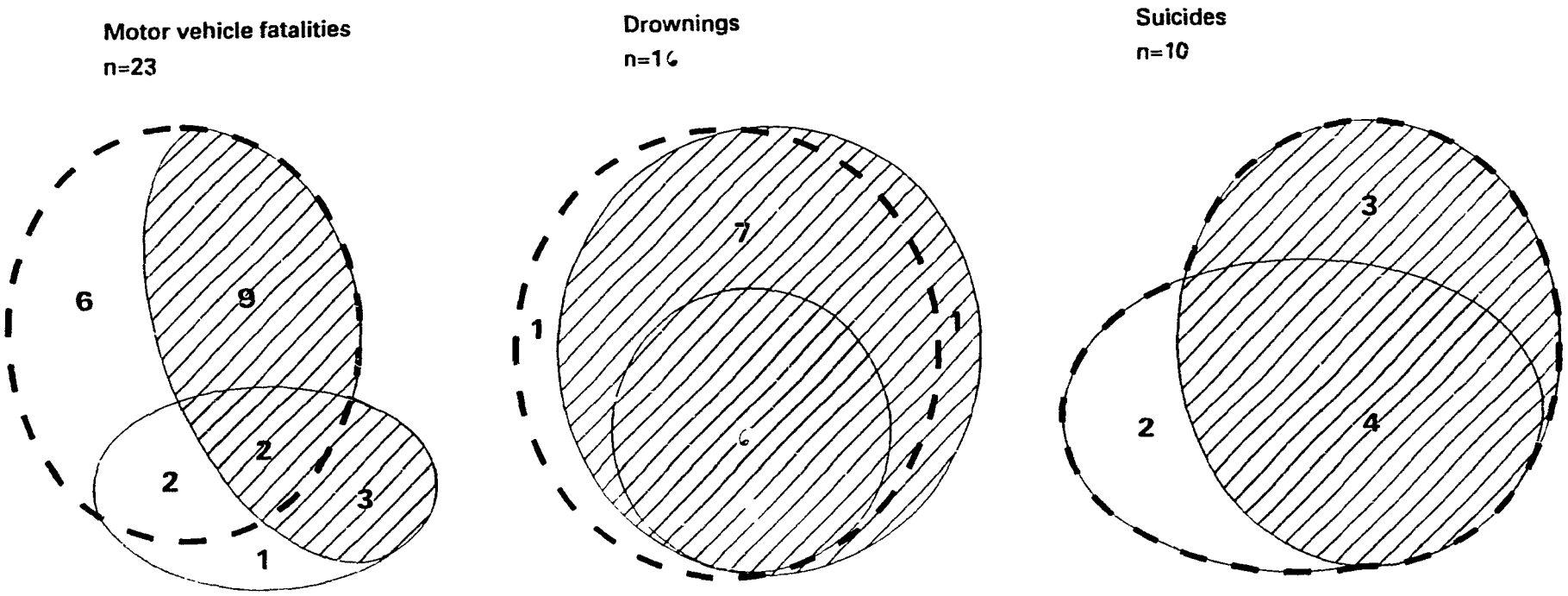
* 2 victims were identified by the James Bay Agreement list of beneficiaries only.

Table 2.2 - Comparison of the completeness of death reporting by different sources of injury mortality data for leading specific injuries.
Cree communities of northern Quebec 1982-91

Data Source	Drowning (n = 16)**						Motor vehicle fatality (n = 23)¶¶						Suicide (n = 10)					
	1982 - 86		1987 - 91		Total 1982 - 91		1982 - 86		1987 - 91		Total 1982 - 91		1982 - 86		1987 - 91		Total 1982 - 91	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Clinic reports	8	80	6	100	14	88	11	92	8	73	19	83	3	100	6	100	9	90
Vital statistics	8	80	6	100	14	88	8	67	6	55	14	61	3	75	4	67	7	70
Coroners reports	1	10	5	83	6	38	1	8	7	64	8	35	1	25§	5	83§	6	60§
James Bay Agreement*	10	100	4	67	14	88	10	83	9	82	19	83	3	75	6	100	9	90
Recall of key informants¶	--	--	--	--	14	93	--	--	--	--	12	52	--	--	--	--	6	60
Total§§	10	100	6	100	16	100	12	100	11	100	23	100	4	100	6	100	10	100

* Deaths reported to the office of the Beneficiaries of the James Bay Agreement.
¶ As reported by Cree Safety Officers and Public Health Officers participating in a course, June 1992.
§ Investigated and reported on by coroner, however only 2/6 deaths reported as suicides.
** Includes 1 water-related fatality classified as hypothermia in the coroner report and as drowning in vital statistics; excludes snowmobile drownings
¶¶ Includes 6 snowmobile-associated drownings. Vital statistics classified 3/5 snowmobile-associated drownings as off-road vehicle fatalities and 2/5 such deaths as drownings.
§§ Total as identified by all sources combined

Fig. 2.3. **Relative contribution of major data sources for the identification of cause-specific injury deaths.**
Cree communities, northern Quebec 1982-91.



Includes snowmobile-related drownings

Clinic reports
Vital statistics
Coroners' reports

1 drowning identified by the James Bay Agreement list of Beneficiaries only.

1 suicide identified by the James Bay Agreement list of Beneficiaries only.

Table 2.3 - Comparison of the completeness of coroners' reports and mortality interviews for identifying presence or absence of relevant circumstances of injury deaths.
Cree communities of northern Quebec 1986 - 91 (n = 26)

Circumstances	No. deaths where relevant	Presence/absence as noted by				Comments
		Coroner		Interview		
		No.	%	No.	%	
General factors						
Age of victim	26	26	100	25	96	
Place of death	26	25	96	26	100	
Time of death	26	25	96	13	50	
Activity at death	26	21	81	23	88	
Nature of injury	26	26	100	25	96	
Personal factors						
Acute alcohol ingestion	18	7	39	16	89	Victims ≥ 15 years only
Acute drug ingestion	18	3	17	12	67	Victims ≥ 15 years only
Chronic alcohol ingestion	18	3	17	17	94	
Chronic drug ingestion	18	1	6	10	56	
Medical diseases	24	5	21	23	96	Eg diabetes, epilepsy, cardiovascular diseases
Personal skill	13	1	8	8	62	Eg swimming ability, driving experience
Equipment factors						
Type of vehicle	11	11	100	11	100	Eg car, truck, snowmobile, boat
Safety equipment	17	5	29	16	94	Eg safety belt, personal flotation device, smoke detector
Environmental factors						
Weather	12	1	8	11	92	Eg sunshine, rain, hail, snow
Other hazards	13	5	38	6	46	Eg strong current, road hazard

* Note If factor was specifically mentioned to be present or absent in the data source, it was counted as complete

III. ACCEPTABILITY AND USEFULNESS OF MORTALITY INTERVIEWS FOR DETERMINING THE CIRCUMSTANCES OF FATAL INJURIES IN ABORIGINAL COMMUNITIES IN NORTHERN QUEBEC, CANADA.

Introduction:

Details of the circumstances of injury deaths can aid in identifying modifiable determinants for different types of injuries. Routine sources of death reporting seldom provide such details.

A special form of mortality interview known as the verbal autopsy has been widely used in developing countries to determine the cause of village deaths that are not certified and reported to vital statistics (Gray et al., 1990; Myntti et al., 1991). Verbal autopsies can provide information on symptom complexes prior to death that frequently makes it possible to assign a cause of death. This is particularly helpful in locations where data from vital statistics are unavailable or unreliable. However, mortality interviews can also be used to identify the circumstances of death where the cause is already available from vital statistics.

The objectives of the present paper are to describe the acceptability of interviews and the quality of the information provided by mortality interviews that were used for ascertaining the circumstances of deaths from intentional and unintentional injuries in Cree communities of northern Quebec.

Methods:

The study population included the 10,000 eastern James Bay Cree residents of three inland and five coastal communities along the eastern coast of James Bay in northern Quebec, Canada (**Figure 2.1**). Cree who resided in one of these communities but died outside their home village, were also included in this study. Non-Crees who lived in these communities and Cree residents of communities other than the ones considered above were excluded from the study.

Mortality from injuries was studied during the ten year period from January 1st, 1982 to December 31, 1991.

The study considered all deaths from intentional and unintentional injuries, including deaths coded E800 to E999 in the International Classification of Diseases, 9th edition (ICD-9), with the exception of iatrogenic injuries such as misadventures during surgical or medical care (E870-E876) and adverse effects of drugs, medicaments or biological substances during therapeutic use (E930-E949) (WHO, 1977).

The following sources of information were used to identify victims of fatal injuries: death reports from clinics in Cree communities, coroners' reports, listings of the Beneficiaries of the James Bay Agreement (administrative agreements used for compensation for land use following hydro-electric dam construction) and interviews with local key informants (Damestoy, 1994a).

Mortality interviews:

Structured questionnaires were prepared to ascertain risk factors for different types of injury deaths. A common core of questions included the age, sex, marital

status, past medical history and other personal risk factors such as habitual use of alcohol, medications and other drugs, together with an open-ended narration of the injury incident. Supplementary questionnaires of various lengths were used for the most frequent causes of fatal injuries in the communities, including drownings, motor vehicles, suicides, burns and firearms. Details of the circumstances of the injury event were described, including the activity at the time of the incident, together with personal, environmental and equipment factors. Information on rescue for victims of selected types of injury was also collected. The total number of questions varied from 23 to a maximum of 92 for different types of injuries, with various skip patterns depending on the circumstances of the injury.

The questionnaire was pre-tested with a professional Cree translator to verify that questions were translatable into Cree and were acceptable to the community. The questionnaire was then pre-tested with Cree volunteers for clarity, acceptability and duration. In each community, Cree interviewers were given four hours of training in the administration of the structured questionnaire. Most interviewers were women with previous experience in health interviewing. Based upon their knowledge of each family and their availability, the interviewers chose the most appropriate relative or witness of the fatal incident to be approached for the interviews. Most interviews took place in the homes of the respondents during the summer of 1992. Families of victims of injury death during the preceding six months were not interviewed in order to avoid disturbing families in mourning. Interviewers signed a statement of confidentiality at the beginning of the work. Telephone follow-up was made with the interviewers every two weeks until

all interviews had been completed. The study protocol had been approved by the ethics committee of the Montreal General Hospital Department of Community Health, and the Community Health Research and Programming Committee of the Cree Health Board.

The rate of acceptance to be interviewed among the families approached was assessed. The variability in the completeness of information collected during the interview was assessed depending on the delay between the death and the interview, and depending on the relationship between the respondent and the victim. For this analysis, a common core of 23 questions was selected from the questionnaires. Then, for each interview, depending upon the cause of injury, pertinent supplementary questionnaires were selected. A maximum of 21 supplementary questions (eg. for boating drownings) were selected for analysis. Any answer among those selected questions that was judged non-pertinent because of the age of the victim (eg. alcohol ingestion by the victim was not considered pertinent for victims less than 15 years of age since there were no positive responses for victims below this age) or the activity at the time of the death (eg. use of a personal flotation device by victims who drowned during recreational swimming) were not considered when calculating the proportion of useful information provided by the interview. Any answer to the selected set of pertinent questions that was "don't know" or that was left blank did not contribute useful information to the study and was not considered further in the analysis. However, these questions were retained in the denominator when calculating the proportion of useful information provided by the interview. All other answers to the selected pertinent questions (positive, negative or providing other details) provided useful information to the study and were the numerator

in the calculation of the proportion of useful information provided by the interview. The variation of the proportion of useful answers during mortality interviews relative to the delay since death was analyzed by calculating a Spearman's rank correlation coefficient (Colton, 1974) to assess the effect of such delay on the recall of specific details relating to the event. The delay between the interview and the death was defined as the number of months between the month of the death and September 1st, 1992, the date at which all interviews were completed (rounded to the nearest month). Finally, the correlation between the proportion of useful answers for each interview and the relationship of the interviewee to the victim was calculated using a Spearman's rank correlation coefficient (r_s) to assess whether a close family member would recall more details about the event than more distant relatives.

Measuring the validity of mortality interviews would mean verifying whether the interview accurately relates the actual circumstances of the event. Since what really happened at the time of the event is unknown, there is no gold standard to identify the actual circumstances of these events. Only criterion validity could be measured (Streiner and Norman, 1991) by comparing, for specific questions, coroners' investigations, which report a different perspective on the circumstances of the same events, to the mortality interviews. This comparison was limited to the events where both coroners' reports and interviews were available, and where the information of interest was collected in each source. Only deaths that had occurred since 1986 could be included in the comparison, since coroners' reports were not available for the earlier period. The comparison was made for alcohol use by the victim at the time of the event, and the use of safety

equipment pertinent to the injury (eg. safety belt for motor vehicle fatalities, helmets for snowmobile and all terrain vehicle fatalities, personal flotation devices for drownings, smoke detectors for burns, and firearm storage for firearm-related fatalities, including both suicides and unintentional firearm injuries).

Epi-info version 5.01b (Centers for Disease Control, Epidemiology program office, Atlanta, Georgia) and SAS were used to analyze the data.

Results:

3.1. Acceptability of the mortality interview

A total of 46 family members or witnesses were interviewed. Seven families formally refused the interview. In one community, the interviewer abandoned the work in progress and could not be replaced due to improper timing for interviews since recent injury deaths had occurred in the community. In this community, only 4 of the 17 families were approached for interview. One community (with only a single injury death) was not visited because of cancellation of a flight due to bad weather during the field work. Overall, the acceptance rate of mortality interviews among the families who were approached (excluding the community with interviewer problems) was 86 percent. The delay since the death did not influence the acceptance rate (**Table 3.1.**). Families who refused interviews had experienced the death of their relative at different times throughout the study period.

Excluding the interviews that took place in the community where the work was not completed, a total of 41 respondents provided details on the events leading to the death of 42 victims. The proportion of useful information provided by each interview ranged from a minimum of 41 percent to a maximum of 100 percent, with a mean of 82 percent and a median of 82.5 percent useful answers/interview. Delay between the death and the time of interview ranged from 13 months to 124 months with a mean delay of 66 months and a median delay of 74.5 months. There was no significant correlation between the proportion of useful information provided by the mortality interview and the duration of the delay between the death and the interview (Spearman's rank correlation

coefficient r_s = - 0.14, p = 0.39) **(Figure 3.1)**.

The frequency distribution of the relationship of the respondent to the deceased is outlined in **Table 3.2.** There was no significant correlation between the relationship of the interviewee to the victim and the proportion of useful information provided by the interview (r_s = 0.11, p = 0.51).

3.2. Quality and completeness of the information provided by the mortality interview

Mortality interviews were compared to the coroners' reports for the 26 victims where both sources of information were available. **Table 3.3.** presents a comparison of the actual information recorded in the interview and in the coroners' report for acute alcohol ingestion by the victim and use of safety equipment pertinent for the injury. Among the 17 victims 15 years and above during the 1986-91 period, acute alcohol ingestion was reported in 76 percent (13/17) of mortality interviews and in 35 percent (6/17) of coroners' reports. There was good agreement between mortality interviews and coroners' reports when both sources mentioned the presence of acute alcohol ingestion. All events where the coroner had identified acute alcohol use were identified by the mortality interview. Blood alcohol levels were measured in 4/6 victims so identified. The lack of use of safety equipment was reported in 75 percent (12/16) of mortality interviews and in 25 percent (4/16) of coroners' reports. All events where the lack of use of safety equipment was identified by the coroners were also identified by the mortality interview. Among those events, the coroner identified the presence of a non-functional smoke detector for two victims while the mortality interview noted the absence

of such equipment.

Discussion:

Mortality interviews to determine the circumstances surrounding a fatal injury event were well accepted in the Cree communities. We believe that the communities' concern with injuries, the support of community officials, and the collaboration of local interviewers contributed to the acceptability of mortality interviews.

Similar interviews have been used in other indigenous communities for studying alcohol and injury deaths (Jarvis and Boldt, 1982). More recently, the U.S. National Mortality Followback Survey used mailed questionnaires to retrospectively assess selected details surrounding death in a representative sample of adults in the United States (Poe et al., 1991). In both cases, the interviews were reported to have been well accepted by the interviewees.

Due to the sensitive nature of such interviews, individuals with previous experience in health interviewing are preferable. The one interviewer who abandoned the work in progress had little experience compared to the interviewers in the other communities. A few of the young interviewers found it emotionally stressful conducting interviews for suicides of former friends in their own age group. Hiring older interviewers might avoid this problem.

There was no decrease in acceptance of interview with increasing delay since the death. However, caution should be exercised when interpreting the results since the numbers are small. In the U.S. National Mortality Followback Survey, the response rate remained above 85 percent after a 40 week delay between the death and the questionnaire mailing (Poe et al., 1991).

There are few other sources of information against which to compare the validity of mortality interview in identifying the circumstances of the injury event. At best, the comparison of answers for specific questions can be made for the cases where interviews and coroners' investigations were conducted. There was good agreement between mortality interviews and the coroners on the presence of acute alcohol consumption at the time of death and use of safety equipment pertinent to the injury. Mortality interviews provided substantial additional information about the circumstances of the events that was missing from the coroners' reports particularly on risk factors such as alcohol consumption around the time of the event, driving experience, swimming ability, use of safety equipment pertinent to the injury, and environmental conditions (Damestoy, 1994a).

The validity of verbal autopsies in identifying injury deaths in developing countries has been found to be better for injuries than for some medical causes, since the cause of injury death is external and obvious even to a lay person (Gray et al., 1990). Although based on very small numbers, a study of childhood mortality in Kenya found a sensitivity of 74 percent and a specificity of 100 percent for the verbal autopsy diagnosis of injury death, using hospital records as the gold standard (Snow et al., 1992).

Incomplete recall is a potential concern since some interviews involved events that had occurred up to ten years ago. In this study, there was no significant decrease in the proportion of useful information in the interviews with increasing delay since the death. However, although the detailed questions in the structured questionnaires helped to ensure a complete ascertainment of the details surrounding the injury event, most of the

important risk factors were also mentioned in the open-ended narration of the event.

In the U.S., a loss of useful information on certain specific questions was noted with increasing time since death, with a maximal interval of 74 weeks (Poe et al., 1991). A maximum interval of 6 months to a year has been suggested to gather enough information to assign a cause of death using a verbal autopsy for medical causes of death in childhood (Gray et al., 1990). However, in a study in Yemen (Myntti et al., 1991), injury deaths were reported without hesitation as far back as 58 years. Injury deaths are very disturbing and unexpected events which families are likely to remember clearly for many years.

Finally, there may be concern regarding the validity of a proxy reporting details about a victims' pre-existing personal risk factors (eg. habitual alcohol consumption). In a study of cardiovascular diseases (Graham and Jackson, 1993), proxies were found to accurately report frequency of alcohol consumption by living family members. Proxy informants have also been identified as reliable in providing information on the medical conditions and smoking habits of living family members (Herrmann, 1985; Halabi et al., 1992). The use of proxy informants for dead cases showed that the correlation between proxy reporting of acute alcohol consumption at the time of the death and blood alcohol levels reported by coroners was high in the mortality study of Jarvis and Boldt (1982). Similarly, surviving spouses provided a reliable overall smoking history of their deceased husbands up to four years following their death from lung cancer (Lerchen and Samet, 1986).

In conclusion, mortality interviews were well accepted in the Cree communities and provided useful information on the circumstances of injury deaths, up to ten years after the event.

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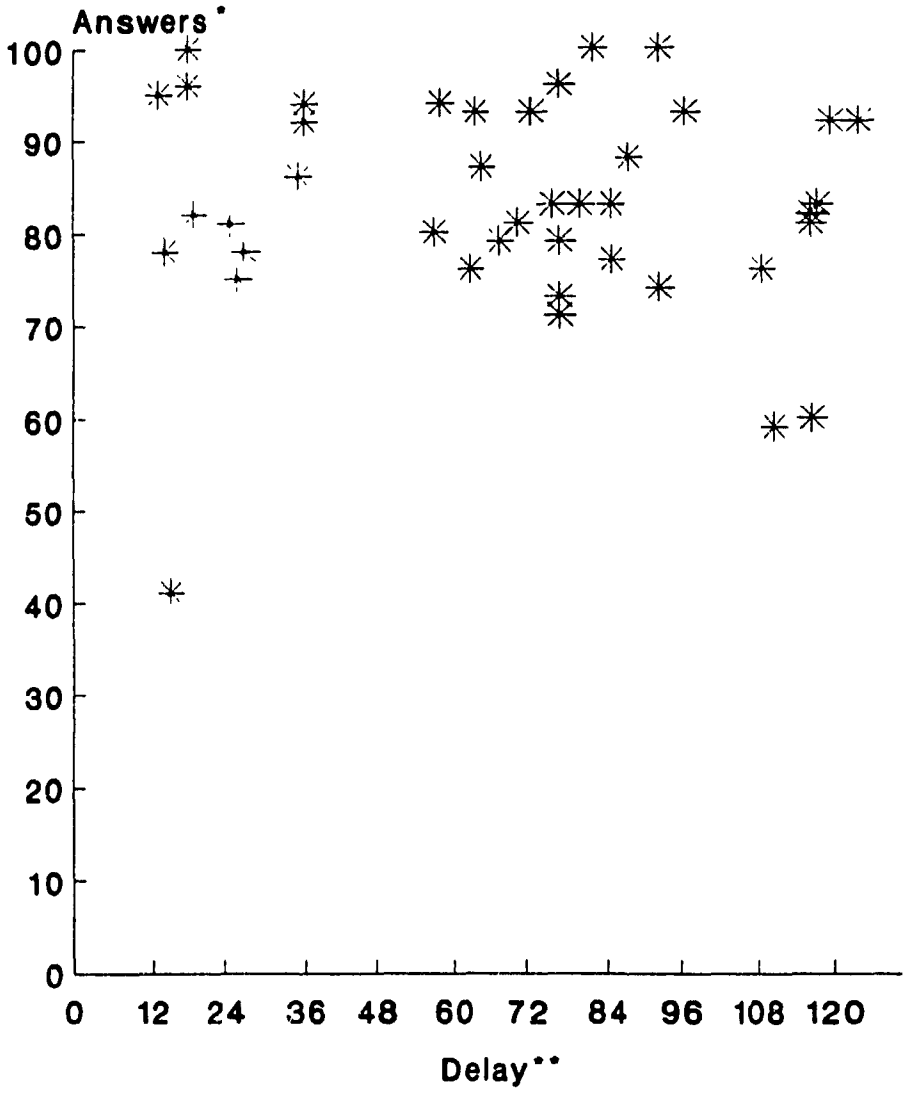
Table 3.1 - Rate of acceptance of mortality interview* for fatal injuries by interval from death.**
Cree communities of northern Quebec 1982-91 (n = 42)

Year of death	Mean interval	Interview accepted	Interview refused	Total approached	% acceptance
82-83	116	8	2	10	80
84-85	88	8	1	9	89
86-87	68	13	2	15	87
88-89	36	3	2	5	60
90-91	19	10	--	10	100
Total	68	42	7	49	86

* Excluding 17 families from the community where an interviewer was not able to complete the work.

** Interval (in months) between death and September 1st, 1992.

Fig. 3.1. **Scatter diagram showing the correlation between the proportion of useful information provided by the mortality interview and the delay between death and interview.**
Cree communities, northern Quebec 1982-91.



* Proportion of useful answers in mortality interviews (%)

** Delay between death and mortality interview (in months)

Table 3.2 - Relation between victim of fatal injury and respondent for mortality interviews. Cree communities of northern Quebec 1982-91 (n = 42)

Relation to victim	No. interviewed	%
Father / Mother	17	40
Husband / Wife	8	19
Brother / Sister	7	17
Other family	4	10
Friend	3	7
Son / Daughter	2	5
Total	42**	100

* Excluding the interviews in one community where an interviewer was not able to complete the work.

** 1 unknown.

Table 3.3- Distribution of agreement between coroners' reports and mortality interviews in identifying specific derterminants of fatal injuries.
Cree communities of northern Quebec 1982 - 91

Acute alcohol ingestion by victims aged 15 and over (n = 17)

Coroners reports / Interviews	Alcohol present**	Alcohol absent	Not mentioned	**Total**
Alcohol present*	6	1	6	13
Alcohol absent	--	--	3	3
Not mentioned	--	--	2	2
Total	6	1	11	17

* Alcohol consumption within 12 hours of the injury event.
** Alcohol consumption around the time of the injury event.

Use of relevant safety equipment* by the victim (n = 16)

Coroners reports / Interviews	Equipment used	Equipment not used	Not mentioned	**Total**
Equipment used	--	--	3	3
Equip. not used	--	4	8	12
Not mentionned	--	--	1	1
Total	--	4	12	16

* Includes: safety belt use / helmet use (n = 8)
personal flotation device (n = 2)
smoke detector (n = 3)
firearm storage (n = 3)

IV. AN EPIDEMIOLOGICAL PROFILE OF INJURY MORTALITY IN ABORIGINAL CREE COMMUNITIES OF NORTHERN QUEBEC 1982-1991

Introduction:

Prevention is the main area of interest when attempting to reduce the number of injury deaths, and even more so in a population so remote that emergency medical services cannot be provided with timeliness.

The objectives of the present study are:

1. To describe the relative importance of injury mortality as a public health problem in the Cree communities of northern Quebec.
2. To compare the burden of injury mortality in the Cree communities of northern Quebec relative to Canada and to other isolated Canadian populations.
3. To describe the relative contributions of different unintentional and intentional injuries to the overall injury mortality problem in the Cree communities.
4. To identify the circumstances of fatal injuries, including the activities at the time of the event along with personal, environmental and equipment factors associated with injury deaths.
5. To define specific injuries and associated determinants that could be priorities in local Cree programs for injury control.

Methods:

The study population included the 10,000 Cree residents in three inland and five coastal communities along the eastern coast of James Bay in northern Quebec, Canada (**Figure 4.1**). Deaths of Cree residents of these communities that occurred outside their home village were also considered. Non-Cree residents of these communities and Cree who live in other non-Cree communities were excluded from the study.

The Cree population is young and growing. Between 1981-86, the Cree population increased 19.5 percent, compared with 1.5 percent in Quebec (Schaeffer et al., 1992) and 3.9 percent in Canada (Statistics Canada, 1987). In 1986, the median age of the Cree population was 19 years compared to 32 years in Canada and Quebec. The age pyramid comparing the Cree population for 1982-91 to the 1986 Canadian census population is presented in **Figure 4.2**.

Mortality from injuries was studied during the ten year period from January 1st, 1982 to December 31, 1991.

The study considered all deaths from intentional and unintentional injuries, including deaths coded E800-E999 in the International Classification of Diseases, 9th edition (ICD-9), with the exception of misadventures during surgical or medical care (E870-E876) and adverse effects of drugs, medicaments or biological substances during therapeutic use (E930-E949), (WHO, 1977).

Clinic files, coroners' reports, death certificates, administrative lists and interviews of community key informants were combined to obtain as complete as possible a listing of injury deaths during the study period in the Cree communities of northern

Quebec (Damestoy, 1994a).

The denominator that was used for the calculation of mortality rates was the total person-years at risk in the Cree population of the communities during the 10 year study period. Person-years at risk by age and sex were computed using the annual population lists from the Beneficiaries of the James Bay Agreement.

In 1975, the James Bay Agreement was signed to allow construction of hydro-electric dams on Cree territory. This agreement contains certain rights and privileges for each party including financial compensation for land use. An administrative listing of Cree people eligible for compensation and other rights and privileges is maintained by a provincial office in Quebec city, and is updated by an employee in each community (La Convention de la Baie James et du Nord québécois, 1976). Since there was no separate listing by sex for infants (< 1 year old), the number of person-years for infants of each sex was estimated by applying the sex ratio of new births in each community for each year, to the total number of infants under 1 year of age in each community for each year of the study period.

There could be concern with the use of an administrative listing of population as a denominator for rates. While these lists are updated periodically, there might be delays in timely deletion of dead beneficiaries. No differences were found when comparing the date of death of injury victims as identified by official data sources (death certificate or coroner's report) and the date when the victim was removed from the administrative listing. The use of pooled data over a 10 year period minimizes any effect of yearly fluctuations in timeliness of reporting of injury deaths in such a small study population.

Population data from the James Bay Agreement were compared with the 1986 and 1991 census (Statistics Canada) and only minor differences were observed. In 1986, the census reported 344 more people than the James Bay Agreement list of Beneficiaries, while in 1991, the census included 96 extra people. The additional people tabulated by the census may be non-Cree inhabitants of the region. There was no over-enumeration of Cree beneficiaries in the administrative listing. The use of the administrative listing ensures that only people who are considered Cree in origin are included in the denominator.

Age, sex and cause-specific injury mortality rates were calculated and 95 percent confidence intervals were estimated with the exact method for Poisson variables with the use of standard tables (CRC, 1968) when the number of deaths was less than 50. When the number of deaths was greater than 50, 95 percent confidence intervals were estimated with the binomial approximation to the normal distribution (Snedecor and Cochran, 1989). Cause-specific mortality rates were calculated. The following ICD-9 external cause of injury codes were used in classifying the cause of injury death:

Drowning: E830, E832, E910

Motor vehicle fatality: E810-E825 (includes road traffic E810-819 and off-road vehicle fatalities E820-825 involving drivers, passengers, pedestrians and bicyclists hit by a motor vehicle either on or off-road)

Fires: E890-E899 (excludes scald burns from hot liquids)

Suicides: E950-E959

Deaths due to other causes (including suffocations, hypothermia, falls and

homicides) were grouped as "other" since the number of deaths from these causes was too small for separate analysis. Snowmobile drownings were considered as off-road vehicle fatalities for the comparison with other populations. However, these deaths were reclassified as drownings for the identification of circumstances and risk factors associated with the incidents, since their prevention is not really linked to off-road traffic measures but more to flotation and hypothermia protection as for boating injuries.

Standardized mortality ratios (SMR) for injuries were calculated to compare Cree injury mortality rates with several other populations. Ninety-five percent confidence intervals on the SMR were estimated using the exact method for Poisson variables (Breslow and Day, 1987). The indirect method of standardization was chosen because in the small Cree population, age-specific injury mortality rates are less stable than in the comparison populations. The comparison populations included:

1. The Canadian population for 1986: Injury mortality rates and census data were obtained from Statistics Canada (1987 and 1988).

2. The population of two isolated rural areas of Quebec for 1982-91: Abitibi-Temiscamingue (population 155,658) and Côte Nord (population 104,755) (**Figure 4.1.**). Inland Cree communities are surrounded by the Abitibi region. No major cities are located in these rural areas. Data on injury mortality were provided from the provincial health ministry listing of deaths from 1982 to 1991 (Ministère de la Santé et des Services sociaux, fichier des décès 1982-91) and denominators were obtained from the 1986 census (Statistics Canada).

3. The Canadian Aboriginal population for 1984-88: Information on injury mortality

and census data for Aboriginal population of Canada were provided by the Medical Services Branch of Health and Welfare, Canada. Data included both on and off-reserve Aboriginals in Manitoba, Saskatchewan, Alberta and Yukon, but only on-reserve Indians were included in the Atlantic provinces. Indians from British Columbia and Labrador and, since 1987, from Northwest Territories were not included in the data transferred. In Ontario and Quebec, only reserves served by Medical Services Branch were included. This excludes Cree communities, which are responsible for their own medical services through the Cree Board of Health and Social services.

4. The Northwest Territories population for 1982-91: Information on injury mortality for a ten year period was used for the Northwest Territories because of its smaller population (n = 52,240 in 1986). Data on injury mortality were obtained from Statistics Canada, and the 1986 census population was used for denominators. The Northwest Territories are inhabited by 37 percent Inuits, 17 percent Dene, 7 percent Metis and 39 percent non-Aboriginal people (Preliminary estimates, Statistics from the 1991 National census, Bureau of Statistics for Northwest Territories). This region was chosen for comparison because of its northern climate and relative isolation.

5. The Canadian Inuit population for 1984-88: Injury mortality rates were available for comparison for only certain age groups (Health and Welfare Canada, 1991).

Since the SMR is a summary measure, age-specific injury mortality rate ratios were calculated to compare injury death rates for different age groups among the Cree and the other populations. Confidence intervals on these injury mortality rate ratios were calculated using Taylor series confidence intervals (Kleinbaum et al., 1982).

Potential years of life lost (PYLL) (Romeder and McWhinnie, 1977) from injuries in the Cree population from birth to age 65 were compared with PYLL from respiratory diseases, neoplasms and circulatory diseases for 1985-87 (Système permanent de surveillance de l'état de santé de la population, 1989) to assess the relative importance of injury deaths as a cause of premature mortality.

To describe the public health importance of injuries in the Cree population relative to other causes of death, proportionate mortality from injuries and other leading diseases was calculated using mortality data in the Cree population from 1985-1987 (Système permanent de surveillance de l'état de santé de la population, 1989).

Epi-Info version 5.01b (Centers of Disease Control, 1991) and Quattro-Pro version 1.0 were used for these calculations.

Identification of circumstances of fatal injuries:

To gather information on the circumstances of the fatal events and to identify possible preventable factors, mortality interviews were conducted with family members of the victims or witnesses of the events in each community. Details on the acceptability and usefulness of mortality interviews for assessing the circumstances of injury are presented elsewhere (Damestoy, 1994a).

In situations where no family or witness was available for interview, information on circumstances was obtained from coroners' reports for those deaths that had been investigated. Coroners' reports were only available for deaths from 1986-91.

In one community, the interviewer abandoned the work in progress and could not

be replaced due to improper timing for interviews, since recent injury deaths had occurred in the community. Coroners' reports were available for many of the deaths in this village, and the Cree public health officer for this community provided information on the circumstances of some of the remaining injury deaths.

Circumstances of the events were described. For each risk factor of interest, the proportion of victims for whom information on the risk factor was known was described as a percent of all victims. Then, for each factor, the proportion (percent) of victims was enumerated for whom the risk factor was present; the denominators included all victims for whom this risk factor was known and pertinent (eg. use of personal flotation device for boating drowning victims only, safety belt use for motor vehicle occupants).

Results:

4.1. Relative importance of injury mortality as a public health problem in the Cree communities of northern Quebec:

4.1.1. Age and sex-specific injury mortality rates

Table 4.1. presents the age and sex specific injury mortality rates in the Cree communities for the 10 year period. Injury mortality rates were 3.5 times greater in males than in females, a difference that is statistically significant. The injury death rates for all adult males 20 years and older was 13 times greater than for adult females. This difference is statistically significant at the 95 percent confidence level as shown by the non-overlapping confidence intervals. In infants (< 1 year) and toddlers (1-4 years old), injury mortality rates are higher than in older children and are similar for both sexes. Nearly half (44 percent) of the female injury deaths involved infants and toddlers.

4.1.2. Standardized mortality ratios for all injuries

Table 4.2. presents the standardized mortality ratios (SMR) for injuries in the Cree population compared to various standard populations. After adjusting for differences in age structure, Cree communities have twice as many injury deaths as expected if the 1986 Canadian injury mortality rates had prevailed. Cree communities had 1.4 times as many injury deaths as expected at the injury mortality rates of selected rural regions of the province of Quebec. Compared to the Northwest Territories, the SMR was 0.7 i.e., Cree communities had 30 percent less injury deaths than expected if NWT injury mortality rates had prevailed. Cree communities had half the injury deaths expected at rates of other Canadian Aboriginal communities whose mortality is reported

by the Medical Services Branch of Health and Welfare Canada (Muir, 1991). All of these differences between the Cree and the other populations were statistically significant at the 95 percent level of certainty.

The increased injury mortality among the Cree with respect to Canada and rural Quebec was mainly attributable to excess deaths among adult males and toddlers of both sexes. The SMR compared to the Canadian population was 2 (95 percent confidence interval: 1.5-2.9) for all Cree adult males 20 years and older, and 0.4 (95 percent confidence interval: 0.1-1.1) for Cree adult females 20 years and older. However, injury deaths of Cree males and of Cree females were less than expected if the sex-specific injury mortality rates of the Northwest Territories had prevailed.

4.1.3. Age-specific injury mortality rate ratios

Tables 4.3.(a) and (b) compare age-specific injury mortality rates across different populations. The mortality rate for Cree infants and toddlers was several times higher than for the Canadian population, but this difference was based on small numbers. Injury mortality rates for Cree children 10 to 14 years old were significantly higher than Canadian rates for this age group.

4.1.4. Potential years of life lost to injuries in the Cree communities

Injuries, including all intentional and unintentional injuries, were the leading cause of potential years of life lost during the three year period 1985-87, followed by respiratory diseases, neoplasms and circulatory diseases (**Figure 4.3.**). Injuries accounted for 1108 potential years of life lost during 1985-87, 6.8 times more than respiratory diseases, the second cause of PYLL in the Cree communities. This reflects

the young age at death of most injury victims, as well as the number of injury deaths.

4.1.5. Proportionate mortality from injuries

Injuries accounted for 24 percent of all deaths among the Cree during 1985-87 (**Figure 4.4.**). Injuries were responsible for the largest proportion of deaths in the Cree population during this period, followed by circulatory diseases and neoplasms (Système permanent de surveillance de l'état de santé de la population, 1989). In comparison, injuries caused 7 percent of all Canadian deaths in 1986. Part of this difference between the Cree and the Canadian population is attributable to the difference in age structure between the two populations. Since the Cree population is younger, a greater proportion of deaths would be expected to be injuries. However, the difference in age structure does not explain all of the discrepancy between Cree and Canadian proportionate mortality due to injuries, as indicated by the SMR already discussed.

4.1.6. Cause-specific injury mortality rates in the Cree communities

Among all injury deaths in Cree communities during the study period, road traffic fatalities on the highway involving cars, trucks, all-terrain vehicles and snowmobiles accounted for 21 percent of injury deaths and drownings (excluding snowmobile drownings) accounted for 22 percent. Another 11 percent of deaths occurred from off-road vehicles travelling in the wilderness, including 2 deaths from all-terrain vehicles and 6 snowmobile drownings. When snowmobile-associated drownings were reclassified as drownings, water-related events accounted for 29 percent of injury mortality. Injury mortality rates were 2 to 11 times higher in males than in females for different specific injuries (**Table 4.4.**).

There were 8 times more drownings in the Cree population than expected if Canadian drowning rates had applied. This excess of drownings was statistically significant for both males and females. There were 3.5 times more drownings in Cree males than could be expected if the rural Quebec male drowning rates had applied. These comparisons exclude snowmobiling drowning which are often classified as off-road vehicle fatalities (ICD-9 code E820) in vital statistics.

Cree males had significantly more deaths from off-road vehicles than expected if Canadian males off-road vehicle mortality rates had applied. However, there were no excess of Cree male deaths from road traffic fatalities than expected if the Canadian male road traffic fatality rate had applied. Compared to the Northwest Territories, off-road vehicle fatalities were not greater than expected. Among off-road vehicle fatalities in the Cree communities, 75 percent (6/8) included incidents where snowmobiles went through the ice (ie. drownings).

Suicide rates in the Cree communities were similar to those for the Canadian population. There were 60 percent less suicide deaths in the Cree communities than expected if the suicide rates of Northwest Territories had applied. This difference was statistically significant for males **(Table 4.5)**.

4.2. Circumstances of fatal injuries:

4.2.1. Sources of information

A total of 72 injury deaths were identified by the combination of the different data sources. Detailed information on the events surrounding the death was available for 92 percent (66/72) of the victims. Most of this information (70 percent) was obtained from mortality interviews (n = 46). For those 20 deaths for which no interview was available, information was collected from coroners' reports for 15 victims, and interviews with key informants for 5 victims.

4.2.2. Characteristics of the victims and the events:

Overall, the victims for whom detailed information on risk factors was available, were similar in age, sex and cause of death to all the injury victims recorded during the study period.

Of the 75 percent of victims aged 18 years and over for whom information is available, 44 percent were single. Of the 72 percent of male victims for whom information was known, 42 percent (13/31) were single, while 60 percent (3/5) of female victims aged 18 years and over were single. Of the 75 percent of victims aged 18 years and over for whom information was available, 17 percent (6/36) were hunting or trapping for subsistence when the fatal incident occurred.

As outlined in **Table 4.6.**, the wilderness/bush was the most frequent location of the fatal incidents. Nineteen percent of injuries occurred on Friday and 18 percent Saturday.

4.2.3. Specific injuries

4.2.3.1. Drownings

There were a total of 22 water-related deaths (26.8 water-related deaths per 100,000 person-years). This includes 16 drownings and 6 snowmobiling drownings. One of these victims died of either hypothermia or drowning after a prolonged immersion in cold water. The groups identified as most at risk were toddlers of both sexes and adult males. Toddler drownings occurred during play near water, when adult supervision was lacking.

Drownings of adult males were related to boating and snowmobiling. Ingestion of alcohol was associated with boating drownings. Water transport activities for subsistence hunting or fishing were not associated with alcohol ingestion. There was a lack of use of personal flotation devices or hypothermia suits. Most drowning victims were described as swimmers. Further details on the public health impact of drownings and the circumstances of fatal drowning incidents in the Cree communities are discussed elsewhere (Damestoy, 1994c).

4.2.3.2. Motor vehicle fatalities

A total of 15 road traffic fatalities involving either a car, a truck or a snowmobile occurred on the road or highway, and a total of 2 all-terrain vehicle fatalities involving four-wheels vehicles were described during the study period. Motor vehicle fatalities involved adult males in 88 percent (15/17) of incidents and were associated with drunk driving (of the victim or of another person) in 9 incidents and lack of safety belt use in 6 of the events for which information was available. Further details on the public health

impact and the circumstances of motor vehicle fatalities in the Cree communities are discussed elsewhere (Damestoy, 1994d).

4.2.3.3. Burns

Eight deaths from fire occurred during the study period, including 6 males and 2 females. These deaths resulted from 5 fires, including 4 house fires and 1 car fire.

Information on the circumstances of the deaths was available for 7 victims. Among the 4 victims 15 years and older, 3 had ingested alcohol at the time of the incident, 2 of whom were visibly intoxicated.

The house fires originated from: electric stoves (n = 2), fat catching fire on the stove (n = 1) and playing with a cigarette lighter (n = 1). The car fire originated from a cigarette when the alcohol intoxicated victim fell asleep. None of the house fires were started by cigarettes.

All houses were equipped with smoke detectors. Two were reported to be non-functional, while in the other 2 fires, it was not known whether the detector was functional.

4.2.3.4. Suicides

A total of 10 suicides were identified during the study period. Nine victims were males and 5 of them were between 25 and 39 years old. Half of the suicides resulted from self-inflicted gunshot wounds. Two suicides took place at a 1.5 month interval in the same community. However, there was no information in the mortality interviews that linked these two deaths as a cluster of suicides.

Information on the circumstances of the suicides was available for 80 percent of

the victims. Among those victims, 7 of 8 had ingested alcohol prior to the incident and 4 were visibly intoxicated. All of the 6 suicide victims for whom information was known had serious personal problems at the time of the incident. These problem included familial or marital difficulties for 3 victims and mourning for 1 victim. Two victims were described as depressed in the interview. It is unknown whether these depressive episodes were clinically recognized and treated. Only one victim among the 4 for whom the information was known had made a previous suicide attempt.

All of the 3 victims of suicides by gunshot wound for whom information was available had used hunting rifles that were stored unlocked in the home. All of these 3 victims had ingested alcohol prior to the incident. Neither of the 2 victims for whom the information was available had stored the gun loaded. Information on storage of the bullets was not available.

Three interviewees believed that the suicide in their family could have been prevented if the victims had received counselling for their personal problems.

4.2.3.5. Other causes

Injury deaths from other causes included: 5 suffocations, 4 homicides, 2 unintentional firearm injuries, 1 exposure hypothermia, 2 poisonings and 1 fall.

Over the study period, a total of 13 children younger than 5 years, including 7 girls and 6 boys, died from injuries. The most common causes of death in this age group were: 4 suffocations, 3 drownings, 3 motor vehicle injuries and 2 burns.

Among the 4 victims younger than 5 years old dying of suffocation, one incident involved 2 victims; they were young children who were being transported on a

snowmobile sled covered with a sheet of plastic. Another suffocation occurred in a child who was being transported in a sled pulled by a snowmobile. The child was febrile, so it was unclear whether the death resulted from suffocation, from an acute illness, or from a combination of both.

4.2.4 Treatment and rescue:

Seventy-four percent (32/43) of victims for whom information was available died within minutes after the event. Twenty-three percent (13/57) of victims for whom information was available, received some form of treatment after the event. Five victims had cardio-pulmonary resuscitation attempted. Eighty-eight percent (15/17) of victims of injury events that occurred in the bush did not receive any first aid or hospital treatment (**Table 4.7.**).

The interviewees were asked their opinion on the potential value of any type of treatment once the injury had occurred. In 60 percent of injury deaths (26/43), it was believed that treatment would not have prevented the death (**Table 4.8.**).

Discussion:

Unintentional and intentional injuries combined were the leading cause of death among the Cree of northern Quebec during 1982-91. During 1975-82 (Robinson, 1985), injuries were the second most common cause of death after circulatory diseases and accounted for 20 percent of deaths.

In other Aboriginal communities, injuries are also an important cause of death. Injuries accounted for 31 percent of deaths in a survey of selected Canadian Aboriginal communities in 1986-88, and were the leading cause of death in Aboriginal communities of western and northern Canada where injuries accounted for 25 to 50 percent of deaths in different communities. In Aboriginal communities in eastern Canada, injuries were the second leading cause of death after circulatory diseases, and caused 20 to 24 percent of all deaths (Muir, 1991). In earlier studies similar proportions of deaths have been attributed to injuries in Aboriginal communities. In northern Ontario injuries accounted for 39 percent of all deaths (Young, 1983), while in Alberta for 32 percent (Jarvis and Boldt, 1982).

Injuries in the Cree communities were the leading cause of potential years of life lost prior to 65 years old.

In Sioux Lookout Zone, Young (1983) found that 46 percent of injury deaths involved victims younger than 25 years old. Injuries were the leading cause of death in each age group from 1 to 64 in Canadian Aboriginal communities, accounting for 87 percent of deaths among 15 to 24 year olds (Muir, 1991).

The standardized mortality ratio for all injuries in the Cree compared to the

Canadian population was 2.0. The excess of deaths was statistically significant for males, especially for adult males above 20 years old. An excess of injury deaths in Aboriginal populations as compared with the overall population has been described for other communities. In 1972-81, the standardized mortality ratio for all injuries in a Northern Ontario community was 4.5 compared to the Canadian population (Young, 1983).

Excess mortality from injuries among Quebec Cree is relatively less when compared with rural regions of Quebec rather than with the Canadian population as a whole. Robinson (1985) previously reported that Cree communities experience lower death rates from injuries than other Aboriginal communities in Canada. The standardized mortality ratios referenced to rural populations control somewhat for the isolation of Aboriginal communities and tend to be closer to one than the SMR referenced to the Canadian population (Mao et al., 1992). However, the enumeration of injury deaths in Cree communities was provided by a combination of several data sources while the data for injury deaths in the comparison populations were provided by vital statistics only. It was previously outlined that vital statistics underascertain the number of injury deaths in the Cree population (Damestoy, 1994a). If underascertainment is also the case for other populations, this might bias upward the SMR comparing the Cree with the populations of other populations.

Injury deaths were 13 times more frequent among adult males than among adult females during the study period. An excess of male injury deaths has been reported in several other studies of Aboriginal communities (Young, 1983; Jarvis and Boldt, 1982).

The second group at high risk for injury death were the toddlers of both sexes. However, caution should be exercised when interpreting these elevated rates, since the number of deaths was small. Moreover, there might be delay in reporting births to the List of Beneficiaries that might overestimate the injury death rate in the under 1 age group.

Drownings:

In the Cree communities, drownings from boating and snowmobiling were the most common cause of injury death, followed by on-road motor vehicle fatalities. Toddlers and adult males were the groups at greatest risk for drowning.

In other reports of injury mortality in Aboriginal communities, the most common causes of injury death varied, and leading causes included motor vehicle fatalities (Hislop et al., 1987), water transport fatalities (Young, 1987) or fires (Jarvis and Boldt, 1982), in various communities.

Improved supervision of children during their play near the water could help prevent toddler drownings. Various strategies to prevent swimming pool drownings have been suggested that could be applied to Aboriginal communities although no formal evaluation of their effectiveness in such a setting was available. Childproof latches on doors for houses near the water might prevent access to the water. Educating community members, preferably new parents, in cardiopulmonary resuscitation (Wilson et al., 1991; Wintemute, 1992) might be useful since most toddlers drownings occur within the village, where victims could be transported quickly to the local clinic after resuscitation efforts have begun.

Use of alcohol and failure to wear a personal flotation device while involved in boating activities and lack of use of a hypothermia suit for snowmobiling were important modifiable risk factors associated with water and ice transport fatalities in this study. Previous interventions in Aboriginal communities have included the distribution of personal flotation devices that were adapted to the needs of hunters (Perkins, 1993). Educational programs for boating, snowmobile and water safety that could be useful to the Cree have been developed by other Aboriginal communities (Health and Welfare Canada, 1990).

Motor vehicle fatalities:

Adult males were most at risk for motor vehicle fatalities. Most adult male victims of road traffic fatalities had ingested alcohol prior to the event. Drunk driving of the victim or another person was associated with most road traffic fatalities involving cars or trucks. Driving at night and failure to wear a safety belt were also associated with many motor vehicle fatalities.

Several interventions have been proposed. Education about drinking and driving, alternatives to driving (eg. taxi services proposed by the interviewees), increased use of safety belts through promotion programs are possible strategies for prevetion; however, the effectiveness of these interventions has not been evaluated in many Aboriginal communities.

Burns:

Eighty-eight percent of fatal burns in the Cree communities resulted from house fires. A smoke detector was either not present or not functional in the events where the

information was available.

In previous studies, fires were an important cause of injury death among Aboriginal communities. Fires were the leading cause of injury deaths in the study by Jarvis and Boldt (1982), second in the study by Hislop et al. (1987) and third in the study by Young (1983), ranging from 11 to 16 percent of all injury deaths. Poorly maintained stove pipes (Young, 1983) and alcohol ingestion by the victims impeding the capacity to escape (Jarvis and Boldt, 1982) were some of the factors that were associated with fatal house fires.

Suicides:

Suicide deaths in the Cree communities were not more frequent than expected when compared to Canada. Suicide victims were nearly all adult males. Alcohol intoxication and firearms were associated with many of the incidents. Mental illness was recognized in only one of the four victims for whom the information was known, but most deaths were preceded by various personal crises of unspecified nature including marital or familial problems. Previous attempts were not habitual.

Among other Aboriginal communities in Canada, suicide was 2.4 more common than expected when compared with the Canadian population (Muir, 1991). In various studies, suicides affected mostly males, however, the method of self-inflicted injury varied from firearms (Fox et al., 1984; Muir, 1991) to hanging (Ross and Davis, 1986).

Although based on a small number of deaths, many Aboriginal suicide victims were found to have made no previous attempts, had had little contact with a mental health professional and often ingested alcohol prior to the incident (Ross and Davis,

1986; Fox at al., 1984). Active preventive measures such as programs increasing self-esteem, combined with education on the danger of use of alcohol during personal crisis or depression might be effective. Counselling and support perhaps involving elders, might be beneficial during periods of personal stress or familial or marital problems (Fox et al., 1984).

The availability and lethality of hunting rifles are difficult to control in communities where hunting is part of the lifestyle (Seiden, 1977). Storage of the firearm in a locked cabinet (Wintemute, 1992) within the home might decrease the availability of the weapon for impulsive use. However, a formal evaluation of most suicide prevention programs has not been conducted (Young et al., 1992)

Feedback of the results of this study to the Cree leaders and the public should be helpful in the development of prevention strategies by the communities. These interventions need to be culturally appropriate and adapted to the needs.

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Fig. 4.1. **Geographical location of Cree communities of northern Quebec and of the rural regions of Quebec used for comparison.**

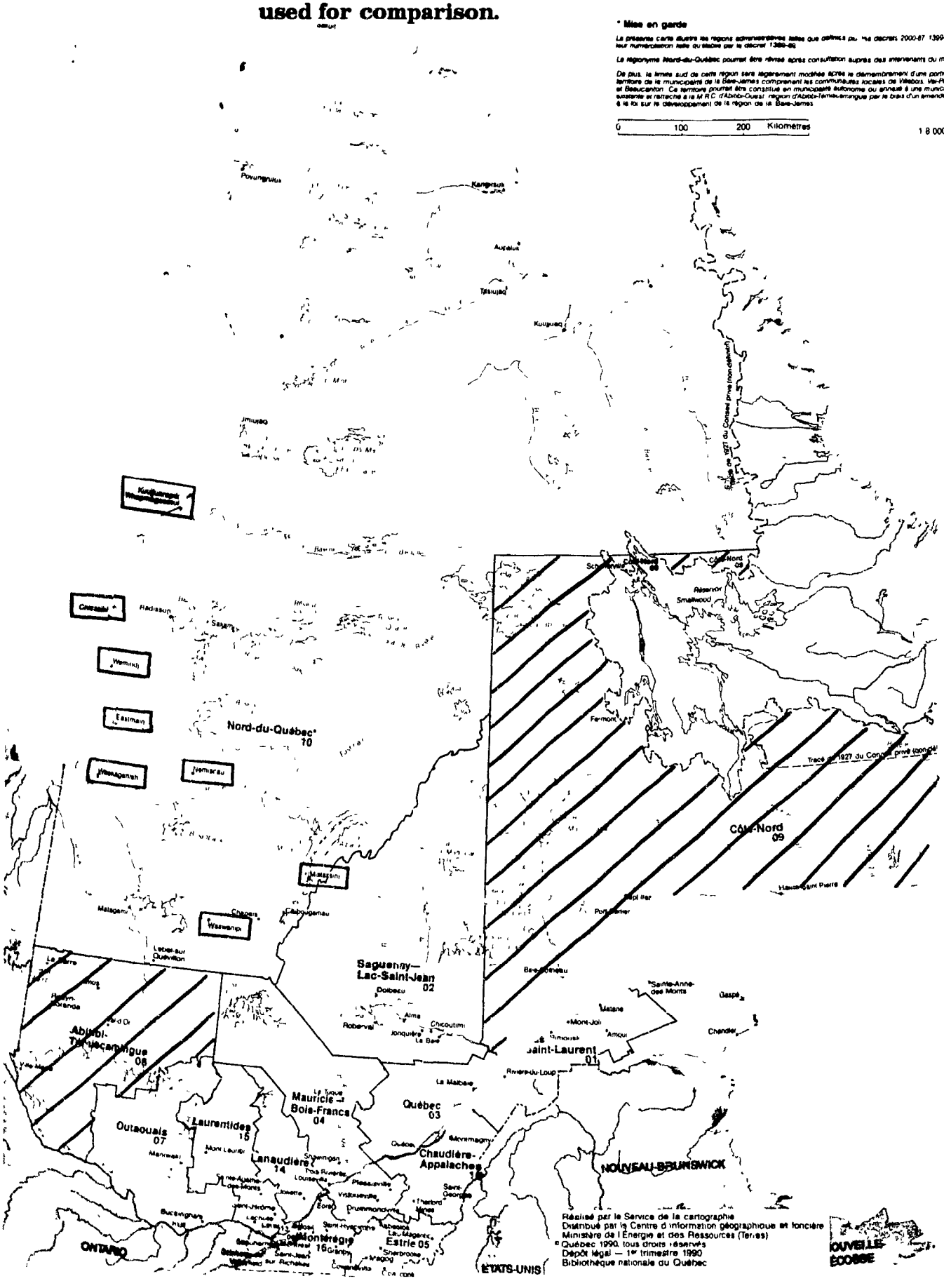
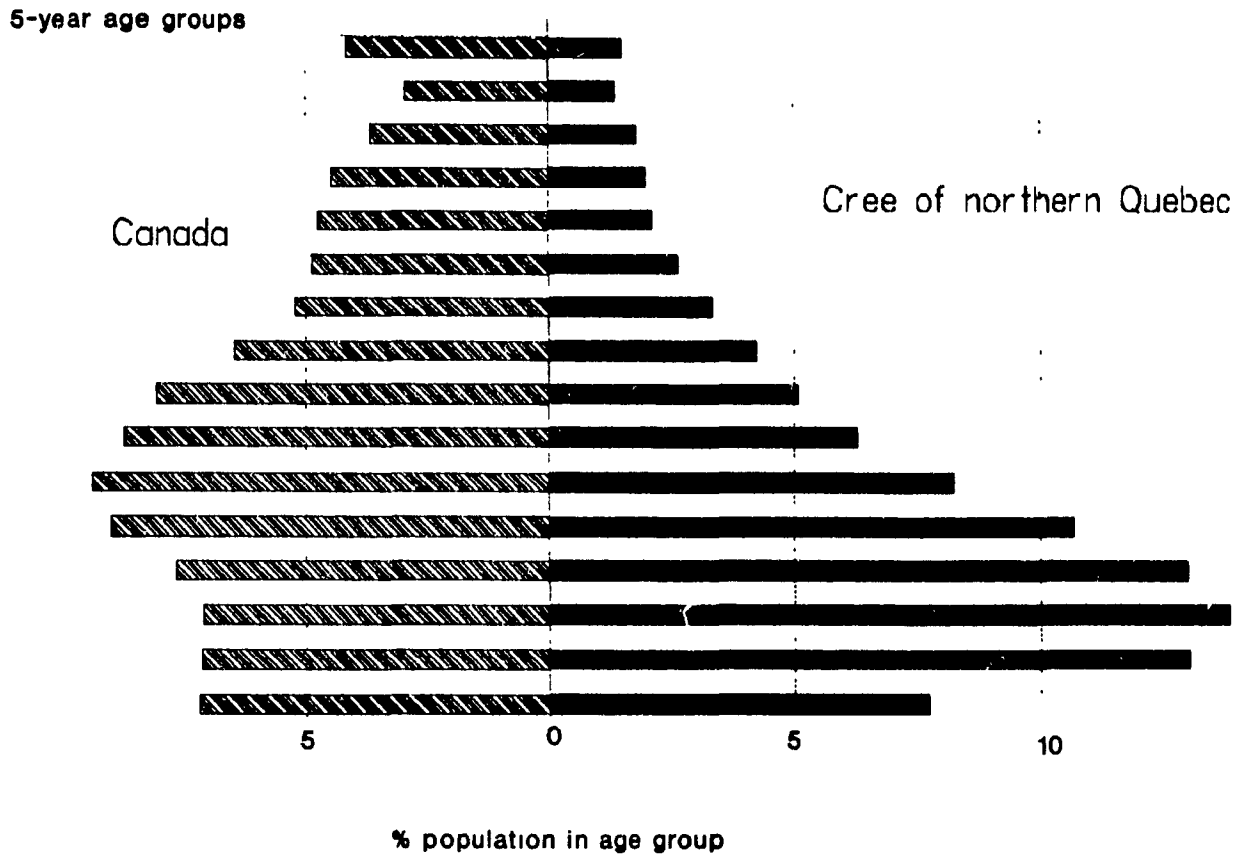


Fig. 4.2. Age pyramids of Cree population of northern Quebec (1982-91) and Canada (1986)



Source: Statistics Canada 1987
James Bay Agreement list of Beneficiaries 1982-91

Table 4.1- Age and sex-specific injury mortality rates per 100,000 person-years Cree communities of northern Quebec 1982 - 91 (n = 72)**

Age groups	Males				Females				Total			
	Rate	95 % CI*	Deaths	PY¶	Rate	95 % CI*	Deaths	PY¶	Rate	95 % CI*	Deaths	PY¶
< 1	170	17-613	2	1174	171	17-615	2	1170	171	43-435	4	2344
1 - 4	126	31-320	4	3184	158	51-371	5	3157	142	63-370	9	6341
5 - 9	0	0- 69	0	5362	19	2-105	1	5320	9	1- 52	1	10682
10 - 14	69	17-176	4	5793	36	4-129	2	5575	53	19-115	6	11368
15 - 19	111	41-243	6	5383	57	11-167	3	5264	85	38-161	9	10647
Subtotal < 20 yo	77	45-124	16	20896	63	34-109	13	20486	70	47-101	29	41382
20 - 24	226	106-416	10	4422	23	2-129	1	4339	126	62-225	11	8761
25 - 39	202	119-328	16	7919	12	1- 69	1	8164	106	62-169	17	16083
40 - 54	198	84-390	8	4047	0	0- 85	0	4351	95	41-188	8	8398
55 +	159	58-348	6	3770	29	3-161	1	3471	97	39-199	7	7241
Subtotal ≥ 20yo	198	142-270	40	20158	15	3- 43	3	20325	106	77- 143	43	40483
Total	136	100-172	56	41054	39	20- 58	16	40811	88	68-108	72	81865

** Includes all unintentional and intentional injuries coded ICD-9 E800-E999, excluding E870-E876 and E930-E949

* 95 percent confidence interval by the exact method for Poisson variables

¶ Person-Years at risk in the age group

Table 4.2- Standardized mortality ratios for injury deaths in the Cree communities 1982-91 compared with the populations of Canada, rural Quebec, Northwest Territories and Canadian Aboriginals (n = 72)**

Standard population	Males (n = 56)		Females (n = 16)		Total (n = 72)	
	SMR	95 % CI*	SMR	95 % CI*	SMR	95 % CI*
Canada 1986	2.1	1.6-2.7	1.7	1.0-2.7	2.0	1.6-2.5
< 20 years old	2.2	1.3-3.5	4.5	2.4-7.7	2.8	1.8-4.0
≥ 20 years old	2.1	1.5-2.7	0.4	0.1-1.3	1.7	1.2-2.3
Rural QC 82-91¶	1.4	1.1-1.8	1.6	0.9-2.5	1.4	1.1-1.8
< 20 years old	1.6	0.9-2.6	4.3	2.3-7.4	2.2	1.5-3.2
≥ 20 years old	1.3	0.9-1.8	0.4	0.1-1.2	1.1	0.8-1.5
NWT 82-91	0.7	0.5-0.9	0.6	0.4-1.0	0.7	0.5-0.9
< 20 years old	0.6	0.3-0.9	1.3	0.7-2.1	0.7	0.5-1.0
≥ 20 years old	0.8	0.6-1.1	0.2	0.0-0.5	0.6	0.5-0.9
Indians 84-88§	--	--	--	--	0.5	0.4-0.6
< 20 years old	--	--	--	--	0.7	0.4-1.0
≥ 20 years old	--	--	--	--	0.4	0.3-0.6

** Includes all unintentional and intentional injuries coded ICD-9 E800-E999, excluding E870-E876 and E930-E949. For the Cree communities ascertainment of deaths was from a combination of 5 sources of information while for the comparison populations deaths were ascertained by vital statistics only

* 95 percent confidence interval by the exact method for Poisson variables

¶ Rural Quebec: Abitibi-Temiscamingue and Côte-Nord regions

§ Includes on and off-reserve Aboriginals in Manitoba, Saskatchewan, Alberta, Yukon; on-reserve Aboriginals from the Atlantic provinces, and Ontario and Quebec Aboriginals serviced by the Medical Services Branch (Health and Welfare Canada)

Table 4.3(a)- Ratio of Cree age-specific injury mortality rate** compared with age-specific injury mortality rates for Canada, rural Quebec, Northwest Territories, Canadian Indians and Canadian Inuits

MALES AND FEMALES COMBINED

Age groups	Cree 82-91	Canada 1986			Rural Quebec 82-91			Northwest Territories 82-91		
	Rate¶	Rate¶¶	Cree:Canada Ratio	95 % CI*	Rate¶¶	Cree:Quebec Ratio	95 % CI*	Rate¶¶	Cree:NWT Ratio	95 % CI*
<1	171	22	7 8	2.8-20.9	17	10.0	0.8-126.7	92	1 9	0 2-15 2
1 - 4	142	18	7 9	4.0-15.1	14	10.1	2.7- 37.1	62	2.3	0.6- 8.2
5 - 9	9	11	0 8	0.1- 5 8	13	0.7	0.1- 6.7	30	0 3	0.0- 3.7
10 - 14	53	12	4.4	1 9- 9 5	19	2.8	0 8- 10.1	65	0.8	0 2- 3.1
15 - 19	85	57	1 5	0 8- 2 9	77	1.1	0.5- 2.5	219	0 4	0 2- 0.9
20 - 24	126	67	1.9	1 0- 3 4	102	1.2	0 6- 2.5	228	0.6	0 2- 1 2
25 - 39	106	52	2.0	1 3- 3 3	84	1.3	0.7- 2.1	140	0.8	0.4- 1.4
40 - 54	95	51	1.9	0 9- 3 7	69	1.4	0 6- 3 0	130	0.7	0 3- 1.9
55 +	97	95	1.0	0 5- 2 1	127	0.8	0.3- 1 7	182	0 5	0 2- 1 6
Total	**88**	**54**			**70**			**130**		

Age groups	Cree 82-91	Canadian Indians 84-88			Canadian Inuits 84-88¶		
	Rate¶	Rate	Cree:Indian Ratio	95 % CI*	Rate	Cree:Inuit Ratio	95 % CI*
<1	171	226	0.8	0 3- 2 1	-	-	-
1 - 4	142	97	1 5	0 7- 2 9	-	-	-
5 - 9	9	29	0 3	0 0- 2 4	24	0 4	-
10 - 14	53	52	1 0	0 4- 2 3	90	0 6	-
15 - 19	85	214	0 4	0 2- 0 8	261	0 3	-
20 - 24	126	287	0 4	0.2- 0 8	292	0 4	-
25 - 39	106	252	0 4	0 3- 0 7	-	-	-
40 - 54	95	254	0 4	0 2- 0 8	-	-	-
55 +	97	250	0 4	0 2- 0 8	-	-	-
Total	**88**	**183**					

** Includes all unintentional and intentional injuries coded ICD 9 E800-E998 excluding E870-E876 and E930-E949 Cree deaths were ascertained by a combination of 5 data sources while for the comparison populations deaths were ascertained by vital statistics only

* Taylor series 95 percent confidence intervals ¶ Death rate per 100 000 person-years at risk in the age group

¶¶ Death rate per 100 000 population at risk in the age group in 1986 ¶ Source Muir BL *Health status of Canadian Indians and Inuit 1990* Health and Welfare Canada and Government of Northwest Territories 1991 No data was available on the actual count of injury deaths among the Inuit Thus, no confidence intervals could be calculated around the injury mortality rates for this population.

Table 4.3(b)- Ratio of Cree age and sex-specific injury mortality rate** compared with age and sex-specific injury mortality rates for Canada, rural Quebec and Northwest Territories

MALES

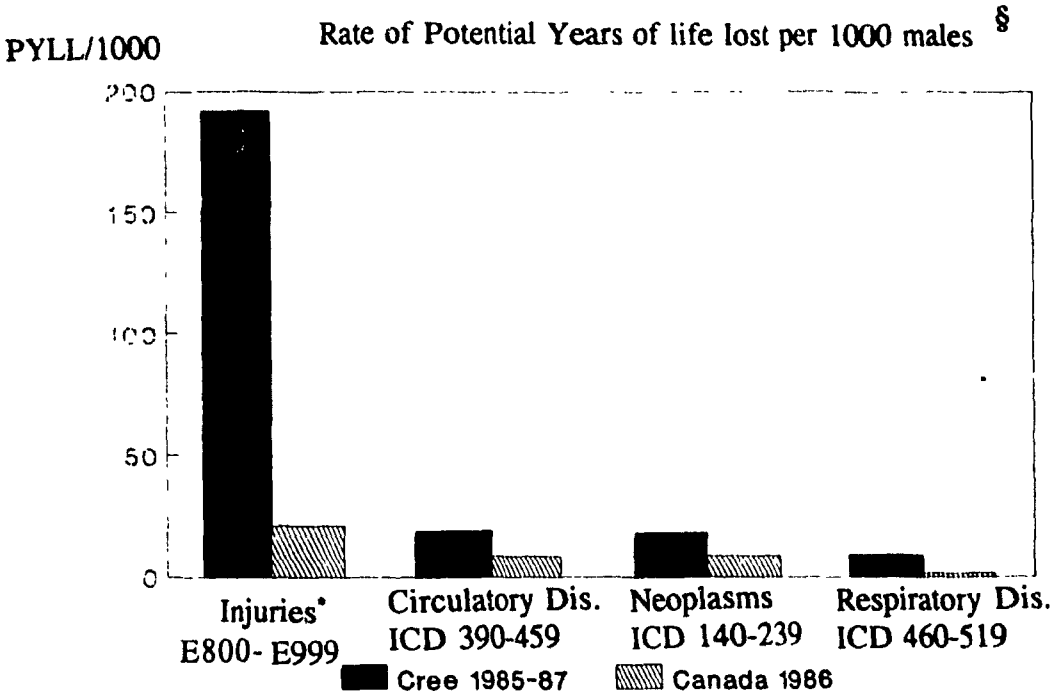
Age groups	Cree 82-91	Canada 1986			Rural Quebec 82-91			Northwest Territories 82-91		
	Rate§	Rate§§	Cree:Canada Ratio	95 % CI*	Rate§§	Cree:Quebec Ratio	95 % CI*	Rate§§	Cree:NWT Ratio	95 % CI*
<1	170	24	7 2	1 8-29 7	19	9 0	0 3-267 9	114	1 5	0 1-22 7
1 - 4	126	22	5 6	2.1-15 2	18	6.8	1 3- 37 3	64	2 0	0 3-11 9
5 - 9	0	14	0	--	19	0	--	42	0	--
10 - 14	69	17	4 1	1.5-11.1	24	2 9	0 6- 13 4	91	0 8	0 2- 3 8
15 - 19	111	85	1 3	0 6- 2.9	127	0 9	0 3- 2 3	339	0 3	0 1- 0 9
20 - 24	226	110	2.1	1.1- 3 8	183	1.2	0.6- 2.6	368	0 6	0 3- 1 5
25 - 39	202	81	2 5	1 5- 4 1	135	1.5	0.9- 2 6	201	1.0	0 5- 2 0
40 - 54	198	74	2 7	1 3- 5 3	103	1.9	0 9- 4 3	184	1.1	0 4- 3 0
55 +	159	121	1 3	0 6- 2 9	183	0.9	0 4- 2 1	233	0 7	0 2- 2 3
Total	**136**	**76**			**109**			**188**		

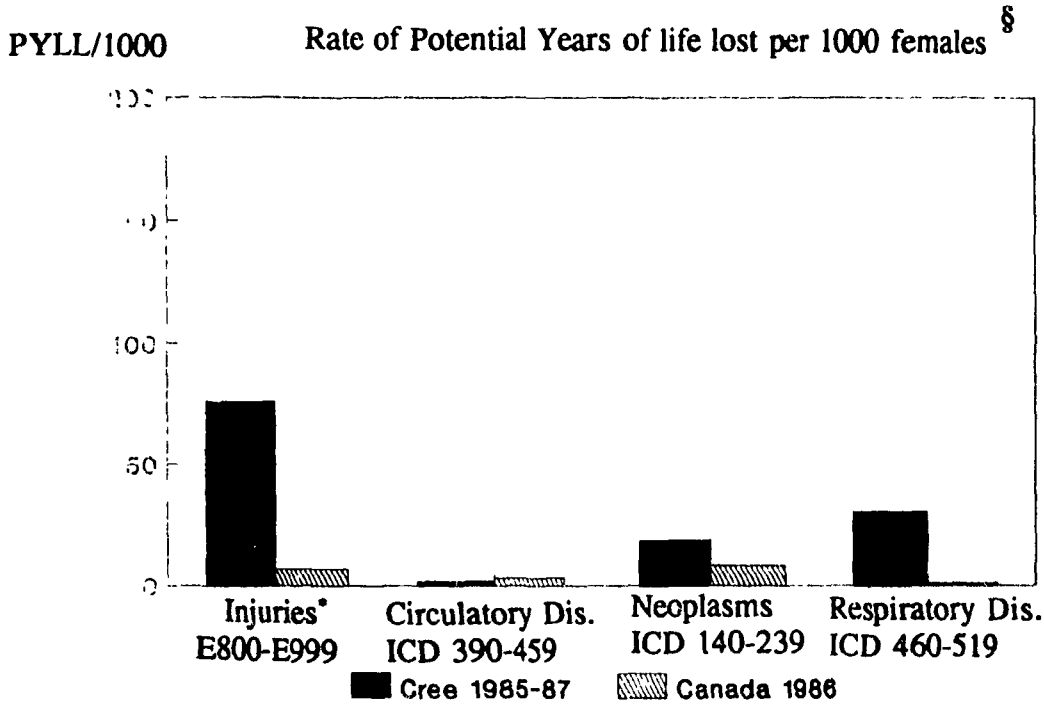
FEMALES

Age groups	Cree 82-91	Canada 1986			Rural Quebec 82-91			Northwest Territories 82-91		
	Rate§	Rate§§	Cree:Canada Ratio	95 % CI*	Rate§§	Cree:Quebec Ratio	95 % CI*	Rate§§	Cree:NWT Ratio	95 % CI*
<1	171	21	8.2	2.0-34 0	15	11 3	0 2-526.1	70	2 4	0.1-72 5
1 - 4	158	14	11.3	4 6-27.7	10	16 5	1.9-140.8	60	2 7	0 4-16 4
5 - 9	19	8	2 3	0.3-16 4	7	2 7	0.1- 50 3	18	1 1	0 0-31.5
10 - 14	36	8	4 3	1.0-17 4	13	2.9	0.3- 26 0	37	1 0	0 1-11 6
15 - 19	57	27	2 1	0.7- 6.7	26	2 2	0 4- 11 3	89	0 6	0 1- 3 6
20 - 24	23	24	0 9	0.1- 6 7	22	1 0	0 1- 10 2	86	0 3	0 0- 2 8
25 - 39	12	22	0 6	0.1- 4 0	31	0 4	0 1- 3 1	71	0 2	0 0- 1 5
40 - 54	0	28	0	--	32	0	--	65	0	--
55 +	29	74	0.4	0 1- 2.8	71	0.4	0 1- 3 1	115	0.2	0 0- 2 9
Total	**39**	**32**			**30**			**66**		

** Includes all unintentional and intentional injuries coded ICD-9 E800-E999 excluding E870-E876 and E930-E949 Cree deaths were ascertained by a combination of 5 data sources while for the comparison populations deaths were ascertained by vital statistics only * Taylor series 95 percent confidence interval, § Death rate per 100,000 person-years at risk in the age group, §§ Death rate per 100,000 population at risk in the age group in 1986

Fig. 4.3. **Rate of potential years of life lost from injuries and other causes (0 - 65 yo). Cree communities 1985-87 and Canada 1986.**



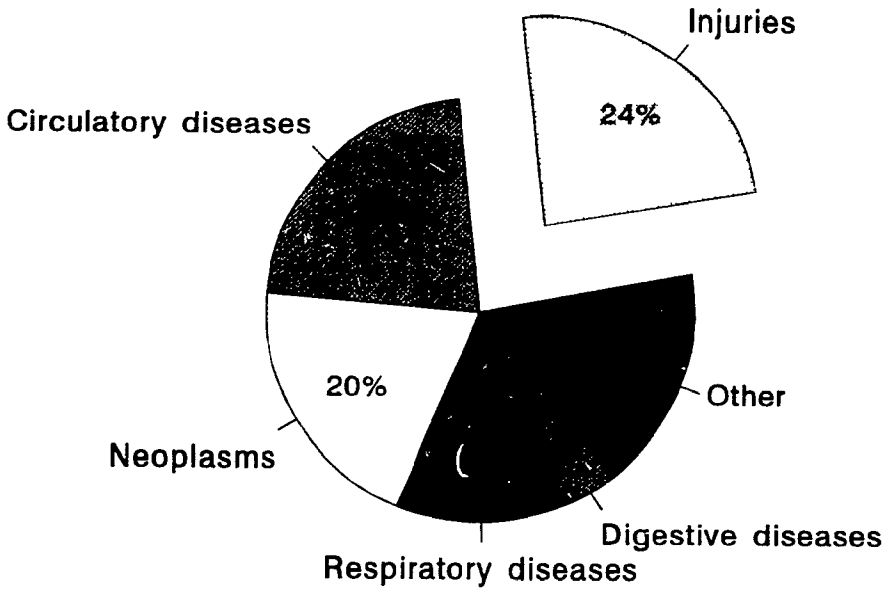


§ During 3 years for Cree communities, during 1 year for Canada

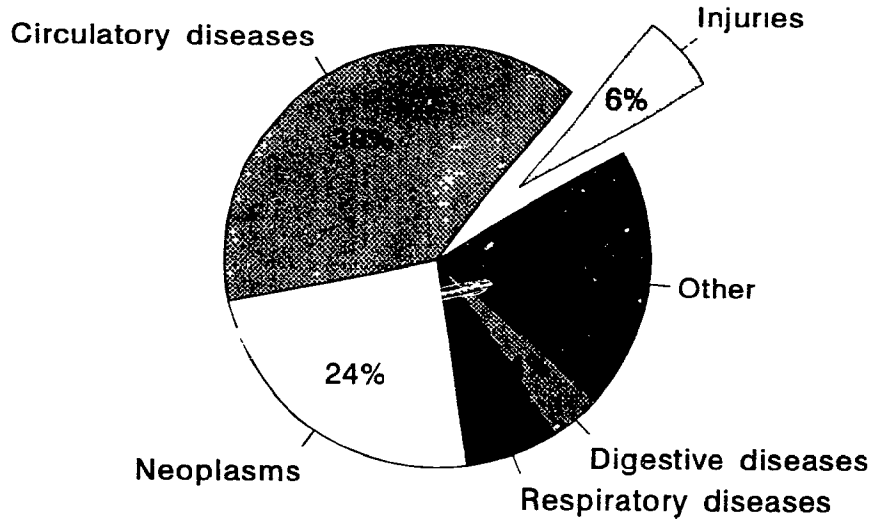
* Includes all unintentional and intentional injuries, excluding E870-E876 and E930-E949

Source: Statistics Canada, 1987
Ministere de la sante et des Services sociaux, 1989

Figure 4.4 Deaths from injuries* as a proportion of all deaths Cree of northern Quebec 1982-91, compared with Canada 1986



Cree 1985-87



Canada 1986

* Includes all unintentional & intentional injuries, E800-E999, excluding E870-E876 and E930-E949

Table 4.4- Deaths from all unintentional and intentional injuries: numbers and rates per 100,000 person-years Cree communities of northern Quebec 1982-91 (n = 72)

Type of injury	Males			Females			Total		
	Rate	95 % CI*	Deaths	Rate	95 % CI*	Deaths	Rate	95 % CI*	Deaths
Unintentional									
Drowning (E830,832,910)	32	17 - 54	13	7	1 - 22	3	20	11 - 32	16
Road traffic (E810-819)	34	19 - 57	14	2	0 - 14	1	18	10 - 30	15
Off-road (E820-825)§	17	7 - 35	7	2	0 - 14	1	10	4 - 19	8
Burns (E890-899)	15	5 - 32	6	5	1 - 18	2	10	4 - 19	8
Suffocations (E911-915)	2	0 - 14	1	10	2 - 25	4	6	2 - 14	5
Hypothermia (E901)	0	0 - 9	0	2	0 - 14	1	1	0 - 7	1
Poisonings (E850-869)	5	1 - 18	2	0	0 - 9	0	2	0 - 9	2
Falls (E880-888)	5	1 - 18	2	0	0 - 9	0	2	0 - 9	2
Intentional									
Suicides (E950-959)	22	10 - 42	9	2	0 - 14	1	12	6 - 22	10
Homicides (E960-969)	5	1 - 18	2	7	1 - 22	3	6	2 - 14	5
Total	136	100-172	56	39	20 - 58	16	88	68 -108	72

* 95 percent confidence interval by the exact method for Poisson variables

§ Includes 6 snowmobile-associated drownings

Table 4.5- Standardized mortality ratios for suicide deaths for the Cree communities of northern Quebec compared with Canada and Northwest Territories (n = 10)**

Standard population	Males (n = 9)		Female (n = 1)		Total	
	SMR	95 % CI*	SMR	95 % CI*	SMR	95 % CI*
Canada 1986	1.2	0.5-2.3	0.5	0.0-2.8	1.1	0.5-2.0
NWT 82-91	0.4	0.2-0.8	0.2	0.0-1.1	0.4	0.2-0.7

* 95 percent confidence interval by the exact method for Poisson variables

** Includes all deaths coded ICD-9 E950-E959. Cree deaths were ascertained by a combination of 5 data sources while ascertainment of deaths in the comparison populations was by vital statistics only

Table 4.6- Location of fatal injury[§] incidents.
Cree communities of northern Quebec 1982 - 91 (n = 72)

Location of injury death	Number of victims	Percent
Wilderness/bush	19	26
In village, outside home	15	21
In village, inside home	11	15
Road	11	15
Another village	5	7
Unknown	11	15
Total	72	100

§ Includes all unintentional and intentional injuries coded ICD9 E800-E999 excluding E870-E876 and E930-E949

Table 4.7- Treatment* of victims of fatal injuries§ by location of the event. Cree communities of northern Quebec 1982-91 (n = 56)

Location of incident	Total no. deaths	Treatment received	
		No.	%
Wilderness/bush	17	2	12
In village, inside home	10	2	20
In village, outside home	16	4	25
Road	11	3	27
Other	2	1	50
Total	56	12	21

* Includes cardiopulmonary resuscitation, first aid, hospitalization

§ Includes all unintentional and intentional injuries coded ICD-9 E800-E999 excluding E870-E876 and E930-E949

Table 4.8- Interviewees'* opinion regarding potential value of treatment by whether treatment for fatal injuries§ was received prior to death. Cree communities of northern Quebec 1982-91 (n = 43).

Treatment received	Treatment of potential value						
	Yes		No		Don't know		Total
	No.	%	No.	%	No.	%	%
Yes	1	11	3	33	5	56	100
No	1	3	21	66	10	31	100
Don't know	-	-	2	100	-	-	-
Total	2	5	26	60	15	35	100

* Family member or witness of the fatal event participating in the mortality interview

§ Includes all unintentional and intentional injuries coded ICD-9 E800-E999 excluding E870-E876 and E930-E949

V. AN EPIDEMIOLOGICAL PROFILE OF DROWNINGS IN ABORIGINAL CREE COMMUNITIES OF NORTHERN QUEBEC 1982 - 1991

Introduction:

The Cree of northern Quebec live in remote communities near many bodies of water, including lakes, rivers and the James Bay.

Prevention is the main area of interest when attempting to reduce the number of drowning deaths in a population so remote that emergency medical services cannot be provided in a timely fashion (Young, 1983).

The objectives of the present study are:

1. To describe the relative importance of drownings as a public health problem in the Cree communities of northern Quebec.
2. To compare the burden of drowning deaths in the Cree communities of northern Quebec relative to Canada and to other isolated Canadian populations.
3. To identify the circumstances of drowning deaths, including the activities at the time of the event along with personal, environmental and equipment factors associated with the incidents.
4. To define the determinants of drowning deaths that could become priorities for local Cree programs to prevent drowning deaths in the communities.

Methods:

The study population included the 10,000 Cree residents in three inland and five coastal communities along the eastern coast of James Bay in northern Quebec, Canada (**Figure 4.1.**). Deaths of Cree residents of these communities that occurred outside their home village were also considered. Non-Cree residents of these communities and Cree who live in other non Cree communities were excluded from the study.

The Cree population is young and growing. Between 1981-86, the Cree population increased 19.5 percent, compared with 1.5 percent in Quebec (Schaeffer et al., 1992) and 3.9 percent in Canada (Statistics Canada, 1987). In 1986, the median age of the Cree population was 19 years compared to 32 years in Canada and Quebec. The age pyramid comparing the Cree population for 1982-91 to the 1986 Canadian census population is presented in **Figure 4.2.**

Mortality from injuries was studied during the ten year period from January 1st, 1982 to December 31, 1991.

The study considered all deaths from drowning coded E830 (water transport accident involving a boat with submersion), E832 (other accidental submersion or drowning during water transport) and E910 (accidental drowning and submersion) in the International Classification of Diseases 9th edition (ICD-9), (WHO, 1977). One death following immersion in cold water was coded as a drowning (E830) by vital statistics but as hypothermia by the coroner's report. This victim was included in the description of circumstances of the incidents since all water-related fatalities, whether drowning or hypothermia following immersion, benefit from the same preventive strategies.

Using official statistics to outline the importance of drownings in the Cree population would only include 2 of the 6 snowmobile drownings (1 event). Three of these 6 deaths were coded as off-road vehicle fatalities and the last snowmobile-associated drowning was not captured by the vital statistics. In view of this heterogeneity in coding snowmobile-associated drownings, these deaths were not included in the calculations of proportionate mortality, age and sex-specific drowning rates and the standardized mortality ratios for drownings unless otherwise specified. However, these snowmobile-related drownings were reclassified as drownings for the identification of the circumstances and the risk factors associated with the incidents.

Clinic files, coroners' reports, death certificates, administrative lists and interviews of community key informants were combined to obtain as complete as possible a listing of drowning deaths during the study period in the Cree communities of northern Quebec (Damestoy, 1994a).

The denominator that was used for the calculation of mortality rates was the total person-years at risk in the Cree population of the communities during the 10 year study period. The person-years at risk by age and sex were computed using the annual population lists from the Beneficiaries of the James Bay Agreement.

In 1975, the James Bay Agreement was signed to allow construction of hydro-electric dams on Cree territory. This agreement contains certain rights and privileges for each party including financial compensation for land use. An administrative listing of Cree people eligible for compensation and other rights and privileges is maintained by a provincial office in Quebec city and is updated by an employee in each community

(La Convention de la Baie James et du Nord québécois, 1976). Since there was no separate listing by sex for infants (< 1 year old), the number of person-years for infants of each sex was estimated by applying the sex ratio of new births in each community for each year, to the total of infants under 1 year in each community for each year of the study period.

There could be concern with the use of an administrative listing of population as a denominator for rates. While these lists are updated periodically, there could be delays in timely deletion of dead beneficiaries. No differences were found when comparing the date of death of injury victims as identified by official data sources (death certificates or coroners' reports) and the date when the victim was removed from the administrative listing. The use of pooled data over a 10 year period minimizes any effect of yearly fluctuations in timeliness of reporting of injury deaths in such a small study population. Population data from the James Bay Agreement were compared with the 1986 and 1991 census (Statistics Canada) and only minor differences were observed. In 1986, the census reported 344 more people than the James Bay Agreement list of Beneficiaries, while in 1991, the census included 96 extra people. The additional people tabulated by the census may be non-Cree inhabitants of the region. There was no over-enumeration of Cree beneficiaries in the administrative listing. The use of the administrative listing ensures that only people who were considered Cree in origin are included in the denominator.

Age and sex specific drowning rates were calculated and 95 percent confidence intervals were estimated using the exact method for Poisson variables with the use of

standard tables (CRC, 1968).

Standardized mortality ratios (SMR) for drownings were calculated to compare Cree drowning rates with several other populations. Ninety-five percent confidence intervals on the SMR were estimated using the exact method for Poisson variables (Breslow and Day, 1987). The indirect method of standardization was chosen because in the small Cree population, age-specific drowning rates are less stable than in the comparison populations. The comparison populations included:

1. The Canadian population for 1986: Drowning rates and census data were obtained from Statistics Canada (1987 and 1988).

2. The population of isolated rural areas of Quebec for 1982-91: Abitibi-Temiscamingue (population 155,658) and Côte Nord (population 104,755) (**Figure 4.1.**). Inland Cree communities are surrounded by the Abitibi region. No major cities are located in these rural areas. Data on drownings were obtained from the provincial health ministry listing of deaths from 1982 to 1991 (Ministère de la Santé et des Services sociaux, fichier des décès 1982-91) and denominators from the 1986 census (Statistics Canada).

3. The Northwest Territories population for 1982-91: Information on drownings for a ten year period was used for the Northwest Territories because of its smaller population (n = 52,240 in 1986). Data were obtained from Statistics Canada, the 1986 census population was used for the denominator. The Northwest Territories are inhabited by 37 percent Inuits, 17 percent Dene, 7 percent Metis and 39 percent non-Aboriginal people (Preliminary estimates, Statistics from the 1991 National census, Bureau of

Statistics for Northwest Territories). This region was chosen for comparison because of its northern climate and relative isolation.

Since the SMR is a summary measure, age-specific drowning rate ratios were calculated to compare drowning rates for different age groups among the Cree and the other populations. Confidence intervals on these drowning rate ratios were calculated using Taylor series confidence intervals (Kleinbaum et al., 1982)

To describe the public health importance of drownings in the Cree population relative to other injury deaths, proportionate mortality from drownings was calculated using the injury mortality data in the Cree communities from the combined sources of information for 1982-91.

Epi-Info version 5.01b (Centers of Disease Control, 1991) and Quattro-Pro version 1.0 were used for the calculations.

Identification of circumstances of fatal injuries:

To gather information on the circumstances of the fatal events and to identify possible preventable factors, mortality interviews were conducted with family members of the victims or witnesses of the events in each community. Details on the acceptability and usefulness of mortality interviews for assessing the circumstances of injury were presented elsewhere (Damestoy, 1994a,b).

In situations where no family or witness was available for interview, information on circumstances was obtained from coroners' reports for those deaths that had been investigated or from interviews from the Cree Public Health Officers.

Data from a 1991 population health survey, Santé Québec Health Survey of the

James Bay Cree were used to compare for the prevalence of certain preventive practices in the Cree communities and in injury victims. Santé Québec Health Survey of the James Bay Cree was a health survey conducted on 400 randomly selected households in the Cree communities during 1991. Adults living in these households, about 20 percent of the Cree population, were invited to fill in an individual questionnaire on health and preventive behavior and visit the clinic for height, weight measurements and blood sampling (Clarkson et al., 1992). Four controls from this health survey were matched on age and sex for each victim in the present study. Age was matched to that of the victim at the time of death. The controls were randomly selected from the non-nominal list of participants to the Santé Québec Health Survey of the James Bay Cree (Robitaille and Barss, 1994). Certain questions in the questionnaire for the mortality interview had been prepared in an identical format to those in the Santé Quebec survey in order to allow such comparisons.

Circumstances of the events were described. For each risk factor, the proportion of victims for whom information on the risk factor was known was described as a percent of all victims. Then, for each factor, the proportion (percent) of victims was enumerated for whom the risk factor was present; the denominators included all victims for whom this risk factor was known and pertinent (eg. use of a personal flotation device for boating drowning victims, but not for swimming drowning victims).

Results:

5.1. Relative importance of drowning as a public health problem in the Cree communities of northern Quebec

5.1.1. Proportionate mortality from drownings

Drownings accounted for 29 percent of Cree injury deaths during 1982-91; of these 8 percent were snowmobile-associated (**Figure 5.1**). Comparatively in Canada, drownings accounted for 4 percent of injury deaths in Canada in 1986. Part of the difference in the proportion of deaths attributed to drowning may be due to the difference in age structure of the two populations. The Cree population being younger, a greater proportion of deaths are expected to be attributed to injuries. However, the difference in age structure cannot explain all of the discrepancy in proportionate mortality due to drownings between Cree and Canadian populations.

5.1.2. Age and sex-specific drowning rates

Table 5.1.(a) presents the age and sex specific drowning rates (excluding snowmobile drownings) in the Cree communities for the 10 year period. When snowmobile-related deaths are included, drowning rates were significantly higher in males than in females (95 percent confidence level) **Table 5.1.(b)**. Because of the small population involved, there was no statistically significant difference between male and female drowning rates for specific age groups. However, most male drownings involved adults, while all female victims were children. The drowning rate for Cree males aged 20 years and above was 69.5/ 100,000 (95 percent confidence interval: 38-117) while it was 0/100,000 (95 percent confidence interval: 0-18) for Cree females of the same

age. This difference is statistically significant. All victims of snowmobiling drownings were males aged 20 years and above; 50 percent of them (3/6) were 50 years and older.

There was no statistically significant trend in drowning deaths in northern Quebec Cree communities between 1982-86 and 1987-91. Drowning mortality rate (including snowmobile drownings) for 1982-86 was 36.9/100,000 person-years (95 percent confidence interval: 20-62), and 18.2/100,000 person-years (95 percent confidence interval: 7-36) for 1987-91.

5.1.3. Standardized mortality ratios for drownings

There were 9 times more drownings in the Cree population than expected if Canadian drowning rates had applied to the Cree population structure. This excess of drownings was statistically significant for both males and females. There were 11 times more drownings in Cree males 20 years and older than would have been expected if the Canadian drowning rates for adult males had applied. There were 3.8 times more drownings in Cree males than expected if the rural Quebec male drowning rates had applied. This excess rises to 4 times more drownings than expected among Cree males 20 years and older. Drowning deaths were not significantly different in the Cree communities than expected if the drowning rates of Northwest Territories had applied **(Table 5.2.)**.

5.1.4. Age-specific drowning rate ratios

Table 5.3. compares age-specific drowning rates across different populations. Drowning rates in each age group between 10 to 54 years were significantly higher in the Cree than in the Canadian population but these were based on small numbers. Cree

age-specific drowning rates were higher than Canadian, rural Quebec or Northwest Territories drowning rates for each age group over 20 years old. However, because of the small number of deaths involved, these ratios did not reach statistical significance at the 95 percent level of confidence.

5.2. Circumstances of fatal injuries

5.2.1. Sources of information

A total of 19 water-related incidents led to 22 victims who were identified by the combination of the different data sources. Detailed information on the circumstances of the death was available for 91 percent (20/22) of victims. Most of this information (75 percent) was provided by mortality interviews (n = 15). For the 5 deaths for which no interview was available, information was collected from 4 coroners' reports, and from one interview with a key informant.

The activities associated with water-related deaths included: boating, 6; snowmobiling, 6; falls into water while playing, 3; swimming, 2; unknown activity, 2. Three incidents each involved two male victims. One of these multiple-victims incidents involved boating, one snowmobiling, and in the last event, the activity was unknown.

5.2.2. Risk factors

5.2.2.1. Personal risk factors

5.2.2.1.1. Alcohol use

Information on acute alcohol consumption was available for 78 percent (14/18) of all drowning victims 15 years and older. Of these victims, 29 percent (4/14) had consumed alcohol acutely prior to the incident and 21 percent (3/14) were reported to have been intoxicated. The 3 intoxicated victims all drowned while boating. None of the 5 snowmobile-related drownings for whom the information was known had consumed alcohol prior to the event. None of the 2 victims known to have been boating for

subsistence fishing or hunting had consumed alcohol prior to the event.

5.2.2.1.2. Drug use

None of the 61 percent of all drowning victims 15 years and older for whom information was available were reported to have consumed legal or illegal drugs prior to the incident.

5.2.2.1.3. Past medical history

Among the 73 percent of drowning victims for whom information on past medical history was available, 19 percent (3/16) were known to suffer from cardiac problems. None of the drowning victims were reported to have insulin dependent diabetes, epilepsy, or other illnesses that can cause sudden loss of consciousness.

5.2.2.1.4. Swimming skills

Information on swimming skills was available for 77 percent of all drowning victims. Of these victims, 59 percent were swimmers (10/17), 40 percent of whom were identified as good swimmers. None of the victims who were swimmers and for whom the information was available had received formal swimming lessons.

In comparison, 66 percent of the 154 randomly-chosen respondents matched for age and sex in the Santé Québec Health Survey of the James Bay Cree stated that they were swimmers.

5.2.2.1.5. Boating/snowmobiling experience

Among the 57 percent of known boating victims for whom information on the frequency of boat use was available, 50 percent (2/4) used a boat at least once a week. Among the 83 percent of known snowmobile drowning victims for whom the information

on the frequency of snowmobile use was available, 60 percent (3/5) used a snowmobile daily during the season.

In comparison, 64 percent of the randomly selected sample from the Santé Québec health survey among the Cree of James Bay used a boat at least once a week, and 57 percent used a snowmobile daily during the season.

5.2.2.2. Environmental risk factors

5.2.2.2.1. Time of day

Of all water/ice transport fatalities (boating or snowmobiling), 38 percent (5/13) occurred at night, at dusk or at dawn. All drownings that occurred at night (n = 3) involved boats.

5.2.2.2.2. Location

Information on the location of the drowning was available for 86 percent of all drownings. Most drownings (74 percent, 14/19) occurred in a river, 46 percent of which (6/13) occurred in areas of strong current. All of the known snowmobile-related drownings for which information was available (67 percent, 4/6) involved travelling over thin ice that broke. Two snowmobiling drownings occurred in early May, 2 in November and 2 in early December.

Of the 3 drownings involving children 4 years old and younger, one occurred in a ditch filled with water on a construction site, one occurred in a lake and one occurred while sliding over thin ice.

5.2.2.2.3. Weather conditions

The ambient air temperature was cold (defined as weather that required wearing a coat) or below freezing in 27 percent (3/11) of the 69 percent of non-snowmobile related drowning victims for whom the information on air temperature was known. Of the 69 percent of boating and snowmobiling drownings for which information on adverse weather conditions was available, 33 percent (3/9) occurred in heavy rain or snow.

5.2.2.2.4. Companions

All of the 7 boating victims were with companions at the time of the incident. Sixty-seven percent (4/6) of the snowmobiling victims were with companions at the time of the incident. Of the 77 percent of boating or snowmobiling drownings for which information was available (10/13), no other vehicle was present in 80 percent of the incidents.

All of the 5 drownings that occurred while the victim was known to be swimming or playing near the water involved children 15 years of age or less, 3 of whom were less than 5 years old. In all 5 drownings of children, the victim was accompanied at the time of the incident by one or more minors, but no adults.

5.2.2.3. Equipment risk factors

5.2.2.3.1. Type of boat

The 6 boating incidents included 4 in non-motorized canoes of about 14 feet in length and 2 in large square-stern canoes with outboard motors.

5.2.2.3.2. Personal flotation devices (PFD)

Information on the use of a personal flotation device or lifejacket was available for 71 percent (5/7) of victims of boating fatalities. None was wearing a flotation device at the time of the event. All except one of these victims were known swimmers.

Only 1 of the 4 boating drowning victims for whom the information was known was reported to have worn a flotation device consistently during most of his boating activities. A personal flotation device was always worn or was worn most of the time by 14.5 percent of the matched sample selected from the Santé Québec Health Survey of the James Bay Cree.

No information was available on the use of hypothermia/flotation suits by snowmobiling drowning victims. None of the victims were reported to wear such garments.

5.2.3. Rescue and treatment

Most drowning deaths occurred immediately after the incident. Of the 77 percent of all drowning victims for whom information on rescue was known, only 12 percent (2/17) were rescued within minutes of the incident. The body of most victims (41 percent, 7/17) was recovered one or more days after the incident. Of the 82 percent of all victims for whom information on treatment was known, 17 percent (3/18) received some treatment after the event (including cardio pulmonary resuscitation for 2 victims). The interviewees were asked their opinion on the potential value of any treatment once the submersion had occurred. In 60 percent of cases, it was believed that treatment

would not have prevented the death. In the other 40 percent, respondents did not know whether treatment would have prevented the death.

5.2.4. Prevention strategies

The interviewees were asked their opinion on whether the drowning could have been prevented. Of the 58 percent who answered the question (11/19), all thought that the drowning could have been prevented. Proposed strategies included: following the shore line when travelling over ice, improving access to the bush via roads, wearing of a flotation device, improved supervision of children, and fencing of areas within villages where they could fall into water.

Discussion:

Drownings, including snowmobile-related drownings are the leading cause of injury mortality in the Cree communities of northern Quebec, accounting for 29 percent of unintentional and intentional injury deaths during 1982-91. Comparatively, drowning deaths accounted for 50 percent of all injury deaths in 1975-82 (Robinson, 1985).

In Aboriginal communities of northwestern Ontario, drownings and water transport fatalities were the leading cause of injury death, accounting for 30 percent of all injury deaths during the 10 year period 1971-82 (Young, 1983). Drownings were accounted for 14 percent of all injury deaths and were the second leading cause of injury death after motor vehicle fatalities in some Aboriginal communities of Quebec, Ontario, Manitoba and Northwest Territories in 1988-90 (Muir, 1991).

The standardized mortality ratio for drownings in the Quebec Cree compared with the Canadian population was 9.3. This excess of deaths was statistically significant for both males and females and is conservative since snowmobile drownings were excluded in this comparison.

The excess of drownings in Aboriginal populations has been described previously. In 1977-82, the standardized mortality ratio for drownings in selected Aboriginal communities compared to the 1971 Canadian population was 5.6 for males and 5.4 for females (Mao et al., 1986). Young (1983) has described standardized mortality ratios of 6.5 for non-boating drownings (E910) and 54.7 for boating drownings (E830,832) in the Cree-Ojibwa of the Sioux Lookout Zone as compared with the Canadian population.

The excess mortality from drowning in the Cree persists for males but is of a

lesser degree when the comparison is made with rural regions of Quebec rather than with the Canadian population, while for females there was no difference between the two populations. The standardized mortality ratios referenced to rural populations control somewhat for the isolation of Aboriginal communities and tend to be closer to one than the SMR referenced to the Canadian population (Mao et al., 1992). The statistically significant excess of male drowning deaths in the Cree compared to rural regions of Quebec shows that there are risk factors other than the remoteness in Aboriginal communities. However, the enumeration of drowning deaths in Cree communities was provided by a combination of several data sources while the data for drowning deaths in the comparison populations were provided by vital statistics only. It was previously outlined that vital statistics underascertain the number of injury deaths in the Cree population (Damestoy, 1994a). If underascertainment is also the case for other populations, the more complete enumeration of Cree deaths might bias upward the standardized mortality ratios comparing the Cree with other populations.

Among the Cree, the groups most at risk for drowning were toddlers of both sexes and adult males. The greatest drowning rates in the Cree population involved children aged 1 to 4 years. While caution should be exercised when interpreting these rates in view of the population and the small number of deaths, a disproportionate number of drowning deaths with respect to populations has also been reported among Aboriginal toddlers in a Canada-wide study (The Canadian Red Cross Society, 1994a). Children drownings occurred while the child was playing near the water, during periods where no adult supervision was provided.

The highest drowning rates in the province of Quebec between 1982-91 were seen among children of 0 to 4 years. The highest rate of drownings among females in 1988-90 was in the same age group (Choinière et al., 1993). Among Canadian drowning victims aged 1 to 4 years old in Canada in 1991, 58 percent resulted from falls into the water while playing. Most victims were either alone (69 percent) or with other minors only (23 percent) at the time of the incident. Thirty-four percent of Canadian victims among this age group (33/96) drowned in home swimming pools, and 44 percent (42/96) in large open bodies of water such as rivers, lakes, ocean and reservoirs (Canadian Red Cross Society, 1994b).

Young males involved in boating or snowmobiling activities were the other group at risk for drownings. Among this group, alcohol ingestion prior to the incident was mainly confined to recreational boating activities and not boating associated with subsistence activities such as hunting or fishing. Most victims were reported to be swimmers and none were known to have worn a flotation device. Most victims had been frequent users of boats or snowmobiles.

Data from the 1991 Santé Québec Health Survey of the James Bay Cree were used for purposes of discussion. The information on the preventive behavior of injury victims in the present study differed from Santé Québec of the James Bay Cree matched sample, in that it was provided by a relative or friend of the victim for events that occurred up to 10 years previously. The comparison does provide a crude indication of certain personal and equipment factors among the victims and the general Cree population. Although information on the preventive behaviors of victims was limited,

Cree drowning victims did not appear significantly different from the Santé Québec of the James Bay Cree sample of participants matched to the Cree injury victims for age and sex in their swimming abilities, low rate of use of flotation devices and frequent exposure to boating and snowmobiling.

In Canada, the highest rate of snowmobile drownings is seen among males between the ages of 15 and 34 years. Contrary to the Cree victims, acute alcohol ingestion was associated with these deaths for 69 percent of Canadian victims (Canadian Red Cross Society, 1994b; Rowe, 1992). In the Canadian Red Cross Society study (1994b), snowmobiling drownings involved either holes in the ice surface or thin ice.

In this study, individual risk factors were described separately. A combination of adverse risk factors can substantially increase the risk of drowning in certain situations, more than for any one risk factor acting alone. The analysis of the interaction of different risk factors was impossible in this study since the number of victims was small and there were incomplete responses to some questions.

Since the timeliness and effectiveness of treatment of drownings is limited in such isolated communities and elsewhere, the emphasis should be on primary and secondary prevention for immersion incidents. Target high-risk groups include toddlers of both sexes and adult males.

For the prevention of toddler drownings, various strategies to prevent swimming pool drownings have been suggested that could be applied to Aboriginal communities although no formal evaluation of their effectiveness in such a setting was available. Childproof latches or doors or self-closing and self-latching gates around the yards for

houses near the water might prevent access to the water. Holes near homes where water accumulation may occur, including construction sites should be fenced or filled. Constant supervision of toddlers is needed in unprotected areas with open bodies of water. Educating community members, preferably parents, in cardiopulmonary resuscitation (Wilson et al., 1991; Wintemute, 1992) might be useful since most toddler drownings occur within the village, where victims could be transported quickly to the local clinic after resuscitation efforts have begun.

Ingestion of alcohol and the failure to wear a flotation device during boating and the failure to use of a hypothermia/flotation suit for snowmobiling were important risk factors for adult male drowning victims. Flotation devices prevent the high energy expenditure involved in trying to stay afloat, and delay the occurrence of hypothermia (Collis, 1976). However, in view of cold water temperatures in northern Quebec, the additional protection of a suit or coat is needed. Previous interventions in Aboriginal communities have attempted to encourage the distribution of personal flotation devices that were adapted to the needs of hunters (Perkins, 1993). Camouflage personal flotation devices and hypothermia jackets and suits do exist and may be more acceptable to hunters and trappers (Mustang Corp., British Columbia). Finally, interviewees' suggestions of travelling along the shores of lakes and rivers in late fall and early spring should be taken into consideration. Travelling in pairs or in groups and carrying rescue ropes may be other options. Educational programs for boating, snowmobile and water safety that could be useful to the Cree have been developed in other Aboriginal communities (Health and Welfare Canada, 1990).

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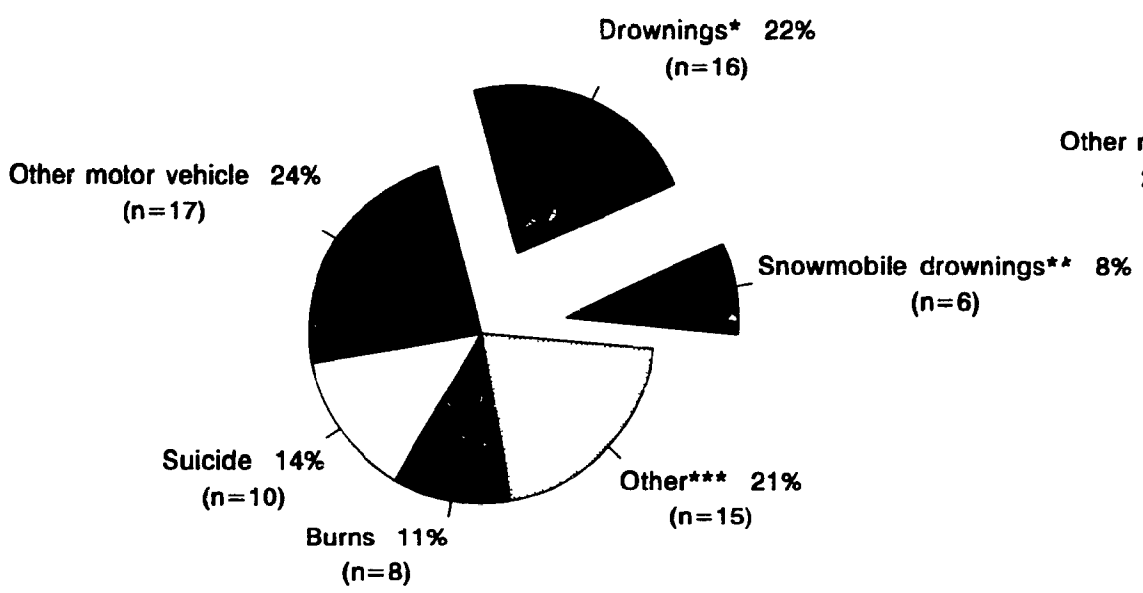
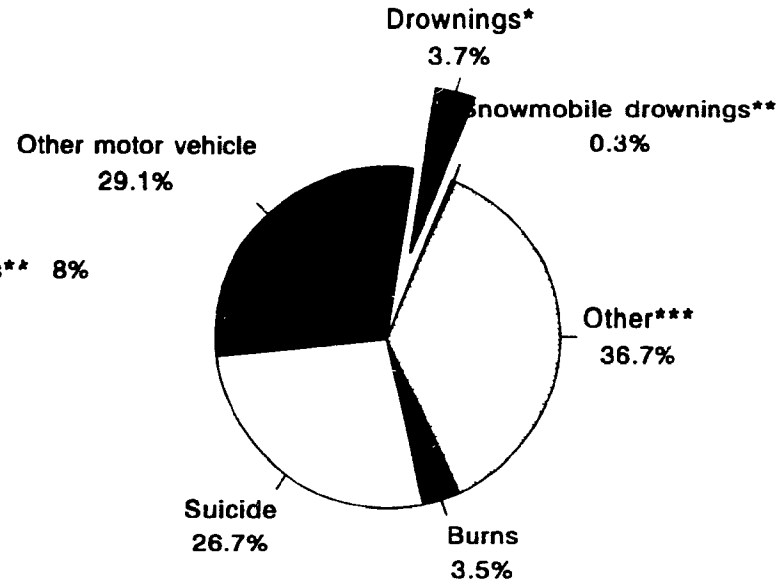
Figure 5.1 Deaths from drownings* as a proportion of all injury deaths Cree of northern Quebec 1982-91, compared with Canada 1986



Cree 1982-91



Canada 1986

* Includes E830, E832, E910, & immersion hypothermia
** Includes snowmobile drownings, usually classified as E820
*** Includes suffocations, falls, unintentional firearm injuries & homicides, exposure hypothermia

Table 5.1(a)- Age and sex-specific drowning rates[§] per 100,000 person-years Cree communities of northern Quebec 1982 - 91 (n = 16)

Age groups	Males (n = 13)				Females (n = 3)				Total (n = 16)			
	Rate	95 % CI*	Deaths	PY¶	Rate	95 % CI*	Deaths	PY¶	Rate	95 % CI*	Deaths	PY¶
<1	0	0-315	0	1 174	0	0-316	0	1 170	0	0-158	0	2 344
1 - 4	31 4	3-176	1	3 184	63 4	6-228	2	3 157	47 3	9-139	3	6 341
5 - 9	0	0- 69	0	5 362	0	0- 70	0	5 320	0	0- 35	0	10 682
10 - 14	0	0- 64	0	5 793	17.9	2-100	1	5 575	8 8	1- 49	1	11 368
15 - 19	55 7	11-163	3	5 383	0	0- 70	0	5 264	28 2	6- 83	3	10 647
20 - 24	67.8	14-199	3	4 422	0	0- 85	0	4 339	34 2	7-100	3	8 761
25 - 39	37 8	8-111	3	7 919	0	0- 45	0	8 164	18 6	4- 55	3	16 083
40 - 54	49 4	5-178	2	4 047	0	0- 85	0	4 351	23 8	2- 86	2	8 398
55 +	26 5	3-149	1	3 770	0	0-107	0	3 471	13 8	1- 77	1	7 241
Total	31.7	17- 54	13	41 054	7.4	1- 22	3	40 811	19.5	11- 32	16	81 865

§ Excludes snowmobile-related drownings (n = 6); includes ICD-9 E910, E830, E832

* 95 percent confidence interval by the exact method for Poisson variables

¶ Person-Years at risk in the age group

Table 5.1.(b)- Age-specific water-related fatality rates Cree communities of northern Quebec 1982 - 91**

Age groups	Drownings including snowmobile-related events in Males (n = 19)				Total water-related deaths** in Males and Females (n = 22)			
	Rate	95 % CI*	Deaths	PY¶	Rate	95 % CI*	Deaths	PY¶
< 1	0	0-315	0	1 174	0	0-158	0	2 344
1 - 4	31 4	3-176	1	3 184	47 3	9-139	3	6 341
5 - 9	0	0- 69	0	5 362	0	0- 35	0	10 682
10 - 14	0	0- 64	0	5 793	8 8	1- 49	1	11 368
15 - 19	55 7	11-163	3	5 383	28 2	6- 83	3	10 647
20 - 24	90 5	23-231	4	4 422	45.7	7-100	4	8 761
25 - 39			5	7 919			5	16 083
40 - 54	74.1	15-217	3	4 047	35 7	7-105	3	8 398
55 +	79.6	16-233	3	3 770	41 4	8-122	3	7 241
Total	46.3	28- 72	19	41 054	26.9	17- 41	22	81 865

* 95 percent confidence interval by the exact method for Poisson variables

¶ Person Years at risk in the age group

** Includes ICD-9 E910, E830, E832, snowmobile-related drownings and immersion hypothermia

Table 5.2- Standardized mortality ratios for drownings in Cree communities of northern Quebec 1982-91 compared with Canada, rural Quebec and Northwest Territories (n = 16)§

Standard population	Males (n = 13)		Females (n = 3)		Total (n = 16)	
	SMR	95 % CI*	SMR	95 % CI*	SMR	95 % CI*
Canada 1986	8.6	4.6-14.7	15.4	3.2-45.0	9.3	5.3-15.0
rural QC 82-91¶	3.8	2.0 6.5	0.9	0.2- 2.6	4.4	2.5- 7.1
NWT 82-91	1.4	0.7- 2.4	2.7	0.6- 7.9	1.5	0.9- 2.4

§ Excludes snowmobile-related drownings among the Cree (n = 6). Cree deaths were ascertained by a combination of 5 data sources while for the comparison populations, deaths were ascertained by vital statistics only

¶ Rural Quebec: Abitibi-Temiscamingue and Côte Nord regions

* 95 percent confidence interval by the exact method for Poisson variables

Table 5.3- Ratio of Cree age-specific drowning rate** compared with age-specific drowning rates for Canada, rural Quebec and Northwest Territories

Age groups	Cree 82-91	Canada 1986			rural Quebec¶ 82-91			Northwest Territories 82-91		
	Rate§	Rate§§	Cree:Canada Ratio	95 % CI*	Rate§§	Cree:Quebec Ratio	95 % CI*	Rate§§	Cree:NWT Ratio	95 % CI*
<1	0	0 8	0	-	0	-	-	0	-	-
1 - 4	47.3	4 3	11 0	3 5- 35 2	3.8	12 6	1 1-148 4	7.7	6 1	0 2-165.9
5 - 9	0	1 4	0	-	1.7	0	-	3 5	0	-
10 - 14	8 8	0.7	13.1	1 7-100 7	3.3	2 7	0 1- 57 4	13 8	0 6	0 - 13.5
15 - 19	28.2	2.9	9.9	3.1- 31.5	4.6	6 2	0 6- 59.4	21.5	1.3	0.1- 11 6
20 - 24	34.2	2.9	11 9	3.7- 37 8	10 0	3 4	0.6- 18 7	25 9	1.3	0 2- 9 8
25 - 39	18.6	2 1	9.0	2.9- 28 2	5.7	3 2	0.7- 14.4	11 0	1.7	0 2- 11 5
40 - 54	23 8	1.9	12.9	3 2- 52 4	4 1	5.8	0 7- 44 6	15 3	1.6	0 1- 17.1
55 +	13 8	1.9	7 4	1 0- 53.0	3.4	4.1	0 3- 58 3	11.3	1 2	0 - 47 6
Total	**19.5**	**2.1**			**4.6**			**13.0**		

** Excludes snowmobile-related drownings (n = 6); includes ICD-9 E910, E830, E832. Cree drownings were ascertained by a combination of 5 data sources while for the comparison populations, drownings were ascertained by vital statistics only

* Taylor series 95 percent confidence interval

¶ Rural Quebec Abitibi-Temiscamingue and Côte Nord regions

§ Death rate per 100,000 person-years at risk in the age group

§§ Death rate per 100,000 population at risk in the age group in 1986

VI. AN EPIDEMIOLOGICAL PROFILE OF MOTOR VEHICLE FATALITIES IN ABORIGINAL CREE COMMUNITIES OF NORTHERN QUEBEC 1982 - 1991

Introduction:

Prevention is the main area of interest when attempting to reduce the number of motor vehicle deaths when most injuries occur in a population so remote that emergency medical services cannot always be provided in a timely fashion (Young, 1983).

The objectives of the present study are:

1. To describe the relative importance of motor vehicle fatalities as a public health problem in the Cree communities of northern Quebec.
2. To compare the burden of motor vehicle fatalities in the Cree communities of northern Quebec relative to Canada and to other isolated Canadian populations.
3. To describe the relative contributions of road traffic and off-road vehicle fatalities as components of the mortality caused by motor vehicles in the Cree communities.
4. To identify the circumstances of motor vehicle fatalities, including the activities at the time of the event, along with personal, environmental and equipment factors associated with the deaths.
5. To define specific determinants that could be priorities in local Cree programs for control of motor vehicle fatalities.

Methods:

The study population included the 10,000 Cree residents in three inland and five coastal communities along the eastern coast of James Bay in northern Quebec, Canada (**Figure 4.1.**). Deaths of Cree residents of these communities that occurred outside their home village were also considered. Non-Cree residents of these communities and Cree who live in other non-Cree communities were excluded from the study.

The Cree population is young and growing. Between 1981-86, the Cree population grew 19.5 percent compared with 1.5 percent in Quebec (Schaeffer et al., 1992) and 3.9 percent in Canada (Statistics Canada, 1987). In 1986, the median age of the Cree population was 19 years compared to 32 years in Canada and Quebec. The age pyramid comparing the Cree population for 1982-91 to the 1986 Canadian census population was presented in **Figure 4.2.**

Mortality from injuries was studied during the ten year period from January 1st, 1982 to December 31, 1991.

The study considered all motor vehicle fatalities, including deaths from road traffic injuries coded E810 to E819 in the International Classification of Diseases, 9th edition (ICD-9), (WHO, 1977). Injuries involving pedestrians or bicyclists hit by a motor vehicle on the road were classified as road-traffic fatalities. There were no deaths from bicycling not involving another vehicle (E826). Deaths from off-road vehicle injuries (ICD-9 E820-E825) included incidents involving snowmobiles and all-terrain vehicles. Snowmobile-related drownings were considered as off-road vehicle fatalities for the comparison with other populations. However, these deaths have also been

combined with the other drownings for the identification of circumstances and risk factors associated with the events, since the circumstances and preventive strategies were more closely linked with drownings than with motor vehicle fatalities (Damestoy, 1994c).

Clinic files, coroners' reports, death certificates, administrative lists and interviews of community key informants were combined to obtain as complete as possible a listing of motor vehicle fatalities during the study period in the Cree communities of northern Quebec (Damestoy, 1994a).

The denominator that was used for the calculation of mortality rates was the total person-years at risk in the Cree population of the communities during the 10 year study period. Person-years at risk by age and sex were computed using the annual population lists from the Beneficiaries of the James Bay Agreement.

In 1975, the James Bay Agreement was signed to allow construction of hydro-electric dams on Cree territory. This agreement contains certain rights and privileges for each party including financial compensation for land use. An administrative listing of Cree people eligible for compensation and other rights and privileges is maintained by a provincial office in Quebec city and is updated by an employee in each community (La Convention de la Baie James et du Nord québécois, 1976). Since there was no separate listing by sex for infants ($<$ 1 year old), the number of person-years for infants of each sex was estimated by applying the sex ratio of new births in each community for each year, to the total number of infants under 1 year of age in each community for each year of the study period.

There could be concern with the use of an administrative listing of population as

a denominator for rates. While these lists are updated periodically, there could be delays in timely deletion of dead beneficiaries. No differences were found when comparing the date of death of injury victims as identified by official data sources (death certificate or coroners' report) and the date when the victim was removed from the administrative listing. The use of pooled data over a 10 year period minimizes any effect of yearly fluctuations in timeliness of reporting. Data from the James Bay Agreement were compared with the 1986 and 1991 census (Statistics Canada) and only minor differences were observed. In 1986, the census reported 344 more people than the James Bay Agreement list of Beneficiaries, while in 1991, the census included 96 extra people. The additional people tabulated by the census may be non-Cree inhabitants of the region. There was no over-enumeration of Cree beneficiaries in the administrative listing. The use of the administrative listing ensures that only people considered Cree in origin are included in the denominator.

A 10 year study period avoids the yearly fluctuation in the number of injury deaths in such small study population.

To describe the public health importance of motor vehicle fatalities in the Cree population relative to other causes of injury death, proportionate mortality from motor vehicle fatalities was calculated using the injury mortality data in the Cree communities from the combined sources of information for 1982-91.

Age and sex-specific motor vehicle fatality rates were calculated and 95 percent confidence intervals were estimated using the exact method for Poisson variables (CRC, 1968).

Standardized mortality ratios (SMR) were also calculated to compare Cree motor vehicle fatalities with several other populations. Ninety-five percent confidence intervals on the SMR were estimated using the exact method for Poisson variables (Breslow and Day, 1987). The indirect method of standardization was chosen because in the small Cree population, age-specific motor vehicle fatality rates are less stable than in the comparison populations. The comparison populations included:

1. The Canadian population for 1986: Motor vehicle fatality rates and census data were obtained from Statistics Canada (1987 and 1988).

2. The Northwest Territories population for 1982-91: Information on motor vehicle fatalities for a ten year period was used for the Northwest Territories because of its smaller population (n = 52,240 in 1986). Data were provided by Statistics Canada, the 1986 census population was used for the denominator. The Northwest Territories are inhabited by 37 percent Inuits, 17 percent Dene, 7 percent Metis and 39 percent non-Aboriginal people (Preliminary estimates, Statistics from the 1991 National census, Bureau of Statistics for Northwest Territories). This region was chosen for comparison because of its northern climate and relative isolation.

Since the SMR is a summary measure, age-specific motor vehicle fatality rate ratios were calculated to compare motor vehicle fatality rates for different age groups among the Cree and the other populations. Confidence intervals on these motor vehicle mortality rate ratios were calculated using the Taylor series confidence intervals (Kleinbaum et al., 1982).

Epi-Info version 5.01b (Centers of Disease Control, 1991) and Quattro-Pro version 1.0 were used for these calculations.

Identification of circumstances of fatal injuries:

To gather information on the circumstances of the fatal events and to identify possible preventable factors, mortality interviews were conducted with family members of the victims or witnesses of the events in each community. Details on the acceptability and usefulness of mortality interviews for assessing the circumstances of injury were presented elsewhere (Damestoy, 1994a,b).

In situations where no family or witness was available for interview, information on circumstances were obtained from coroners' reports for those deaths that had been investigated.

In one community, the interviewer abandoned the work in progress and could not be replaced due to improper timing for interviews since recent injury deaths had occurred in the community. The Cree public health officer in this community provided information on the circumstances of some injury deaths.

Data from a 1991 population health survey, Santé Québec Health Survey of the James Bay Cree, were used to compare the prevalence of certain preventive practices in the Cree communities and in injury victims. Santé Québec Health Survey of the James Bay Cree was a health survey conducted on 400 randomly selected households in the Cree communities during 1991. Adults living in these households, about 20 % of the Cree population, were invited to fill in an individual questionnaire on health and preventive behavior and visit the clinic for height, weight measurement and blood

sampling (Clarkson et al., 1992). Four controls from this health survey were chosen for each victim of the present study, matched on sex and age of the victim at the time of death. The controls were randomly selected from the non-nominal list of participants to the Santé Québec Health Survey of the James Bay Cree (Robitaille and Barss, 1994). Certain questions in the present survey had been prepared in an identical format to those in the Santé Québec survey to allow such a comparison.

Circumstances of the events were described. For each risk factor of interest, the proportion of victims (percent) for whom the risk factor was known was described as a percent of all victims. Then, for each factor, the proportion of victims (percent) for whom the risk factor was present was enumerated; the denominators included all victims for whom this risk factor was known and pertinent (eg. acute alcohol consumption in victims 15 years and over).

Results:

6.1. Relative importance of motor vehicle fatalities as a public health problem in the Cree communities of northern Quebec

6.1.1. Proportionate mortality from motor vehicle fatalities

Motor vehicle fatalities were the most frequent type of injury death, and accounted for 32 percent (23/72) of all deaths from unintentional and intentional injuries among the Cree during 1982-91 **(Figure 6.1)**. Comparatively, motor vehicle fatalities accounted for 30 percent of injury deaths in Canada in 1986. Road traffic fatalities accounted for 21 percent (15/72) of all injury deaths, and off-road vehicle fatalities for 11 percent (8/72). However, when 6 drownings occurring from snowmobiles going through thin ice that were originally classified as off-road vehicle fatalities were reclassified as drownings, off-road vehicle fatalities involving 4-wheel all-terrain vehicles accounted for 3 percent (2/72) of all injury deaths during the study period. With this adjustment, 29 percent (21/72) of injury deaths were from drownings, while on and off-road motor vehicle fatalities accounted for 24 percent of deaths.

6.1.2. Age and sex-specific motor vehicle fatality rates

Table 6.1(a). presents the age and sex-specific road traffic fatality rates in the Cree communities for the 10 year period. Overall, males had a road traffic fatality rate 13.6 times higher than females, which was statistically significant at the 95 percent confidence level. Because of the small numbers involved, there were no statistically significant differences in the road traffic fatality rates between males and females for different specific age groups. The road traffic fatality rate for all adult males 20 years

and older was 55/100,000 person-years (95 percent confidence interval: 27-98) while it was 0/100,000 person-years (95 percent confidence interval: 0-18) for Cree females of the same age. This difference was statistically significant. **Table 6.1(b).** presents the age and sex-specific off-road vehicle fatality rate (including snowmobile-related water fatalities) in the Cree communities for the 10 year period. Overall, males had an off-road vehicle fatality rate 6.8 times higher than females, but this difference was not statistically significant.

Child victims of motor vehicle fatalities included one baby occupant of a vehicle involved in a road traffic crash, one occupant of an off-road all-terrain vehicle and one pedestrian run over by a school bus.

There was no statistically significant trend in on-road fatality rates in northern Quebec Cree communities between 1982-86 and 1987-91. On-road fatality rate for 1982-86 was 18.5/100,000 person-years (95 percent confidence interval: 7-38), and 20.5/100,000 person-years (95 percent confidence interval: 9-39) for 1987-91. Both off-road vehicle fatalities occurred between 1987 and 1991.

6.1.3. Standardized mortality ratios for motor vehicle fatalities

Table 6.2. presents the standardized mortality ratios (SMR) for motor vehicle fatalities in the Cree population compared to various standard populations. After adjusting for differences in age structure, the number of motor vehicle fatalities in the Cree communities was not significantly different than expected if the 1986 Canadian motor vehicle fatality rates had prevailed.

Compared to all Canadian males, Cree males had 2.3 times more motor vehicle

fatalities than expected. This excess was statistically significant at the 95 percent level of confidence. There was no excess of motor vehicle fatalities among Cree males as compared with Northwest Territories males during the same period.

Road traffic fatalities were analyzed separately from off-road vehicle fatalities. There was no excess mortality from road traffic incidents in the Cree communities compared to the Canadian or Northwest Territories populations. Cree males had 19 times more off-road vehicle fatalities (including snowmobile drownings) than expected if the male Canadian off-road mortality rates had prevailed. The rate of death from off-road vehicle incidents in Cree males was double that of Northwest Territories males, but this proportion did not reach statistical significance. However, the number of deaths in each group is small, and data should be interpreted cautiously. A more complete enumeration of deaths in the Cree communities may also bias upward the comparisons with other populations.

6.1.4. Age-specific motor vehicle mortality rate ratios

Table 6.3(a). compares male age-specific road traffic fatality rates across different populations. Cree infants had a road traffic fatality rate several times higher the Canadian rate for the same age group. However, this comparison is based on a single death in the Cree communities. When compared with the Northwest Territories, age-specific road traffic fatality ratios showed no statistically significant excess of deaths in any age group of the Cree population. **Table 6.3(b).** compares male age-specific off-road traffic fatality rates for the different populations. Despite the small number of fatalities, age-specific off-road vehicle fatality rate ratio was significantly higher among

Cree males than among all Canadian males for all age groups. There was no excess off-road vehicle fatalities when Cree males were compared to Northwest Territories males of the same age group.

6.2. Circumstances of motor vehicle fatalities

6.2.1. Sources of information

A total of 17 road traffic and off-road vehicle fatalities (excluding snowmobile drownings) were identified by the combination of the different data sources. Detailed information on the events surrounding the death was available for all of the motor vehicle fatalities. Most of this information (76 percent) was provided by mortality interviews (n = 13). For those deaths for which no interview was available, information was collected from coroners' reports for 2 victims, and interviews with key informants for 2 victims.

6.2.2. Characteristics of the victims and the events

These include 15 road traffic fatalities and 2 all-terrain vehicle fatalities where the riders were injured off-road. The circumstances of one of the two off-road vehicle fatalities were unknown. Road traffic fatalities involved 11 occupants of cars or trucks, 1 pedestrian struck by a vehicle, 2 occupants of snowmobiles struck by a car or a truck while crossing a road and 1 victim for whom the information was unknown. A car or a truck was involved in 87 percent (13/15) of road traffic fatalities. Among those, 3 incidents involved a collision with another vehicle. The other 7 incidents involving a car or a truck for which information was available resulted from driving off the road in 2 cases, a mechanical failure in 2, falling off while the vehicle was moving in 1 and a

collision with a fixed object in 1. Among the 10 road traffic fatalities involving occupants of cars or trucks for which information was available, 4 victims were drivers, 3 were back seat passengers, 2 were front seat passengers and 1 was a passenger in the open back of a truck.

6.2.2.1. Personal risk factors

6.2.2.1.1. Alcohol use

Information on acute alcohol consumption was available for 92 percent (11/12) of road traffic victims 15 years and older. Of these, 73 percent (8/11) had consumed alcohol within 12 hours of the incident and 27 percent (3/11) were reported to have been intoxicated. Forty-three percent of the victims (3/7) known to have ingested alcohol prior to the incident and for whom information was available, were driving the vehicle involved in the crash. Alcohol consumption by another person (driver or other) was thought to have been significant in causing or contributing to the death for the 5 victims who were passengers in the vehicles involved in road traffic crashes (4 were known to have consumed alcohol prior to the incident). Thus, alcohol consumption by the victim or another individual was reported to have contributed to 53 percent (8/15) of the road traffic deaths.

Alcohol consumption was reported to have contributed to 1 of the 2 off-road vehicle deaths.

6.2.2.1.2. Drug use

None of the 58 percent of road traffic victims 15 years and older were reported to have consumed legal or illegal drugs prior to the incident.

Information on drug use was not available for off-road vehicle victims.

6.2.2.1.3. Past medical history

Among the 73 percent of motor vehicle fatality victims for whom information on past medical history was available, 27 percent (3/11) had medical problems that might have contributed to the death. These included insulin-dependent diabetes and cardiac problems, as well as deafness in 1 victim involved in a snowmobile crash while crossing the highway.

None of the 2 off-road vehicle victims were reported to suffer from medical problems that might have contributed to the death.

6.2.2.1.4. Driving experience

Of the 6 road traffic events for which the experience of the driver (victim or otherwise) was known, 3 drivers had 1 year or less of experience in driving the vehicle involved in the crash.

One of the drivers of the all-terrain vehicles involved in off-road fatalities was reported to have no experience in driving this type of vehicle.

6.2.2.2. Environmental risk factors

6.2.2.2.1. Time of day

Of the 73 percent of road traffic fatalities for which this information was available, 55 percent (6/11) had occurred at night, at dusk or at dawn.

One of the off-road fatalities occurred at dawn.

6.2.2.2.2. Road hazards

Road hazards were identified in 6 road traffic fatalities. For two victims, a slippery road was mentioned, whereas poor road design or condition (bumps and gravel) were identified in the others.

6.2.2.2.3. Weather conditions

Of the 60 percent of road traffic fatalities for which information on adverse weather conditions was available, 22 percent (2/9) had occurred in blizzard conditions.

Both off-road fatalities occurred in good weather conditions.

6.2.2.3. Equipment risk factors

6.2.2.3.1. Safety belt

Of the 64 percent of road traffic fatalities involving cars or trucks for which information was available, only 14 percent (1/7) of victims were wearing a safety belt at the time of the incident. No child seat was used in the single motor vehicle fatality that involved a child younger than 4 years old.

Only one of the 4 victims for whom information on habitual use of safety equipment within the vehicle was available always wore a safety belt. A safety belt was always worn by 28 percent of the matched sample from Santé Québec Health Survey of the James Ba[illegible] Cree.

6.2.3. Rescue and treatment

Most injury deaths occurred rapidly after the event. Of the 93 percent of motor vehicle fatalities for which information is known, 64 percent of the victims died either immediately or within minutes after the impact. The interviewees were asked their opinion on the potential value of any treatment once the injury had occurred. In 62 percent of interviews, it was believed that treatment would not have changed the course of the events.

6.2.4. Prevention strategies

The interviewees were asked their opinion on whether the injury could have been prevented. Of the 59 percent who answered the question, 90 percent believed that the death could have been prevented. Proposed preventive strategies included: education on drunk driving, increased police control on drunk drivers, organized taxi services or arrangements for sober drivers.

Discussion:

Motor vehicle fatalities, excluding snowmobile-related drownings are the second leading cause of unintentional and intentional injury deaths in the Cree communities, accounting for 24 percent of injury deaths during 1982-91.

In Sioux Lookout Zone, motor vehicle fatalities (E810-E825) accounted for 8 percent of all injury deaths during the 10 year period 1971-82 (Young, 1983). Motor vehicle fatalities were the leading cause of injury death and accounted for 19 to 41 percent of such deaths in other Canadian Aboriginal communities (Muir, 1991).

The standardized mortality ratio for all motor vehicle fatalities in the Cree compared with the Canadian population was 1.2. Previously described standardized mortality ratios for motor vehicle fatalities compared to the Canadian population varied from 0.97 (Young, 1983), to 2.13 and 2.47 for males and females respectively in selected Canadian Aboriginal communities (Mao et al., 1986).

When compared with rural regions such as the Northwest Territories, Cree communities did not experience a statistically significant excess of road traffic or off-road vehicle fatalities. The standardized mortality ratios referenced to rural populations control somewhat for the isolation of Aboriginal communities and tend to be closer to one than the SMR referenced to the Canadian population (Mao et al., 1992).

The excess of Cree deaths comes from off-road vehicles fatalities which affected both sexes significantly when compared to Canada. However, the excess off-road vehicle mortality rate in males was mostly due to snowmobile drownings which were classified as off-road vehicles for comparison with other populations. Given the number of deaths

on which these calculations were based, caution should be exercised when interpreting the results. Moreover, the enumeration of off-road mortality in Cree communities was provided by a combination of several data sources while the data for off-road fatalities in the comparison populations were provided by vital statistics only. It was previously outlined that vital statistics underascertain the number of injury deaths in the Cree population (Damestoy, 1994a). If underascertainment is also the case for other areas, the more complete enumeration of Cree deaths might bias upward the standardized mortality ratios comparing the Cree with other populations. Moreover, snowmobile drownings were classified as off-road fatalities in Cree communities and were assumed to be classified similarly in comparison populations. If snowmobile drownings were classified differently in the comparison populations, standardized mortality ratios and age-specific mortality rate ratios comparing the Cree off-road fatalities with other populations may be biased upward.

Among the Cree, the group most at risk for motor vehicle fatalities was adult males. Male teenagers in Cree communities seem to be less affected by motor vehicle fatalities than in the Canadian population, however caution should be exercised in interpreting these data since the mortality rates are based on small numbers.

Most adult male victims of road traffic fatalities had ingested alcohol prior to the event. Drunk driving of the victim or another person was associated with most road traffic fatalities involving cars or trucks. Driving at night and failure to wear a safety belt were also associated with many motor vehicle fatalities.

Data from the 1991 Santé Québec Health Survey of the James Bay Cree were

used for purposes of discussion. The information on the preventive behavior of injury victims in the present study differed from Santé Québec Health Survey of the James Bay Cree matched sample in that it was provided by a relative or friend of the victim for events that occurred up to 10 years previously. The comparison does provide a crude indication of certain personal and equipment factors among the victims and the general Cree population. Although information on the preventive behaviors of victims was limited, victims from motor vehicle crashes did not appear significantly different from the 1991 Santé Québec Health Survey of the James Bay Cree sample of participants matched to the Cree injury victims for age and sex..

Risk factors similar to those identified among the Cree have been described among other Aboriginal communities. Alcohol ingestion was suspected for 92 percent of drivers involved in fatal motor vehicle crashes in Saskatchewan Aboriginal populations (Szabo, 1990). Failure to wear safety belts was found among 70 percent of Aboriginal respondents to a health survey in the Northwest Territories (Young et al., 1992). In another survey in Alberta, mechanical failure of the vehicle and adverse weather conditions were not found to be associated with motor vehicle fatalities (Jarvis and Boldt, 1982).

In this study, individual risk factors were described separately. A combination of adverse risk factors can substantially increase the risk of motor vehicle fatality in certain situations, more than for any one risk factor acting alone. The analysis of the interaction between different risk factors was impossible since the number of victims was small.

Since the timeliness and effectiveness of treatment are limited in such isolated communities, the emphasis should be on prevention. Target high risk groups include adult males.

Several interventions have been proposed. Education about drinking and driving, alternatives to driving (eg. taxi services proposed by the interviewees), increased use of safety belts through promotion programs are possible strategies for prevention; however, the effectiveness of these interventions has not been evaluated in many Aboriginal communities. Some Aboriginal communities have developed educational material on safety belt use that might be useful (Health and Welfare Canada, 1990).

Preventive strategies regarding off-road vehicle fatalities involving snowmobiles going through thin ice were discussed elsewhere (Damestoy, 1994c). Travelling in pairs or in groups, travelling along the shores of lakes and rivers in late fall and early spring and wearing a flotation suit that protects against hypothermia. The remaining 2 off-road vehicle fatalities were too isolated to allow the analysis of risk factors surrounding the events.

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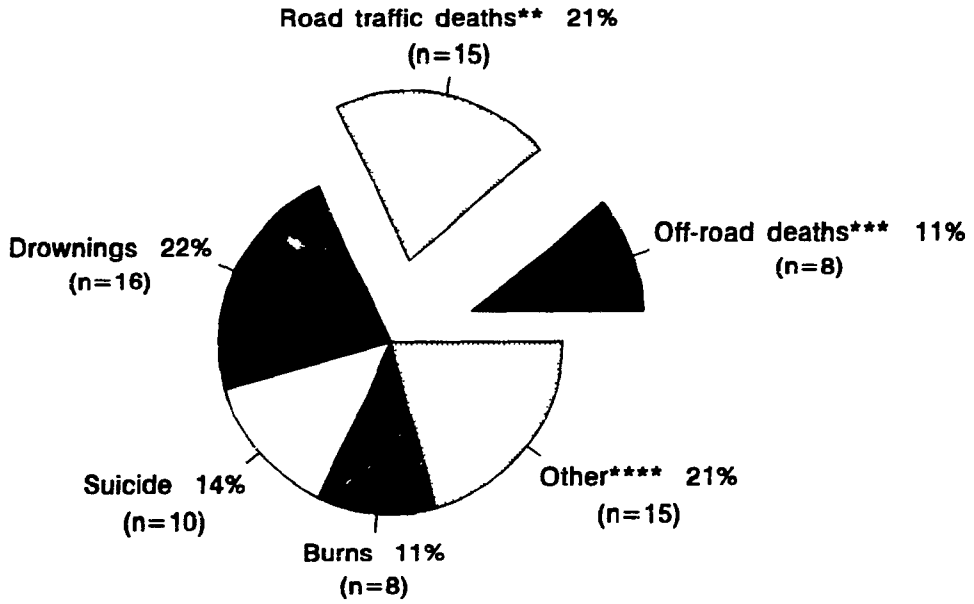
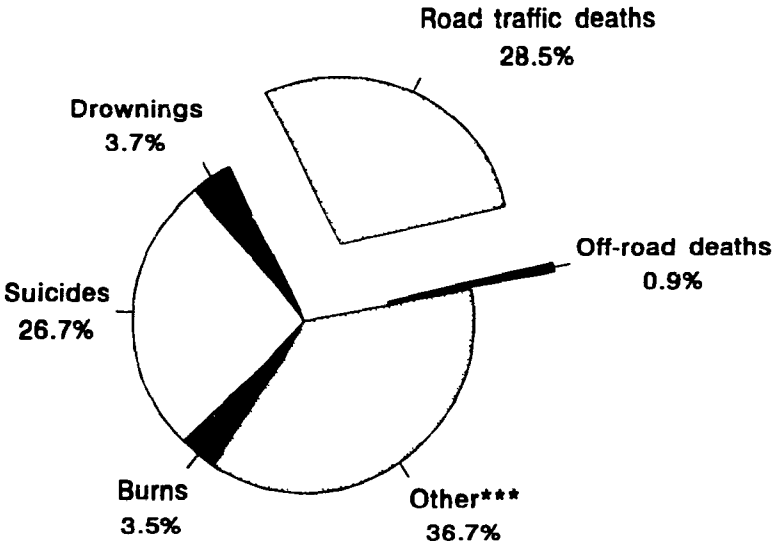
Figure 6.1 Deaths from motor vehicles* as a proportion of all injury deaths Cree of northern Quebec 1982-91, compared with Canada 1986



Cree 1982-91



Canada 1986

* Includes on-road E810-E819 & off-road E820-E825, ** Vehicle occupants, pedestrians, 2 snowmobilers
*** Includes snowmobile drownings (n=6) (E820) & all-terrain vehicle fatalities;
**** Includes suffocations, falls, unintentional firearm injuries & homicides, exposure hypothermia

Table 6.1(a)- **Age and sex-specific road traffic fatality rates** per 100,000 person-years. Cree communities of northern Quebec 1982 - 91 (n = 15)**

Age groups	Males (n = 14)				Females (n = 1)				Total (n = 15)			
	Rate	95 %CI*	Deaths	PY¶	Rate	95% CI*	Deaths	PY¶	Rate	95 %CI*	Deaths	PY¶
< 1	85 2	9 - 477	1	1 174	0	0 - 316	0	1 170	42 7	4 - 239	1	2 344
1 - 4	0	0 - 116	0	3 184	31.7	3 - 177	1	3 157	15.7	2 - 88	1	6 341
5 - 9	0	0 - 69	0	5 362	0	0 - 70	0	5 320	0	0 - 35	0	10 682
10 - 14	17.3	2 - 97	1	5 793	0	0 - 66	0	5 575	8.8	1 - 49	1	11 368
15 - 19	18.6	2 - 104	1	5 383	0	0 - 70	0	5 264	9 4	1 - 53	1	10 647
20 - 24	90.5	23 - 231	4	4 422	0	0 - 85	0	4 339	45 7	11 - 116	4	8 761
25 - 39	37 9	8 - 111	3	7 919	0	0 - 45	0	8 164	18 7	4 - 55	3	16 083
40 - 54	49 4	5 - 178	2	4 047	0	0 - 85	0	4 351	23.8	2 - 86	2	8 396
55 +	53 1	5 - 191	2	3 770	0	0 - 107	0	3 471	27.6	3 - 99	2	7 241
Total	**34.1**	**19 - 57**	**14**	**41 054**	**2.5**	**0.3 - 14**	**1**	**40 811**	**18.3**	**10 - 30**	**15**	**81 865**

** Includes road traffic fatalities coded ICD-9 E810-E819

* 95 percent confidence interval by the exact method for Poisson variables

¶ Person-Years at risk in the age group

Table 6.1(b)- **Age and sex-specific off-road vehicle fatality rates** per 100,000 person-years Cree communities of northern Quebec 1982 - 91 (n = 8)**

Age groups	Males (n = 7)				Females (n = 1)				Total (n = 8)			
	Rate	95 %CI*	Deaths	PY¶	Rate	95 %CI*	Deaths	PY¶	Rate	95 %CI*	Deaths	PY¶
< 1	0	0 - 315	0	1 174	0	0 - 316	0	1 170	0	0 - 158	0	2 344
1 - 4	31.4	3 - 176	1	3 184	0	0 - 117	0	3 157	15 8	2 - 88	1	6 341
5 - 9	0	0 - 69	0	5 362	0	0 - 70	0	5 320	0	0 - 35	0	10 682
10 - 14	0	0 - 64	0	5 793	0	0 - 66	0	5 575	0	0 - 33	0	11 368
15 - 19	0	0 - 69	0	5 383	19 0	2 - 106	1	5 264	9.4	1 - 53	1	10 647
20 - 24	22 6	2 - 127	1	4 422	0	0 - 85	0	4 339	11 4	1 - 64	1	8 761
25 - 39	25 3	3 - 91	2	7 919	0	0 - 45	0	8 164	12 4	1 - 45	2	16 083
40 - 54	24.7	3 - 138	1	4 047	0	0 - 85	0	4 351	11.9	1 - 67	1	8 396
55 +	53 1	5 - 191	2	3 770	0	0 - 107	0	3 471	27.6	3 - 99	2	7 241
Total	**17.1**	**7 - 35**	**7**	**41 054**	**2.5**	**0.3 - 14**	**1**	**40 811**	**9 8**	**4 - 19**	**8**	**81 865**

** Snowmobile-related drownings included with all off-road vehicle fatalities coded ICD-9 E820-E825

* 95 percent confidence interval by the exact method for Poisson variables

¶ Person-Years at risk in the age group

Table 6.2 - Standardized mortality ratios for motor vehicle fatalities in Cree communities of northern Quebec compared with Canada and Northwest Territories (n = 23)

Injury	Standard population	Males		Females		Total	
		SMR	95 % CI*	SMR	95 % CI*	SMR	95 % CI*
Motor vehicle (E810-825)§	Canada 1986	2 3	1 4 - 3 5	0 6	0 1 - 2 2	1 2	0 8 - 1 8
	NWT 82-91	1.5	0.9 - 2.3	0 4	0 0 - 1 4	1 8	1 1 - 2 7
Road traffic (E810-819)	Canada 1986	1 6	0 9 - 2 7	0 3	0 0 - 1 7	1 2	0 7 - 2 0
	NWT 82-91	1 3	0.7 - 2 2	0 2	0 0 - 1 1	1 0	0 6 1 7
Off road (E820-825)§	Canada 1986	19 1	7 7 - 39.3	19 7	0 5 - 109 7	18 6	8 0 36 6
	NWT 82-91	2 2	0 9 - 4 5	2 0	0 1 - 11 1	2 1	0 9 4 1

* 95 percent confidence interval by the exact method for Poisson variables

§ Includes Cree snowmobile drowning ICD E820 (n = 6) Cree deaths were ascertained by a combination of 5 data sources while for the comparison populations, deaths were ascertained by vital statistics only

Table 6.3(a)- Ratio of Cree male age-specific road traffic fatality rate compared with male age-specific road traffic fatality rates for Canada and Northwest Territories**

Age groups	Cree 82-91	Canada 1986			Northwest Territories 82-91		
	Rate§	Rate§§	Cree:Canada Ratio	95 % CI*	Rate§§	Cree:NWT Ratio	95 % CI*
< 1	85.2	4.8	17.8	2.2 -139.1	0	--	--
1 - 4	0	5.1	0	--	3.7	0	--
5 - 9	0	5.8	0	--	10.5	0	--
10 - 14	17.3	8.0	2.2	0.3 - 15.4	7.6	2.3	0 -277.1
15 - 19	18.6	44.3	0.4	0.1 - 3.0	56.5	0.3	0 - 4.1
20 - 24	90.5	49.2	1.8	0.7 - 4.9	55.2	1.6	0.3 - 10.7
25 - 39	37.9	23.3	1.6	0.5 - 5.0	19.5	1.9	0.3 - 13.8
40 - 54	49.4	16.2	3.0	0.8 - 12.2	36.2	1.4	0.2 - 12.4
55 +	53.1	21.9	2.4	0.6 - 9.7	30.4	1.7	0.1 - 31.2
Total	**34.1**	**22.2**			**25.5**		

** Includes all road traffic fatalities coded ICD-9 E810-E819. Cree road traffic fatalities were ascertained by a combination of 5 data sources while for the comparison populations, road traffic fatalities were ascertained by vital statistics only

* Taylor series 95 percent confidence interval

§ Death rate per 100,000 person-years at risk in the age group

§§ Death rate per 100,000 population at risk in the age group in 1986

Table 6.3(b)- **Ratio of Cree male age-specific off-road vehicle fatality rate** compared with male age-specific off-road fatality rates for Canada and Northwest Territories**

Age groups	Cree 82-91	Canada 1986			Northwest Territories 82-91		
	Rate§	Rate§§	Cree:Canada Ratio	95 % CI*	Rate§§	Cree:NWT Ratio	95 % CI*
< 1	0	0.5	0	--	0	--	--
1 - 4	31.4	1.1	28.5	3.6 -232.7	3.7	8.5	0 -5579.8
5 - 9	0	0.5	0	--	7.0	0	--
10 - 14	0	0.2	0	--	0	--	--
15 - 19	0	1.5	0	--	15.1	0	--
20 - 24	22.6	1.7	13.3	1.8 -100.6	11.0	2.0	0 - 121.0
25 - 39	25.3	0.9	28.1	6.8 -119.0	6.5	3.9	0.2- 86.2
40 - 54	24.7	1.0	24.7	3.3 -182.5	8.4	2.9	0.1-174.9
55 +	53.1	0.5	106.2	24-491	15.2	3.5	0.1-162.0
Total	**17.1**	**0.9**			**7.7**		

** Snowmobile-related drownings included with all off-road vehicle fatalities coded ICD-9 E820-E825. Cree off-road fatalities were ascertained by a combination of 5 data sources while for the comparison populations, off-road fatalities were ascertained by vital statistics only

* Taylor series 95 percent confidence interval

§ Death rate per 100,000 person-years at risk in the age group

§§ Death rate per 100,000 population at risk in the age group in 1986

VII. CONCLUSION

This study was helpful in determining the usefulness of different data sources to count injury deaths in Aboriginal communities. No single source of information provided a complete count of injury deaths in the communities. Official sources of information, such as vital statistics, underestimated the number of injury deaths by about 40 percent, especially motor vehicle fatalities. Coroners' reports provided a somewhat better overall count of injury deaths in the 1987-91 period; nevertheless 25 percent of injury deaths were not counted. This has implications for surveillance of injury deaths. When relying on official statistics for remote population, caution should be exercised in the interpretation of the data since underestimation of deaths is probable. Such under-ascertainment of injuries by official statistics has been observed in other populations (Smith and Middaugh, 1989; Marshall and Soule, 1988). Moreover, when counting suicide deaths, the coroner mislabelled most of them as non-intentional. Coroners' reports need to provide a more accurate reporting of suicide, even if only to mention that suicide was suspected but not proven.

Details on the circumstances of injury incidents are necessary to elaborate injury prevention programs appropriate for the community in which they will be applied. Such details are also important for surveillance purposes. Trends in use of safety equipment use or of acute alcohol ingestion at the time of the incident are important to monitor the change in the distribution of risk factors as injury prevention programs are applied (Ing,

1985). Coroners' reports sometimes provide such details, however the reporting on risk factors of interest such as acute alcohol ingestion and use of safety equipment pertinent for the injury is inconsistent. Standardization of coroners' reports to ensure routine inquiry about personal factors such as acute alcohol ingestion, use of safety equipment as well as environmental factors pertinent to the specific injury, would increase their quality and usefulness for injury mortality surveillance.

Mortality interviews with relatives of the victims were used to obtain details on the causes and circumstances of injury deaths. The interviews were well accepted by the communities with an 86 percent response rate. There was no influence of the delay between the deaths and the interview on the amount of useful information gathered by the interview, even though some deaths had occurred 10 years previously. This research methodology could be helpful in determining the circumstances of injury deaths in other remote communities.

This study confirmed the importance of injuries in the Cree communities. Injury deaths were the most common cause of death and the first cause of potential years of life lost in the Cree communities during 1985-87. Previously, Robinson (1985), and Courteau (1989) have both emphasized injuries as an important cause of all deaths in the Cree population. The standardized mortality ratio for all injuries was 2 when compared to the Canadian population, and 1.4 compared to rural regions of Quebec. The use of rural populations as references for calculating SMR controls somewhat for the isolation of the Aboriginal communities (Mao et al., 1992).

Adult males and toddlers of both sexes were the groups most at risk of injury

death during this period. Adult females were at low risk. Drownings and motor vehicle fatalities accounted for most injury deaths during the study period, followed by suicides.

Details of the circumstances of drowning deaths allowed the identification of groups and activities at risk not previously described in this community. Previous studies had outlined the importance of drownings in the Cree communities as a major cause of injury death (Robinson, 1985; Courteau, 1989), but did not define the circumstances of drownings.

Drownings associated with snowmobiles going through thin ice and boating drownings during hunting or fishing involved adult males. None of these drownings were associated with acute alcohol ingestion prior to the incident. Failure to wear a flotation devices or hypothermia suit was common to all of these incidents. Toddlers were another important risk group for Cree drownings. Often these children were playing with other minors near a river without adult supervision.

The second most common cause of injury deaths in the Cree communities was motor vehicle crashes, mainly road traffic fatalities involving cars and trucks. Fifty-three percent of these events were associated with acute alcohol ingestion prior to the event by the victims and/or their drivers. Most victims were adult males 20 years and older. The combination of driving at night on suboptimal road surfaces (slippery or gravel roads) may increase the risk of injury. None of the victims for whom information was available were wearing a safety belt.

Suicide deaths during the study period affected almost exclusively adult males. Half of the suicides resulted from self-inflicted gunshot wounds. Seven victims (7/10)

were reported to have ingested alcohol prior to the event. Most deaths were preceded by various personal crisis.

The importance of prevention in the communities is outlined by the fact that three quarters of injury deaths occurred immediately or within minutes of the incident in isolated areas. These deaths could not have been prevented by more sophisticated emergency medical services (Trunkey, 1983).

Haddon (1972) has developed a method of classifying prevention strategies for motor vehicle fatalities, applicable to other injuries as well. This focuses on personal, environmental and vehicle (or other equipment) factors, prior, during and after the injurious event. The use of this approach might help the communities to organize preventive strategies using the circumstances analyzed in this document.

The Cree communities will choose their priorities and adapt this knowledge for their own needs. They need to focus preventive efforts particularly on drownings of adult males and toddlers, traffic injuries and suicides of adult males. Other surveys have shown that the rate of use of safety belts and personal flotation devices in the Cree communities is very low (Robitaille and Barss, 1994). This is only one example of several possible areas of intervention.

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Appendix 1: Calculation of person-years in the Cree communities for 1982-91 from the list of Beneficiaries of the James Bay Agreement

James Bay Agreement Beneficiaries - June 1st of each year

Year	Sex	Age groups																Total/ Y/S	Total/Y
		< 1	1-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75 +	
1982	M	103	220	570	549	446	360	247	208	189	117	126	89	87	80	80	46	47	3 564	7 102
	F	117	206	552	523	457	359	262	214	200	135	113	90	84	82	52	33	59	3 538	
1983	M	98	275	544	570	481	377	268	210	196	116	130	90	88	84	75	51	51	3 704	7 391
	F	113	278	523	543	487	364	280	221	208	138	127	78	98	82	51	42	54	3 687	
1984	M	120	229	513	501	500	391	283	218	197	130	133	91	98	85	69	58	56	3 772	7 506
	F	116	240	518	549	475	405	300	218	201	165	132	84	80	98	57	41	55	3 734	
1985	M	116	254	524	602	517	394	308	225	200	150	124	106	88	85	73	67	54	3 887	7 752
	F	120	247	515	591	478	416	329	226	199	179	133	99	75	89	67	49	53	3 865	
1986	M	108	331	536	588	523	445	321	246	194	170	120	112	90	78	76	71	59	4 068	8 108
	F	114	324	514	599	505	424	344	241	198	194	134	108	82	83	72	50	54	4 040	
1987	M	112	305	516	599	550	447	349	244	207	185	117	121	83	83	77	72	64	4 131	8 263
	F	112	325	519	569	537	448	349	262	213	204	134	112	85	77	83	46	57	4 132	
1988	M	121	379	506	576	568	477	368	265	208	190	116	125	84	84	82	66	69	4 284	8 557
	F	105	393	530	549	555	477	350	277	215	207	137	124	74	90	79	47	64	4 273	
1989	M	151	360	540	568	605	501	383	279	213	193	130	127	83	93	82	55	73	4 436	8 856
	F	105	397	549	567	566	471	394	299	216	203	163	130	79	75	91	51	64	4 420	
1990	M	113	416	556	576	604	515	384	301	221	199	144	123	99	85	80	64	79	4 559	9078
	F	138	362	547	553	600	476	411	322	226	197	179	132	95	72	82	60	67	4 519	
1991	M	132	415	557	564	589	515	436	314	237	190	167	116	105	89	71	64	88	4 649	9 252
	F	130	385	553	532	604	499	418	334	237	195	193	132	101	76	75	67	72	4 603	
PY at risk	M	1 174	3 184	5 362	5 793	5 383	4 422	3 347	2 510	2 062	1 640	1 307	1 100	905	846	765	614	640	41 064	
	F	1 170	3 157	5 320	5 575	5 264	4 339	3 437	2 614	2 113	1 817	1 445	1 089	853	824	709	486	599	40 811	
Total PY at risk / Y		**2 344**	**6 341**	**10 682**	**11 368**	**10 647**	**8 761**	**6 784**	**5 124**	**4 175**	**3 457**	**2 752**	**2 189**	**1 758**	**1 670**	**1 474**	**1 100**	**1 239**	**81 865**	

Appendix 2: Calculation of the potential years of life lost from injuries and other causes of death.
Cree communities of northern Quebec 1985-87.

Calculation of the potential years of life lost before 65 years old to injuries and other major causes of death
Cree communities of northern Quebec 1985-87

Age group			Neoplasms ICD 140 - 239		Circulatory diseases ICD 390 - 459		Respiratory diseases ICD 460 - 519		Injuries* ICD E800 - E999	
	Midpoint	Years left to 65 yo	deaths	PYLL¶	deaths	PYLL¶	deaths	PYLL¶	deaths	PYLL¶
0 - 4	2 5	62.5	0	0	0	0	2	125	7	437.5
5 - 9	7.5	57.5	0	0	0	0	0	0	1	57.5
10 - 14	12 5	52 5	0	0	0	0	0	0	1	52.5
15 - 19	17 5	47.5	0	0	0	0	0	0	3	142 5
20 - 24	22 5	42.5	1	42.5	0	0	0	0	4	170
25 - 29	27.5	37 5	1	37.5	0	0	1	37.5	2	75
30 - 34	32.5	32 5	0	0	1	32.5	0	0	1	32.5
35 - 39	37 5	27.5	1	27.5	0	0	0	0	3	82.5
40 - 44	42 5	22.5	1	22.5	1	22.5	0	0	0	0
45 - 49	47.5	17.5	0	0	0	0	0	0	0	0
50 - 54	52.5	12.5	0	0	1	12.5	0	0	4	50
55 - 59	57 5	7 5	3	22.5	1	7.5	0	0	1	7.5
60 - 64	62.5	2.5	1	2.5	1	2.5	0	0	0	0
Total			8	155	5	77.5	3	162.5	27	1107.5

* Includes all unintentional and intentional injuries coded ICD-9 E800-E999 excluding E870-E876 and E930-E949
¶ Potential years of life lost before 65 years old

Source: MSSS, 1989

Appendix 3: Calculation of standardized mortality ratios for all injuries in the Cree communities compared with Canada, rural Quebec, Northwest Territories and other Canadian Aboriginal communities.

Calculation of standardized mortality ratio for injuries,
Cree communities of northern Quebec 1982-91
Standardized to 1986 Canadian population

	TOTAL				MALES				FEMALES			
Age group	Observed Cree deaths	Expected Cree deaths	Canadian rate/100 000	Cree PY at risk	Observed Cree deaths	Expected Cree deaths	Canadian rate/100 000	Cree PY at risk	Observed Cree deaths	Expected Cree deaths	Canadian rate/100 000	Cree PY at risk
Under 1	4	0 5	22 3	2344	2	0 3	23 6	1174	2	0 2	20 9	1170
1-4	9	1 2	18 3	6341	4	0 7	22 3	3184	5	0 4	14 0	3157
5-9	1	1 2	11 4	10682	0	0 8	14 5	5362	1	0 4	8 2	5320
10-14	6	1 4	12 5	11368	4	1 0	16 8	5793	2	0 5	8 4	5575
15-19	9	6 0	56 5	10647	6	4 6	85.0	5383	3	1 4	26 7	5264
20-24	11	5 9	67 4	8761	10	4.9	110 0	4422	1	1 1	24 3	4339
25-39	17	8 3	51 5	16083	16	6 4	81 4	7919	1	1 8	21 9	8164
40-54	8	4.3	51 4	8398	8	3 0	74 4	4047	0	1 2	28 1	4351
55 +	7	6 9	95 0	7241	6	4 5	120.5	3770	1	2 6	74 2	3471
Total	72	35 7	54 0	81865	56	26 2		41054	16	9.6		40811
	SMR = 2 0		(1,6 - 2,5)		SMR Males	2 1	(1.6 - 2,7)		SMR Females	1 7	(1,0 - 2,8)	

Calculation of standardized mortality ratio for injuries,
Cree communities of northern Quebec 1982-91
Standardized to rural region of Quebec, 1982-91

	TOTAL				MALES				FEMALES			
Age group	Observed Cree deaths	Expected Cree deaths	Rural QC rate/100 000	Cree PY at risk	Observed Cree deaths	Expected Cree deaths	Rural QC rate/100 000	Cree PY at risk	Observed Cree deaths	Expected Cree deaths	Rural QC rate/100 000	Cree PY at risk
Under 1	4	0 4	17 1	2344	2	0 2	18 9	1174	2	0 2	15 1	1170
1-4	9	0 9	14 1	6341	4	0 6	18 4	3184	5	0 3	9 6	3157
5-9	1	1 4	13 3	10682	0	1 0	19 3	5362	1	0 4	7 1	5320
10-14	6	2 1	15 6	11368	4	1 4	24 2	5793	2	0 7	12 5	5575
15-19	9	8 2	76 6	10647	6	6 8	126 7	5383	3	1 4	25 8	5264
20-24	11	9 0	102 3	8761	10	8 1	182 8	4422	1	1 0	22 4	4339
25-39	17	13 5	84 2	16083	16	10 7	135 3	7919	1	2.5	31 1	8164
40-54	8	5 8	68 6	8398	8	4 2	102 6	4047	0	1 4	32 2	4351
55 +	7	9 2	126 7	7241	6	6 9	183	3770	1	2 5	71 3	3471
Total	72	50 4		81865	56	39.9		41054	16	10 3		40811
	SMR = 1 4		(1 1 - 1,8)		SMR Males	1 4	(1,1 - 1,8)		SMR Females	1 6	(0 9 - 2,6)	

Calculation of standardized mortality ratio for injuries,
Cree communities of northern Quebec 1982-91
Standardized to Northwest Territories population, 1982-91

Age group	TOTAL				MALES				FEMALES			
	Observed Cree deaths	Expected Cree deaths	NWT rate/100 000	Cree PY at risk	Observed Cree deaths	Expected Cree deaths	NWT rate/100 000	Cree PY at risk	Observed Cree deaths	Expected Cree deaths	NWT rate/100 000	Cree PY at risk
Under 1	4	2 2	92 4	2344	2	1 3	113 8	1174	2	0 8	70 2	1170
1-4	9	3 9	61 8	6341	4	2 0	63.7	3184	5	1 9	59 8	3157
5-9	1	3 2	30 0	10682	0	2 2	41 8	5362	1	0 9	17 8	5320
10-14	6	7 4	65 2	11358	4	5.3	90.9	5793	2	2 1	37 1	5575
15-19	9	23 3	219 2	10647	6	18 2	339 0	5383	3	4 7	89 4	5264
20-24	11	20 0	227 8	8761	10	16 3	368 3	4422	1	3 7	85 7	4339
25-39	17	22 5	140 0	16083	16	15.9	201.3	7919	1	5 8	71 4	8164
40-54	8	11 0	130.5	8398	8	7 4	183 8	4047	0	2 8	65 0	4351
55 +	7	13.1	181.6	7241	6	8 8	233 0	3770	1	4 0	115 4	3471
Total	72	106 6		81865	56	75 6		41054	16	26 8		40811
	SMR = 0 7		(0,5 - 0,9)		SMR Males	0 7	(0,5 - 0,9)		SMR Females	0 6	(0,3 - 1,0)	

Calculation of standardized mortality ratio for suicides (E950-E959)
Cree communities of northern Quebec 1982-91
Standardized to 1986 Canadian population

Age group	TOTAL				MALES				FEMALES			
	Observed Cree deaths	Expected Cree deaths	Canadian rate/100 000	Cree PY at risk	Observed Cree deaths	Expected Cree deaths	Canadian rate/100 000	Cree PY at risk	Observed Cree deaths	Expected Cree deaths	Canadian rate/100 000	Cree PY at risk
Under 1	0	0 0	0 0	2344	0	0 0	0 0	1174	0	0.0	0 0	1170
1-4	0	0 0	0 0	6341	0	0 0	0 0	3184	0	0 0	0 0	3157
5-9	0	0 0	0 1	10682	0	0 0	0 1	5362	0	0 0	0 0	5320
10-14	0	0 1	1 3	11368	0	0 1	2 2	5793	0	0 0	0 5	5575
15-19	2	1 3	12 5	10647	1	1 1	20 2	5383	1	0 2	4 5	5264
20-24	2	1 7	19 4	8761	2	1 5	32 8	4422	0	0 3	6 0	4339
25-39	5	3.1	19 2	16083	5	2.4	30 5	7919	0	0 7	8 1	8164
40-54	1	1 6	19.6	8398	1	1 2	28 9	4047	0	0 4	10 3	4351
55 +	0	1 3	17 7	7241	0	1.1	29.4	3770	0	0 3	8 2	3471
Total	10	9 2	14 5	81865	9	7 4	22 9	41054	1	1 9	6 4	40811

SMR for suicides = 1 1 (0,5 - 2,0) SMR Males 1.2 (0,5 - 2,3) SMR Females 0 5 (0,0 - 2,8)

Calculation of standardized mortality ratio for suicides (E950-E959)
Cree communities of northern Quebec 1982-91
Standardized to Northwest Territories population, 1982-91

Age group	TOTAL				MALES				FEMALES			
	Observed Cree deaths	Expected Cree deaths	NWT rate/100 000	Cree PY at risk	Observed Cree deaths	Expected Cree deaths	NWT rate/100 000	Cree PY at risk	Observed Cree deaths	Expected Cree deaths	NWT rate/100 000	Cree PY at risk
Under 1	0	0 0	0 0	2344	0	0 0	0 0	1174	0	0 0	0 0	1170
1-4	0	0 0	0 0	6341	0	0 0	0 0	3184	0	0 0	0 0	3157
5-9	0	0 2	1 8	10682	0	0 2	3 5	5362	0	0 0	0 0	5320
10-14	0	1 3	11 8	11368	0	0 7	11 4	5793	0	0 7	12 4	5575
15-19	2	9 4	88 1	10647	1	7 9	146 9	5383	1	1 3	24 4	5264
20-24	2	7 5	85 2	8761	2	6 3	143 6	4422	0	1 1	26 1	4339
25-39	5	6 7	41 9	16083	5	5 3	67 5	7919	0	1 1	13 1	8164
40-54	1	2 2	26 1	8398	1	1 4	33 4	4047	0	0 7	17 1	4351
55 +	0	1 0	14 2	7241	0	0 8	20 3	3770	0	0.2	6 4	3471
Total	10	28 3	34 6	81865	9	22 6	54 7	41054	1	5 1	12 5	40811

SMR suicides = 0 4 (0,2 - 0 7) SMR Males 0 4 (0 2 - 0 8) SMR Females 0 2 (0 0 - 1 1)

Appendix 4: Calculation of standardized mortality ratios for drownings in the Cree communities compared with Canada, rural Quebec and Northwest Territories.

Calculation of standardized mortality ratio for drowning (E830, E832, E910)
Cree communities of northern Quebec 1982-91
Standardized to 1986 Canadian population

Age group	TOTAL				MALES				FEMALES			
	Observed Cree deaths	Expected Cree deaths	Canadian rate/100 000	Cree PY at risk	Observed Cree deaths	Expected Cree deaths	Canadian rate/100 000	Cree PY at risk	Observed Cree deaths	Expected Cree deaths	Canadian rate/100 000	Cree PY at risk
Under 1	0	0 0	0 8	2344	0	0 0	1.1	1174	0	0 0	0 6	1170
1-4	3	0 3	4 3	6341	1	0 2	6 5	3184	2	0 1	2 0	3157
5-9	0	0 1	1 4	10682	0	0 1	2 4	5362	0	0 0	0 3	5320
10-14	1	0 1	0 7	11368	0	0 1	1 3	5793	1	0 0	0 1	5575
15-19	3	0 3	2 9	10647	3	0 3	5 4	5383	0	0 0	0 2	5264
20-24	3	0 3	2 9	8761	3	0.3	5 7	4422	0	0 0	0 1	4339
25-39	2	0 3	2 1	16083	2	0.3	3.9	7919	0	0 0	0 3	8164
40-54	2	0 2	1 9	8398	2	0 1	3 2	4047	0	0 0	0 5	4351
55 +	1	0 1	1 9	7241	1	0 1	2.7	3770	0	0 0	1 2	3471
Total	15	1.7		81865	12	1 5		41054	3	0 2		40811

SMR drownings = 8 7 (4,9 - 14.4) SMR drownings Males 8 0 (4,2 - 14,0) SMR drownings Females 15 4 (3,2 - 45,0)

Calculation of standardized mortality ratio for drowning (E830, E832,E910)
Cree communities of northern Quebec 1982-91
Standardized to rural Quebec population, 1982-91

Age group	TOTAL				MALES				FEMALES			
	Observed Cree deaths	Expected Cree deaths	Rural QC rate/100 000	Cree PY at risk	Observed Cree deaths	Expected Cree deaths	Rural QC rate/100 000	Cree PY at risk	Observed Cree deaths	Expected Cree deaths	Rural QC rate/100 000	Cree PY at risk
Under 1	0	0 0	0 0	2344	0	0 0	0 0	1174	0	0 0	0 0	1170
1-4	3	0 2	3 8	6341	1	0 2	6 4	3184	2	3 0	96 0	3157
5-9	0	0 2	1.7	10682	0	0 2	3 4	5362	0	0 0	0 0	5320
10-14	1	0 4	3 3	11368	0	0 4	6 3	5793	1	0 0	0 0	5575
15-19	3	0 5	4 6	10647	3	0 5	9 1	5383	0	0 0	0 0	5264
20-24	3	0 9	10 0	8761	3	0.9	20 0	4422	0	0 0	0 0	4339
25-39	2	0 9	5 7	16083	2	0 8	10 2	7919	0	0 1	1 1	8164
40-54	2	0 3	4 1	8398	2	0 3	7 0	4047	0	0 0	1 0	4351
55 +	1	0 2	3 4	7241	1	0 2	5 7	3770	0	0 0	1.1	3471
Total	15	3 7		81865	12	3 4		41054	3	3 2		40811

SMR drownings = 4 1 (2.3 - 6.8) SMR drownings Males 3 5 (1.8 - 6.1) SMR drownings Females 0 9 (0,2 - 2,6)

Calculation of standardized mortality ratio for drowning (E830, E832, E910)
Cree communities of northern Quebec 1982-91
Standardized to Northwest Territories population, 1982-91

Age group	TOTAL				MALES				FEMALES			
	Observed Cree deaths	Expected Cree deaths	NWT rate/100 000	Cree PY at risk	Observed Cree deaths	Expected Cree deaths	NWT rate/100 000	Cree PY at risk	Observed Cree deaths	Expected Cree deaths	NWT rate/100 000	Cree PY at risk
Under 1	0	0 0	0 0	2344	0	0 0	0 0	1174	0	0 0	0 0	1170
1-4	3	0 5	7 7	6341	1	0 5	15 0	3184	2	0 0	0 0	3157
5-9	0	0 4	3 5	10682	0	0 4	7 0	5362	0	0 0	0 0	5320
10-14	1	1 6	13 8	11368	0	1.1	18 9	5793	1	0 5	8 3	5575
15-19	3	2 3	21 5	10647	3	2 0	37.7	5383	0	0 2	4 1	5264
20-24	3	2 3	25 9	8761	3	2 1	47 9	4422	0	0 2	3 7	4339
25-39	2	1 8	11 0	16083	2	1.5	19 5	7919	0	0 1	1 5	8164
40-54	2	1 8	15 3	8398	2	1 0	25 1	4047	0	0 1	3 4	4351
55 +	1	1.3	11 3	7241	1	0 8	20 3	3770	0	0.0	0 0	3471
Total	15	0 8		81865	12	9 4		41054	3	1.1		40811

SMR drownings = 1.4 (0.8 - 2.3) SMR drownings Males 1.3 (0.7 - 2.3) SMR drownings Females 2 7 (0.6 - 7.9)

Appendix 5: Calculation of standardized mortality ratios for motor vehicle fatalities, road traffic and off-road vehicle fatalities in the Cree communities compared with Canada and Northwest Territories.

Calculation of standardized mortality ratio for motor vehicle fatalities (E810–E819, and E820–E825)
Cree communities of northern Quebec 1982–91
Standardized to 1986 Canadian population

Age group	TOTAL				MALES				FEMALES			
	Observed Cree deaths	Expected Cree deaths	Canadian rate/100 000	Cree PY at risk	Observed Cree deaths	Expected Cree deaths	Canadian rate/100 000	Cree PY at risk	Observed Cree deaths	Expected Cree deaths	Canadian rate/100 000	Cree PY at risk
Under 1	1	0 1	3 9	2344	1	0 1	5 4	1174	0	0 0	2 3	1170
1–4	2	0 3	5 5	6341	1	0 2	6 2	3184	1	0 2	4 8	3157
5–9	0	0 6	5 7	10682	0	0 3	6 3	5362	0	0.3	5 1	5320
10–14	1	0 7	6 2	11368	1	0 5	8 3	5793	0	0.2	4.3	5575
15–19	2	3.4	31 5	10647	1	2.5	45 8	5383	1	0.9	16 6	5264
20–24	5	2 8	31.6	8761	5	2.3	50 9	4422	0	0 5	12 2	4339
25–39	5	2 5	15.8	16083	5	1.9	24 2	7919	0	0 6	7 5	8164
40–54	3	1.1	12 6	8398	3	0 7	17.2	4047	0	0 3	7 9	4351
55 +	4	1.2	17 1	7241	4	0.8	22.4	3770	0	0.4	12 8	3471
Total	23	12.7		81865	21	9.3		41054	2	3.5		40811

SMR motor vehicle fatalities = 1 8 (1,1 - 2,7) SMR Males 2 3 (1.4 - 3,5) SMR Females 0 6 (0,1 - 2,2)

Calculation of standardized mortality ratio for motor vehicle fatalities (E810–E819, and E820–E825)
Cree communities of northern Quebec 1982–91
Standardized to Northwest Territories population, 1982–91

Age group	TOTAL				MALES				FEMALES			
	Observed Cree deaths	Expected Cree deaths	NWT rate/100 000	Cree PY at risk	Observed Cree deaths	Expected Cree deaths	NWT rate/100 000	Cree PY at risk	Observed Cree deaths	Expected Cree deaths	NWT rate/100 000	Cree PY at risk
Under 1	1	0 0	0 0	2344	1	0 0	0 0	1174	0	0 0	0 0	1170
1–4	2	1 0	15 4	6341	1	0 2	7.5	3184	1	0 8	23 9	3157
5–9	0	1.3	12 3	10682	0	0 9	17 4	5362	0	0 4	7 1	5320
10–14	1	0 7	5 9	11368	1	0 4	7 6	5793	0	0 2	4 1	5575
15–19	2	4 6	43 1	10647	1	3 9	71 6	5383	1	0 6	12 2	5264
20–24	5	3 7	42.6	8761	5	2 9	66 3	4422	0	0.8	18 6	4339
25–39	5	3 1	19 2	16083	5	2 1	26 0	7919	0	1 0	11 7	8164
40–54	3	2.2	26 1	8398	3	1 8	44 6	4047	0	0 1	3 4	4351
55 +	4	2.5	34.0	7241	4	1.7	45 6	3770	0	0 7	19 2	3471
Total	23	19 0	23.0	81865	21	14 0	33 2	41054	2	4 6	11 7	40811

SMR motor vehicle fatalities = 1.2 (0,8 - 1,8) SMR Males 1.5 (0,9 - 2,3) SMR Females 0 4 (0 0 - 1 4)

Calculation of standardized mortality ratio for road traffic fatalities (E810–E819)
Cree communities of northern Quebec 1982–91
Standardized to 1986 Canadian population

Age group	TOTAL				MALES				FEMALES			
	Observed Cree deaths	Expected Cree deaths	Canadian rate/100 000	Cree PY at risk	Observed Cree deaths	Expected Cree deaths	Canadian rate/100 000	Cree PY at risk	Observed Cree deaths	Expected Cree deaths	Canadian rate/100 000	Cree PY at risk
Under 1	1	0 1	3 6	2344	1	0 1	4.8	1174	0	0 0	2 3	1170
1–4	1	0 3	4.8	6341	1	0 2	5 1	3184	1	0 1	4 4	3157
5–9	0	0 6	5 4	10682	0	0 3	5 8	5362	0	0 3	5 0	5320
10–14	1	0 7	6 0	11368	1	0 5	8 0	5793	0	0 2	4 0	5575
15–19	1	3 3	30 7	10647	1	2 4	44 3	5383	0	0 9	16 5	5264
20–24	4	2 7	30 7	8761	4	2 2	49 2	4422	0	0 5	12 0	4339
25–39	3	2 5	15 4	16083	3	1 8	23 3	7919	0	0 6	7 4	8164
40–54	2	1 0	12 0	8398	2	0 7	16 2	4047	0	0 3	7 8	4351
55 +	2	1 2	16 9	7241	2	0 8	21 9	3770	0	0 4	12 7	3471
Total	15	12 3	15 5	81865	14	8 9	22 2	41054	1	3 4	9 0	40811

SMR road traffic fatalities = 1 2 (0,7 - 2,0) SMR Males 1 6 (0,9 - 2,7) SMR Females 0 3 (0,0 - 1,7)

Calculation of standardized mortality ratio for road traffic fatalities (E810–E819)
Cree communities of northern Quebec 1982–91
Standardized to Northwest Territories population, 1982–91

Age group	TOTAL				MALES				FEMALES			
	Observed Cree deaths	Expected Cree deaths	NWT rate/100 000	Cree PY at risk	Observed Cree deaths	Expected Cree deaths	NWT rate/100 000	Cree PY at risk	Observed Cree deaths	Expected Cree deaths	NWT rate/100 000	Cree PY at risk
Under 1	1	0 0	0 0	2344	1	0 0	0 0	1174	0	0 0	0 0	1170
1–4	1	0 9	13 5	6341	1	0 1	3 7	3184	1	0 8	23 9	3157
5–9	0	0 9	8 8	10682	0	0 6	10 5	5362	0	0 4	7 1	5320
10–14	1	0 4	3 9	11368	1	0 4	7 6	5793	0	0 0	0 0	5575
15–19	1	3 7	35 2	10647	1	3 0	56 5	5383	0	0 6	12 2	5264
20–24	4	3 2	37 0	8761	4	2 4	55 2	4422	0	0 8	18 6	4339
25–39	3	2 4	15 1	16083	3	1 5	19 5	7919	0	0 8	10 2	8164
40–54	2	1 7	20 0	8398	2	1 5	36 2	4047	0	0 0	0 0	4351
55 +	2	1 8	25 5	7241	2	1 1	30 4	3770	0	0 7	19 2	3471
Total	15	15 2	18 4	81865	14	10 8	25 5	41054	1	4 1	10 5	40811

SMR road traffic fatalities = 1 0 (0 6 - 1.7) SMR Males 1 3 (0 7 - 2 2) SMR Females 0 2 (0 0 - 1 1)

Calculation of standardized mortality ratio for off-road vehicle fatalities (E820-E825)
Cree communities of northern Quebec 1982-91
Standardized to 1986 Canadian population

Age group	TOTAL				MALES				FEMALES			
	Observed Cree deaths	Expected Cree deaths	Canadian rate/100 000	Cree PY at risk	Observed Cree deaths	Expected Cree deaths	Canadian rate/100 000	Cree PY at risk	Observed Cree deaths	Expected Cree deaths	Canadian rate/100 000	Cree PY at risk
Under 1	0	0 1	0 3	2344	0	0.0	0 5	1174	0	0 0	0 0	1170
1-4	1	0 0	0 8	6341	1	0 0	1.1	3184	0	0 0	0 4	3157
5-9	0	0 0	0 3	10682	0	0 0	0 5	5362	0	0 0	0 1	5320
10-14	0	0 0	0 2	11368	0	0 0	0.2	5793	0	0 0	0 2	5575
15-19	1	0 1	0 8	10647	0	0 1	1.5	5383	1	0 0	0 1	5264
20-24	1	0 1	0 9	8761	1	0 1	1 7	4422	0	0 0	0 2	4339
25-39	2	0 1	0 5	16083	2	0.1	0 9	7919	0	0 0	0 0	8164
40-54	1	0 1	0 6	8398	1	0 0	1 0	4047	0	0 0	0.1	4351
55 +	2	0 0	0 3	7241	2	0 0	0 5	3770	0	0 0	0.1	3471
Total	8	0.5	0 5	81865	7	0.4	0 9	41054	1	0 1	0 1	40811

SMR for off road fatalities = 18 6 (8,0 - 36,6) SMR Males 19 1 (7,7 - 39,3) SMR Females 19.7 (0,5 - 109,7)

Calculation of standardized mortality ratio for off-road fatalities (E820-E825)
Cree communities of northern Quebec 1982-91
Standardized to Northwest Territories population, 1982-91

Age group	TOTAL				MALES				FEMALES			
	Observed Cree deaths	Expected Cree deaths	NWT rate/100 000	Cree PY at risk	Observed Cree deaths	Expected Cree deaths	NWT rate/100 000	Cree PY at risk	Observed Cree deaths	Expected Cree deaths	NWT rate/100 000	Cree PY at risk
Under 1	0	0 0	0 0	2344	0	0 0	0 0	1174	0	0 0	0 0	1170
1-4	1	0 1	1 9	6341	1	0.1	3 7	3184	0	0 0	0 0	3157
5-9	0	0.4	3.5	10682	0	0 4	7 0	5362	0	0 0	0 0	5320
10-14	0	0.2	2 0	11368	0	0 0	0 0	5793	0	0 2	4 1	5575
15-19	1	0 8	7 8	10647	0	0 8	15.1	5383	1	0 0	0 0	5264
20-24	1	0 5	5 6	8761	1	0.5	11 0	4422	0	0 0	0 0	4339
25-39	2	0 7	4 1	16083	2	0 5	6 5	7919	0	0 1	1 5	8164
40-54	1	0 5	6 1	8398	1	0.3	8 4	4047	0	0 1	3 4	4351
55 +	2	0 6	8 5	7241	2	0 6	15 2	3770	0	0 0	0 0	3471
Total	8	3 8	4 6	81865	7	3.2	7 7	41054	1	0 5	1 2	40811

SMR off-road fatalities = 2 1 (0,9 - 4,1) SMR Males 2 2 (0,9 - 4,5) SMR Females 2 0 (0,1 - 11,1)

Appendix 6: Consent form.

DÉPARTEMENT DE SANTÉ COMMUNAUTAIRE | DSC | DEPARTMENT OF COMMUNITY HEALTH

980, rue Guy, suite 300A, Montreal (QC) H3H 2K3 Tel (514) 932-3055 Fax (514) 932-1502

VERBAL CONSENT FORM

READ THIS FORM TO THE PERSON YOU ARE ABOUT TO INTERVIEW. ANSWER ANY EXTRA QUESTIONS THEY MAY HAVE. OBTAIN THEIR VERBAL AGREEMENT TO PARTICIPATE.

1. As you may know, deaths from injuries are an important health problem in the Cree communities, both because of the relatively large number of deaths from this cause and because of the unusually young age of most victims. For this reason, the Cree Health Board has requested a complete study of all injuries severe enough to cause death or hospitalization. This project is being conducted by the Injury Prevention Program and the Northern Quebec Module of the Department of Community Health of the Montreal General Hospital. We need to obtain more specific details about the events occurring around the time of the injury death. This information will help to allow the creation of prevention programs to reduce the number of such tragedies in the future.

2. As a family member of a victim of a fatal injury or a witness to such an injury, you may be aware of important information that could help to prevent other similar deaths. We would therefore be grateful if you could answer a series of questions about the circumstances of .....'s death. It should take about 20 minutes to answer these questions.

3. The interviewer is bound to confidentiality. He/she will not reveal the contents of this interview, nor the fact that you have been interviewed to anyone other than the two doctors who are working on this project.

4. All answers are analysed without names. The results of this study will be presented only as summaries of the answers to each question from all of the interviews. No single person will be recognizable.

5. Your help in this project will be very helpful. In other similar projects elsewhere most people have not minded answering questions about the death of one of their relatives or companions. However, you are free to refuse if you think that it would be too upsetting for you to reconsider the details of the death. Moreover, if, after starting the interview, you feel that it bothers you too much to answer certain questions, you can request not to answer those questions or stop the interview completely if you wish. Refusing to participate will have no consequences to you.

AFTER HAVING BEEN READ THIS FORM:
THE INTERVIEWEE AGREES: _____
THE INTERVIEWEE DOES NOT AGREE: _____

If interviewee agrees, thank the person for their participation. GO TO FIRST SECTION OF THE QUESTIONNAIRE.
If interviewee disagrees, thank the person for their time and attention to your visit.

If you have further questions or would like to talk with one of the researchers before the interview, you may contact either Dr Peter Barss, Consultant Physician, Injury Control Program, Department of Community Health, Montreal General Hospital, or Dr Nicole Damestoy at the same address. The interviewer can arrange for you to talk with them.

Appendix 7: Cree Injury Survey questionnaires.

Cree Injury Survey 1992

A Study of Fatal Injuries in the Cree Communities
of Northern Quebec being conducted for the Cree Health Board
by the Injury Prevention Program and the Northern Quebec Module
of the Department of Community Health
Montreal General Hospital

Cover Letter for Cree Injury Questionnaire

Village of interview: _____

Identification no of victim:_____

Name of person interviewed:

_____

Last name of victim: _____ First name:

_____

Age at death: _____ Sex: m f

Date of birth: _____

Place of Death: _____

Village of Residence:_____

Date of death: _____ (mmddyy)

Date of injury (if different): _____ (mmddyy)

Type of injury:

Drowning ___	Traffic injury ___	Suicide ___
Burn/Fire ___	Poisoning ___	Homicide ___
Suffocation ___	Gunshot (unintentional) ___	

Other (specify): _____

E-code of injury: ____

Identification number:_____

Village:_____

Part I: Background and circumstances of the injury:

This first part of the interview contains some general questions about -----'s age or work etc.. As well, it will help describe the injury and its circumstances.

1g. How was ----- related to you?

Husband/Wife.....1
Mother/Father.....2
Son/Daughter.....3
Sister/Brother.....4
Live-in partner.....5
Other family 6
Specify _____
Friend.....7
Work companion.....8
Social acquaintance.....9
Other 10
Specify _____

2g. Did you live in the same house as -----?

Yes.....1
No.....2

3g. Did you witness the event that caused -----'s death?

Yes.....1

No.....2

4g. How old was ----- at the time of the injury?

Years....._____

Months....._____

Don't know.....98

5g. Was ----- Cree?

Yes.....1

No.....2

6g. What was -----'s marital status?

Single.....1

Married.....2

Divorced/Separated.....3

Widowed.....4

Live-in-relationship.....5

7g. Please tell me in your own words what ----- was doing just prior to the injury:

_____

_____

_____

_____

8g. What went wrong?

_____

_____

_____

_____

_____.

9g. What injury occurred?

_____

_____

_____

_____

_____.

10g. In your opinion, could this injury have been prevented?

Yes 1

No .....2 GO TO Q.12g, p 4.

Don't know .....98 GO TO Q.12g, p 4.

11g. If so, how?

_____

_____

_____.

12g. How soon after the injury did the death occur?

Immediately.....1

Minutes after the injury.....2

Specify how many minutes_____

Hours after the injury.....3

Specify how many hours _____

Days after the injury.....4

Specify how many days _____

Weeks after the injury.....5

Specify how many weeks _____

Other.....6

Specify _____

Don't know.....98

13g. Did ----- receive any treatment from a nurse, doctor or hospital before death?

Yes.....1

No.....2 GO TO Q. 15g, p 5.

Don't know.....98 GO TO Q. 15g, p 5.

14g. Could you give details, including how long after the injury the treatment was received.

_____

_____

__.

15g. In your opinion, would treatment have made any difference?

Yes.....1

No.....2

Don't know.....3

16g.

Explain:_____

_____.

17g. Which of the following best describes -----'s working status at the time of the fatal injury? (**Question 67b. Individual**)

Work full-time (with a salary)....1

Work part-time (with a salary)....2

Work occasionally (with a salary).3

Income security for trappers.....4

Housework.....5

Retired or on pension.....6

Unemployment insurance.....7

Social welfare.....8

Other 9

Specify _____

Don't know.....98

18g. What was -----'s occupation at the time of the injury?

_____.

19g. Was ----- at work when the injury occurred?

Yes.....1

No.....2

Don't know.....98

20g. Where did the injury occur?

At home.....1

Outside home, but in the village 2

Specify_____

In another village.....3

On the road / trail.....4

In the bush.....5

Other 6

Specify _____

Don't know.....98

21g. Where did the injury take place exactly? Name the exact location or the road, the lake etc.. where the injury occurred.

_____

22g. Were there people present with the victim at the scene of the event?

Yes.....1

No.....2 GO TO Q. 24g, p.7

Don't know.....98 GO TO Q. 24g, p.7

23g. How many persons other than the victim were at the scene when the injury happened?

_____ person(s)

Don't know.....98

24g. Do you think that ----- drank alcohol within 12 hours prior to the injury?

Yes.....1

No.....2 GO TO Q. 27g, p.8

Don't know.....98 GO TO Q. 27g, p.8

25g. In your opinion, about how many drinks did ------ have prior to the injury?

_____ bottle(s) of beer

_____ glass(es) of wine

_____ drink(s) of hard liquor

Don't know.....98

26g. In your opinion, was ------ drunk at the time of the injury?

Yes.....1

Specify _____

No.....2

Don't know.....98

27g. To your knowledge, did ----- consume any recreational or prescription drugs around the time of the injury?

Yes.....1

No.....2 GO TO Q. 30g, p.9

Don't know.....98 GO TO Q. 30g, p.9

28g. What did ----- consume around the time of the injury? (Check any of the appropriate)

Marijuana.....1

Cocaine.....2

Sniffing solvents.....3

Specify which solvent _____

Medication for the nerves/sleeping pills.....4

Specify _____

None of the above.....5

Specify _____

Don't know.....98

29g. Do you think that ----- 's alertness affected by this consumption of drugs at the time of the injury?

Yes.....1

No.....2

Don't know.....98

30g. Was -----'s alertness affected by something else?

Fatigue.....1

Specify _____

Stress.....2

Specify _____

Other.....3

Specify _____

Not pertinent.....4

Don't know.....98

31g. In your opinion, was alcohol consumption by another person responsible for ----- death?

Yes.....1

Explain _____

No.....2

Don't know.....98

IF THERE WERE NO OTHER PERSONS WITH THE VICTIM AT THE TIME OF THE INJURY, GO TO QUESTION 34g, p. 11.

31g. To your knowledge, did any of the persons present with the victim drink alcohol around the time of the injury?

Yes.....1

No.....2

Don't know.....98

32g. To your knowledge, did any of the persons present with the victim consume recreational drugs around the time of the injury?

Yes.....1

No.....2

Don't know.....98

IF THE INTERVIEWEE WAS NOT A WITNESS OF THE EVENT:

34g. Could you think of one or more persons who witnessed the injury who would be willing to participate in a similar interview so that we could get more information about the details of the event.

Depending on your preference, either you or us will contact this person.

Interviewee contacts the witness.....1

Interviewer contacts the witness.....2

No witness known.....3

If interviewer contacts the witness:

Could we say to the person who witnessed the event that you provided his/her name?

Yes.....1

No, keep my name confidential.....2

Name: _____ Address or phone no: _____

IF THE INTERVIEWEE DID NOT KNOW THE VICTIM CLOSELY:

35g. Could you think of one person who knew the victim closely (in terms of habits, attitudes, and medical illnesses), and who would be willing to participate to a similar interview so that we could get more information about -----'s lifestyle and medical condition before the injury. Depending on your preference, either you or us could contact this person.

Interviewee contacts the person.....1

Interviewer contacts the person.....2

No other person to contact.....3

If interviewer contacts the person:

Could we say to the person we contact that you provided his/her name?

Yes.....1

No, keep my name confidential.....2

Name: _____ Address or phone no: _____

Cree Injury Questionnaire: Specific for drowning

The second part of this interview contains questions that are specific for the injury that occurred. We will go more into the details concerning the event.

Activity/Equipment:

1d. What was the activity of the victim at the time of the drowning? (Circle 1 or more responses)

Recreation, leisure..(Specify_____)...1

Travelling to/from the bush.....2

Travelling to another boat.....3

Fishing/hunting/trapping.....4

Specify _____

Working on dam/logging etc.....5

Specify _____

Other.....6

Specify _____

Don'tknow.....98

2d. At the time of the drowning, the victim was:

Travelling by boat or canoe.....1 GO TO Q.3d

Travelling by skidoo.....2 GO TO Q.9d, p. 5

Travelling by all-terrain veh.* 3 GO TO Q.7d, p. 4

Swimming.....4 GO TO Q. 11d, p.6

Playing, walking, other activity

near the water.....5

Specify_____ GO TO Q. 9d, p.5

Playing, wading, or other actiivity

in the water.....6

Specify_____ GO TO Q. 9d, p.5

Don't know .....98 GO TO Q.9d, p.5

* All-terrain vehicle=3-wheeler, 4-wheeler: specify type_____

3d. What type of boat was the victim travelling in at the time of the drowning?

Large square-stern canoe with outboard motor.....1

Other outboard motor boat.....2

Specify lgth & type _____

Small canoe with paddles.....3

Specify lgth & type _____

Small canoe with motor.....4

Specify lgth & type _____

Another type of boat.....5

Specify lgth & type _____

Don'tknow.....98

4d. Circumstances of the boating drowning included (choose one or more):

Swamped or capsized by high waves.....1

Capsized by standing up in boat.....2

Specify _____

Fell overboard or capsized while urinating.....3

Specify _____

Capsized by other activity of occupants.....4

Specify _____

Fell overboard.....5

Boat overloaded.....6

Give details: no. occupants, load _____

Don't know.....98

5d. Was the victim wearing a lifejacket at the time of the drowning?

Yes.....1

Specify type _____

Lifejacket in boat but not worn.....2

No.....3

Don't know.....98

6d. How often did the victim usually wear a lifejacket prior to the drowning? (**Question 27b. Individual**)

Always.....1

Most of the time.....2

Rarely.....3

Never.....4

Don't know.....98

7d. Was cold (hypothermia) an important factor in the death?

Yes.....1

Explain _____

No.....2

Don'tknow.....98

8d. Was the victim wearing a special hypothermia protection/flotation jacket or suit to protect against cold water at the time of the drowning?

Yes.....1

Specify make & model _____

No.....2

Don'tknow.....98

9d. How often did the victim usually wear a hypothermia protection jacket or suit prior to the drowning?

Always.....1

Most of the time.....2

Almost never.....3

Never.....4

Don't know.....98

10d. What type of clothing was the victim wearing at the time of the drowning ? (Circle all that apply)

Hip-boots.....1

Rubberboots.....2

Coat.....3

Sweater.....4

Raingear.....5

Synthetic long underwear.....6

Other...(Specify_____).....7

Don'tknow.....98

Environmental factors:

11d. At what type of location did the drowning occur?

Natural body of water

River.....1

Bay.....2

Lake or pond.....3

Other..Specify_____.....4

Man-made body of water

Reservoir above dam.....5

River below dam.....6

Other..Specify_____.....7

Don'tknow.....98

12d. Was there fast-flowing current involved in the drowning?

Yes.....1

Explain _____

No.....2

Don'tknow.....98

13d. Was there a sudden and unexpected change in the water level or speed at the time of the drowning?

Yes.....1

Explain _____

No.....2 GO TO Q.15d, p.7

Don't know.....98 GO TO Q.15d, p.7

14d. Was this sudden change due to:

Natural phenomena, eg. snow thaw, heavy rainfall.....1

Specify _____

Man-made phenomena eg. reservoir release for power generation.....2

Specify _____

Other.....3

Specify _____

Don't know.....98

15d. How far away from shore did the drowning occur?

Less than 1 boat length away (<16 feet).....1

Between 1 and 3 boat length (16-48 feet).....2

More than 3, ≤ 10 boat length (49-160 ft).....3

More than 10 boat length (more than 160 ft).....4

Don't know.....98

16d. How deep was the water where the drowning occurred?

5 or more feet deep (over the head of adults)....1

Specify _____

Less than 5 feet deep (less than adults'height)..2

Specify _____

Don't know.....98

17d. At what time of the day did the drowning occur?

At night (after dark)(time_____).....1

At dusk.....2

At dawn.....3

During the daytime.....4

Don't know.....98

18d. Did the victim normally travel over water after dark?

Often.....1

Occasionally.....2

Rarely.....3

Never.....4

Don't know.....98

19d. What was the weather at the time of the drowning?

Sunshine, nice weather.....1

Light rain.....2

Heavy rain.....3

Snow, sleet, hail.....4

Fog.....5

Don't know.....98

20d. What were the wind conditions at the time of the drowning?

Calm, no wind.....1
Slight wind.....2
High winds difficult to stand against..3
Don't know.....98

21d. What were the wave conditions at the time of the drowning?

Calm, no waves.....1
Small waves.....2
Medium waves, as high as edge of boat..3
Large waves, higher than edge of boat..4
Don't know.....98

22d. What was the air temperature at the time of the drowning?

Warm, shirt sleeves weather.....1
Cool, sweater required.....2
Cold, coat required.....3
Below freezing (cold enough for ice to form).....4
Don't know.....98

23d. Were the surroundings familiar to the victim or the driver of the boat/vehicle involved in the drowning?

Yes.....1

No.....2

Explain _____

Don't know.....98

Personal factors:

24d. Did the victim know how to swim? **(Question 28 Individual)**

Yes.....1

No.....2 GO TO Q. 27d, p. 10

Don't know.....98 GO TO Q. 27d, p. 10

25d. How would you qualify the victim's swimming abilities?

Good swimmer (could swim continuously for 30 min).....1

Able to swim a little.....2

None swimmer.....3

Don't know.....98

26d. How did the victim learn how to swim?

Self-taught.....1

Taught by family or friends.....2

Formal Red Cross lessons 3

Other.....4

Specify _____

Don't know.....98

27d. At the time of the drowning, the victim was:

The driver of the boat/vehicle involved.....1

A passenger of the boat/vehicle involved.....2

Not pertinent, no vehicle involved.....3

Don't know.....98

28d. At the time of the drowning, was the victim: Check the appropriate

Alone.....1

With one or more adults..(No._____).....2

With one or more children < 18 yrs (No.__).....3

Other.....4

Specify _____

Don't know.....98

29d. At the time of the drowning, were there one or more other boats/vehicles accompanying the boat/vehicle of the victim?

Yes.....1

Specify _____

No.....2

Don't know.....98

30d. How often did the victim usually drive or ride in the type of boat/vehicle involved in the drowning? (depending on the vehicle, **Questions 24, 25c., 26c., 27c. Individual**)

At least once a day.....1

At least once a week.....2

At least once a month.....3

Less than once a month.....4

Don't know.....98

31d. Was the driver of the boat/vehicle ever involved in other similar types of incidents in the past?

Yes.....1

Specify _____

No.....2

Don't know.....98

32d. Had the driver of the boat/vehicle or the victim ever received a course in water safety/drowning prevention?

Yes.....1

Explain _____

No.....2

Don't know.....98

Rescue:

33d. The body was recovered by:

Companions.....1

Police.....2

Family.....3

Other.....4

Specify _____

Don't know.....98

34d. About how long after the drowning was the body of the victim recovered?

Minutes..(Specify no._____).....1

Hours..(Specify_____).....2

Days..(Specify_____).....3

Weeks..(Specify_____).....4

Months..(Specify_____).....5

Never.....6

Other..(Specify_____).....7

Don't know.....98

35d. Did anyone try to rescue the victim at the time he/she was drowning?

Yes..Details_____.....1

No..Why not_____.....2

Don't know.....98

36d. Did anyone in the boat/vehicle know mouth to mouth breathing or CPR at the time of the drowning?

Yes.....1

Details _____

No.....2 GO TO Q. 38d, p.15

Not pertinent.....3 GO TO Q. 38d, p.15

Don't know.....98 GO TO Q. 38d, p.15

37d. Did anyone in the vehicle try mouth to mouth breathing or CPR on the victim at the time of the drowning?

Yes.....1

Specify _____

No.....2

Don't know.....98

38d. When involved in water activities, did the victim ever go alone?

Never.....1

Almost never.....2

Most of the time.....3

Always.....4

Don't know.....5

39d. Was the boat/vehicle involved in the drowning equipped with safety and rescue materials such as (Circle any equipment present):

Rescue ropes.....1

Dry clothes for each passenger in waterproofbag.....2

Life jackets for each passenger.....3

Other flotation devices..Specify_____.....4

Hypothermia jackets or suits..Specify_____..5

Reserve food.....6

Portable stove.....7

Communication equipment (radio, CB) Specify_____.....8

Flashlight.....9

Other..Specify_____.....10

Don't know.....98

40d. At the time of the drowning, was the boat/vehicle being used for a purpose it was not designed for (eg. carrying heavy loads, towing, etc.)?

Yes.....1

Specify _____

No.....2

Don't know.....98

IF THE DROWNING WAS NOT SNOWMOBILE OR ATV RELATED, GO TO THE LAST SECTION OF THE QUESTIONNAIRE.

41d. For snowmobile or all-terrain vehicle associated drownings, the drowning resulted from: Check all that apply

Travelling over thin ice, ice broke.....1

Travelling after dark, didn't see hole.....2

Travelling at high speed, didn't see hole.....3

Other.....4

Specify _____

Don't know.....98

IF THE DROWNING DID NOT RESULT FROM A FALL THROUGH THE ICE, GO TO THE LAST SECTION OF THE QUESTIONNAIRE.

42d. If the drowning resulted from a fall through ice, was the victim wearing a snowmobile suit?

Yes.....1

No.....2 GO TO Q. 44d, p.18

Don't know.....98 GO TO Q. 44d, p.18

43d. Was the snowmobile suit designed to keep the victim afloat and protect against hypothermia in the water?

Yes.....1

Specify make & model _____

No.....2

Don't know.....98

44d. What was the main factor(s) accounting for the person going through the ice? (Circle one or more)

Excessive speed.....1

Lack of knowledge of ice conditions.....2

Recklessness.....3

Trying to impress others.....4

Travelling after dark.....5

Changes in ice conditions due to dam construction or water releases..Explain_____.....6

Alcohol consumption by victim.....7

Specify _____

Alcohol consumption by driver.....8

Specify _____

Recreational drugs.....9

Specify _____

Other.....10

Specify _____

Don't know.....98

Cree Injury Questionnaire: Specific to Motor Vehicle Accidents

The second part of this interview contains questions that are specific for the injury that occurred. We will go more into the details concerning the event.

Equipment factors:

1t. At the time of the crash, the victim was:

The driver.....1
A front seat passenger.....2
A back seat passenger.....3
Passenger in the open back of a truck.....4
A pedestrian.....5 GO TO Q.10t, p.7
A bicyclist.....6
Other 7
Specify _____
Don't know.....98

2t. What type of vehicle was involved in the crash? Check all vehicles involved in the crash. Follow the skip pattern for the vehicle that was being used by the victim.

Car/truck/van .....1 GO TO Q. 3t

Specify _____

Motorcycle.....2 GO TO Q. 4t, p.4

Three-wheel all terrain vehicle.3 GO TO Q. 4t, p.4

Four-wheel all terrain vehicle..4 GO TO Q. 4t, p.4

Bicycle.....5 GO TO Q. 4t, p.4

Snowmobile.....6 GO TO Q. 5t, p.5

Other 7

Specify _____

3t. Safety equipment use within the vehicle:

Automobiles/ trucks/ vans:

a) Was the victim wearing a seatbelt at the time of the crash?

Yes.....1

No.....2

Don't know.....98

b) How often did the victim usually use a seatbelt?

(Question 23.b. Individual)

Always.....1 GO TO 3t.(d), p.3

Most of the time.....2

Rarely.....3

Never.....4 GO TO 3t.(d), p.3

Don't know.....98

c) When using the seatbelt, was it: Check the appropriate

In the village only.....1

On the highway only.....2

Both in the village and highway...3

Other.....4

Specify _____

Don't know.....98

IF THE VICTIM WAS OLDER THAN 4 YEARS OLD, GO TO QUESTION 6t

d) If the victim was younger than 4 years old, was a child's car seat being used?

Yes.....1

No.....2

Don't know.....98

GO TO QUESTION 6t

4t. Use of safety equipment with the vehicle:

All terrain vehicles:

a) Was the victim wearing a helmet at the time of the crash?

Yes.....1

No.....2

Don't know.....98

b) When riding an ATV, did the victim usually wear a helmet? (**Question 25.b. Individual**)

Always.....1

Most of the time.....2

Rarely.....3

Never.....4

Don't know.....98

No response.....99

c) In general, when travelling outside the village, was another ATV accompanying the driver?

Always.....1

Most of the time.....2

Rarely.....3

Never.....4

Don't know.....98

GO TO QUESTION 6t

5t. Use of safety equipment with the vehicle:

Snowmobiles:

a) At the time of the crash, was the victim wearing a helmet?

Yes.....1

No.....2

Don't know.....98

b) When riding a snowmobile, did the victim usually wear a helmet? (**Question 26.b. Individual**)

Always.....1

Most of the time.....2

Rarely.....3

Never.....4

Don't know.....98

No response.....99

c) In general, when travelling outside the village, was there another snowmobile accompanying the driver? (**Question 26e. Individual**)

Always.....1

Most of the time.....2

Rarely.....3

Never.....4

Don't know.....98

No response.....99

6t. What was the cause of the crash? Check any of the appropriate

Collision with another vehicle.....1

Specify _____

Collision with a fixed object.....2

Specify _____

Falling off while the vehicle was moving....3

Rolling over of the vehicle.....4

Mechanical/brake failure (poor maintenance).5

Specify _____

Drove off the road.....6

Other 7

Specify _____

Don't know.....98

7t. Did the crash occur while racing?

Yes.....1

No.....2

Don't know.....98

8t. How many passengers were there on the vehicle?

_____ passengers

Don't know.....98

9t. Do you think that the vehicle was overloaded?

Yes.....1

Specify _____

No.....2

Don't know.....98

Environmental factors:

10t. The crash occurred while:

Travelling from another village to home.....1

Specify _____

Travelling from home to another village.....2

Travelling in another village / town.....3

Travelling within own village.....4

Crossing a road.....5

Crossing a body of water 6

Specify _____

Don't know.....98

11t. At what time of the day did the crash occur?

At night.....1

Specify time _____

At dusk.....2

At dawn.....3

During the daytime.....4

Don't know.....98

12t. What was the weather like on the day of the accident?

Sunshine, nice weather.....1

Blizzard, snowstorm.....2

Rain.....3

Fog.....4

Don't know.....98

13t. Were any of the following road hazards present at the time of the event? Check any of the appropriate

Slippery road with ice or rain.....1

Poor visibility from dust.....2

Road design hazards (eg. sharp turns).....3

Specify _____

Other.....4

Specify _____

Don't know.....98

Personal factors:

IF THE DRIVER OF THE VEHICLE WAS THE VICTIM, GO TO QUESTION 18t, p. 10. IF THE VICTIM WAS A PEDESTRIAN OR A BICYCLIST, THIS SECTION PERTAINS TO THE DRIVER OF THE VEHICLE WHO WAS INVOLVED IN THE CRASH

14t. What was the age of the driver?

_____ years

Don't know.....98

15t. Do you think that the driver drank alcohol around the time of the crash?

Yes.....1

No.....2 GO TO Q. 18t, p. 10

Don't know.....98

16t. Do you think that this drinking impaired the driver's alertness at the time of the injury?

Yes.....1

No.....2

Don't know.....98

17t. To your knowledge, had the driver ever been warned for drunk driving? (**Question 112d. Individual**)

Yes.....1

No.....2

Don't know.....98

No response.....99

18t. Approximately, how many years of driving experience did the driver have?

_____ years

Don't know.....98

19t. How often did the victim travel in the type of vehicle involved in the crash? (**Question 24 Individual for automobiles, Question25c Individual for ATV, Question 26c Individual for snowmobiles**)

At least once a day.....1

At least once a week.....2

At least once a month.....3

Less than once a month.....4

Don't know.....98

No response.....99

20t. Was the driver ever involved in previous accidents either with the same type of vehicle or with another type of motor vehicle?

Yes.....1

No.....2 GO TO Q. 22t

Don't know.....98

No response.....99

21t. If so, did previous accident(s) cause:

No injuries.....1

Minor injuries, requiring no hospitalization.....2

Major injuries, requiring hospitalization.....3

Fatal events.....4

Don't know.....98

22t. How did the driver learn how to drive?

Self taught.....1

Taught by family.....2

Formal driving lessons.....3

Don't know.....98

Cree Injury Questionnaire: Specific to fire

The second part of this interview contains questions that are specific for the injury that occurred. We will go more into the details concerning the event.

Equipment factors:

1b. Did the fire happen:

In a building, in a village.....1

In the bush 2

Forest fire.....3

Other 4

Specify _____

2b. If it was not a forest fire, what type of building was involved?

Modern, permanent building.....1

Log house.....2

Cabin in the bush.....3

Tent.....4

Other 5

Specify _____

3b. What was the primary source of the flame that caused the fire?

A cigarette, a cigar, a pipe.....1
Overheated wood stove.....2
A kerosene heater 3
Electric heater or stove.....4
Gas stove.....5
Fat catching fire on stove.....6
Playing with matches.....7
Starting a fire using kerosene, gasoline or other flammable liquid.....8
Other 9
Specify _____
Don't know.....98

4b. Did the fire start in a chimney or woodstove pipe?

Yes.....1
No.....2 GO TO Q. 6b, p.3
Don't know.....98 GO TO Q. 6b, p.3

5b. If the chimney fire occurred in a permanent house, was regular chimney sweeping taking place?

Yes.....1
No.....2
Don't know.....98

6b. Was a smoke detector installed in the house?

Yes.....1

No..GO TO QUESTION 8b.....2

Don't know.....98

7b. Was the smoke detector working at the time of the fire?

Yes.....1

No.....2

Don't know.....98

Personal factors:

8p. Excluding -----, how many persons were victims in this fire?

_____ persons

Don't know.....98

IF THE FIRE DID NOT ORIGINATE FROM SMOKING, GO TO THE LAST SECTION OF THIS QUESTIONNAIRE

9b. Did the fire originate from smoking:

By the victim.....1

By somebody else.....2 GO TO Q. 13b, p.4

Specify _____

Don't know.....98 GO TO Q. 10b, p.4

10b. Did the victim smoke everyday? (**Question 5 Individual**)

Yes.....1

No.....2 GO TO Q.12b

Don't know.....98

11b. How many cigarettes did he/she smoke each day? (**Question 6 Individual**)

------cigarettes

Don't know.....98

12b. Did the victim ever smoke in bed?

Yes.....1

No.....2

Don't know.....98

GO TO LAST SECTION OF THE QUESTIONNAIRE.

13b. Did the companion smoke every day ?

Yes.....1

No.....2

Don't know.....98

Cree Injury Questionnaire: Specific for Suicides

The second part of this interview contains questions that are specific for the injury that occurred. We will go more into the details concerning the event.

1s. Did the victim experience serious personal problems in the year prior to the event?

Yes.....1

No.....2 GO TO Q. 3s, p.3

Don't know.....98

2s. Which event(s) produced the stressful situation? Check all appropriate answers.

Moving away from family (**Question 36a Individual**)...1

Having problems at school.....2

Losing one's job (**Question 36b Individual**).....3

Experiencing rejection or disapproval from the community (**Question 36c Individual**).....4

Having a serious illness diagnosed (**Question 36d Ind**)5

Having someone in the household diagnosed with a serious illness (**Question 36e Individual**).....6

Experiencing the death of one's husband, wife or partner (**Question 36f Individual**).....7

Experiencing the death of someone very close other than one's husband, wife or partner (**Question 36g Individual**).....8

Experiencing a new challenge (eg. job promotion, newjob).....9

Other.....10

Specify _____

3s. In your opinion, the suicide was the result of: (Check all appropriate answers)

A difficult home situation.....1

Specify _____

Temporary serious personal problems.....2

Specify _____

Suicide of another person.....3

Specify _____

Chronic mental illness (depression, other)...4

Specify _____

Chronicalcoholism.....5

Other.....6

Specify _____

4s. What method did ----- use to take his\her life away?

Firearm.....1 GO TO Q. 5s, p.4

Drowning.....2 GO TO Q. 10s, p.5

Hanging.....3 GO TO Q. 10s, p.5

Carbon monoxide poisoning(exhaust)..4 GO TO Q10s

Fall .....5 GO TO Q. 10s, p.5

Overdose of medication.....6 GO TO Q. 10s, p.5

Other 7

Specify _____

5s. What kind of firearm caused the injury?

Hunting rifle.....1

Shotgun..... 2

Handgun.....3

Other 4

Specify _____

Don't know.....98

6s. Was the weapon involved in the event one of the firearms stored in the house, garage or car where the event occurred?

Yes.....1

No.....2

Don't know.....98

7s. Was the firearm that caused the injury kept in a locked place?

Yes.....1

No.....2

Don't know.....98

8s. Was this firearm stored loaded?

Yes.....1

No.....2

Don't know.....98

9s. Were there bullets stored near this firearm?

Yes.....1

Specify _____

No.....2

Don't know.....98

Personal factors:

10s. Did the victim ever make prior attempts to take his/her life? (**Question 100 Individual**)

Yes.....1

No.....2 GO TO Q. 12s

Don't know.....98

No response.....99

11. Approximately, how long ago was that:

_____ months.

12s. Did ----- seek help from an outside professional or non professional resource prior to the event?

Yes.....1

No.....2

Don't know.....98

13s. Who was involved in helping?

A nurse.....1

A doctor.....2

A social or community worker or other similar counsellor.....3

A friend or family 4

An elder.....5

A minister.....6

Don't know.....98

14s. Did the family of ----- receive any help to cope with this loss?

Yes.....1

No.....2

Don't know.....98

Cree Injury Questionnaire: firearm-related injuries

The second part of this interview contains questions that are specific for the injury that occurred. We will go more into the details concerning the event.

Equipment and environment factors:

1f. What kind of firearm caused the injury?

Hunting gun.....1
Shotgun.....2
Handgun.....3
Other 4
Specify _____
Don't know.....98

2f. What activity resulted in the injury?

Intentional shooting of person.....1
Hunting, shot self.....2
Hunting, shot companion.....3
Shooting games in the bush, shot self.....4
Shooting games in the bush, shot companion.....5
Shooting games in the village, shot self.....6
Shooting games in the village, shot companion.....7
Cleaning firearm, shot self.....8
Cleaning firearm, shot companion.....9
Transporting firearm, shot self.....10
Transporting firearm, shot companion.....11
Other 12
Specify _____

3f. Was the weapon involved in the event one of the firearms stored in the house, garage or car where the event occurred?

Yes.....1

No.....2

Don't know.....98

4f. Was the firearm involved in the event kept in a locked place?

Yes.....1

No.....2

Don't know.....98

5f. Was the firearm involved in the event stored loaded?

Yes.....1

No.....2

Don't know.....98

6f. Were there bullets stored near the firearm involved in the event?

Yes.....1

Specify where _____

No.....2

Don't know.....98

7f. Did the owner of the gun involved in the event receive formal instruction about the safe use of firearms?

Yes.....1

No.....2

Don't know.....98

Not pertinent.....99

Personal factors:

IF VICTIM SHOT SELF IN THE INJURY, GO TO THE LAST SECTION OF THE QUESTIONNAIRE.

8f. Do you know of any physical or verbal violence in the relationship between the persons involved in the event?

Yes.....1

No.....2 GO TO LAST SECTION

Don't know.....98 GO TO LAST SECTION

9f. How long had the problem of violence within this relationship been present?

Less than 1 month.....1

More than 1 month, < 6 months.....2

6 mo. to 1 year.....3

More than 1 year.....4

Don't know.....98

10f. Was there any outside professional or non professional resources involved to help with this violence problem?

Yes.....1

No.....2 GO TO Q. 12f

Don't know.....98 GO TO Q. 12f

11f. Who was involved in helping with this problem?

(**Question 14 and 15c Household**)

A nurse.....1

A doctor.....2

A social or community worker or similar counsellor...3

A friend or family 4

An elder.....5

A minister.....6

Don't know.....98

No response.....99

12f. Did the person who killed ----- make violent threats or attempts prior to the event?

Yes.....1

No.....2 GO TO Q. 14f, p.5

Don't know.....98 GO TO Q. 14f, p.5

13f. How often did the person who killed ----- make violent threats or attempts?

Often.....1
Sometimes.....2
Almost never.....3
Never.....4
Don't know.....98

14f. To your knowledge, was the person who killed ----- under the influence of alcohol at the time of the injury?

Yes.....1
No.....2
Don't know.....98

15f. To your knowledge, was the person who killed ----- under the influence of drugs at the time of the injury?

Yes.....1
No.....2
Don't know.....98

16f. To your knowledge, did the person who killed ----- ever have long periods when he/she had visions or heard voices that other people could not see or hear?

Yes.....1
No.....2
Don't know.....98

Cree Injury Questionnaire Part III:

Medical history and behaviourial characteristics of the victim

Now, we begin the very last part of this interview. It contains questions about the medical history and the habits of -----. It will give us a better knowledge of who ----- was as a person.

A. Medical history:

1p. Did ----- have a medical condition that restricted his/her movements (permanent disability)?

Yes 1

Specify _____

No.....2

Don't know.....98

2p. Because of any sickness or health problem did ----- need the help of another person with his (her) personal care needs such as eating, bathing, dressing or getting about around the house, which a person of his (her) age would normally do for himself (herself)? (**Question 37 and Question 46 Household**)

Yes.....1

No.....2

Don't know.....98

3p. Did ----- suffer from : (**Question 58 Individual, Question 47 Household**) Check any of the appropriate answers

Epilepsy or seizures.....1

Diabetes requiring daily insulin injections.....2

Other illnesses causing sudden loss of consciousness 3

Specify _____

Other serious illnesses.....4

Specify _____

Don't know.....98

No response.....99

4p. In the month prior to the event, did the victim ever express feelings of being hopeless about the future? **(Question 84 Individual)**

Never.....1

Once in a while.....2

Fairly often.....3

Very often.....4

Don't know.....98

No response.....99

5p. In the month prior to the event, did the victim cry easily? **(Question 92 Individual)**

Never.....1

Once in a while.....2

Fairly often.....3

Very often.....4

Don't know.....98

No response.....99

6p. Did ----- ever have long periods (6 months or more) when he/she had visions, heard voices or was afraid without obvious reasons? **(Question 47 bb Individual)**

Yes.....1

No.....2

Don't know.....98

7p. In the month prior to the event, did ----- believe that his/her mind was affected by a curse? **(Question 47 cc Individual)**

Yes.....1

No.....2

Don't know.....98

8p. Did ----- suffer from a condition impairing his/her knowing of what was happening (level of consciousness) eg. dementia (confusion associated with old age), mental retardation, mental illness, other?

Yes 1

Specify _____

No.....2

Don't know.....98

B. Habits in general:

9p. Did ----- consume alcoholic beverages during the year preceding the accident? (**Question 103 Individual**)

Yes.....1

No.....2 GO TO Q. 15p, p.6

Don't know.....98 GO TO Q. 15p, p.6

No response.....99 GO TO Q. 15p, p.6

10p. About how often did ----- usually have an alcoholic drink? (**Question 104 Individual**)

Every day.....1

1 to 6 times a week.....2

1 to 3 times a month.....3

Less than once a month.....4

Don't know.....98

No response.....99

11p. To your knowledge, on the days that ----- drank, how many drinks did he/she have per day, on average? **(Question 105 Individual)**

The word "drinks" means:

- One bottle of beer or glass of draft or
- One small glass of wine or
- One shot or mixed drink with hard liquor

Number of drinks ..... ____

Don't know.....98

No response.....99

IF ANSWER TO QUESTION 11p IS 5 OR MORE DRINKS, GO TO QUESTION 14p ON PAGE 6 OF THIS SECTION

12p. During the last year of life, did ----- ever have 5 or more drinks at one time?

Yes.....1

No.....2 GO TO Q. 14p, p. 6

13p. During the last year of life, how often did ----- have at least 5 or more drinks at one time?

Every day.....1

3 - 6 times a week.....2

1 - 2 times a week.....3

1 - 3 times a month.....4

Less than once a month.....5

14p. In your opinion, did drinking ever interfere with -----'s work or normal activities in the year prior to death?

Yes.....1

Specify _____

No.....2

Don't know.....98

15p. Did ----- consume recreational drugs in the year prior to the accident? (**Question 115 Individual**)

Yes.....1

No.....2 GO TO Q. 17p, p.7

Don't know.....98

No response.....99

16p. In the year prior to the accident, would you say that ----- took the drugs: (**Question 115 e.Individual**)

More than once a week.....1

Once a week.....2

From one to three times a month....3

Less than once a month.....4

Don't know.....98

No response.....99

17p. Did ----- like to try adventurous, thrilling or dangerous activities such as driving a skidoo on ice or going out in a boat in bad weather etc..?

Never.....1

Almost never.....2

Sometimes.....3

Specify _____

Often.....4

Specify _____

Always or almost always.....5

Don't know.....98

IF THE VICTIM DID NOT DRIVE A MOTOR VEHICLE, END THE INTERVIEW, GO TO PAGE 8 AND THANK THE PERSON INTERVIEWED.

18p. How often did ----- like to drive very fast for the thrill of it?

Never.....1

Almost never.....2

Sometimes.....3

Specify _____

Often.....4

Specify _____

Always or almost always.....5

Don't know.....98

19p. To your knowledge, has ----- ever been warned for drunk driving? **(Question 112d. Individual)**

Yes.....1

No.....2

Don't know.....98

No response.....99

END OF INTERVIEW.

We thank you very much for the time and consideration you have provided for this study. Your answers will remain confidential. Names will not be included in the analysis of this information. Your participation will contribute to the knowledge needed in order to design effective prevention programs against deaths from injuries in the Community. The results of this study will be made public so that changes can be made to reduce the number of such tragedies.