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MOTOR VEHICLE CRASHES AND OCCUPANT RESTRAINT USE AMONG ABORIGINAL POPULATIONS IN BC

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The British Columbia Injury Research and Prevention Unit (BCIRPU) was established by the Ministry of Health and the Minister's Injury Prevention Advisory Committee in August 1997. BCIRPU is housed within the Centre for Community Child Health Research (CCCHR) and supported by the Child and Family Research Institute. BCIRPU's vision is "to be a leader in the production and transfer of injury prevention knowledge and the integration of evidence-based injury prevention practices into the daily lives of those at risk, those who care for them, and those with a mandate for public health and safety in British Columbia".

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Introduction

In Canada, injuries represent a serious public health problem in terms of costs and potential years of life lost (PYLL). (1) Injury is one of the leading causes of death among Aboriginal populations. The rate of injury death among Aboriginal populations is 3 to 6 times higher than the Canadian average. For the years 1992 to 2002, 25 percent of deaths among Aboriginal people in BC were attributable to injuries, compared to 7.1 percent of injury deaths among other residents of BC. (2) Among all injuries in BC, motor vehicle related injury is a leading cause of death and disability among Aboriginal children and adults, and bears a considerable human cost, as well as an enormous burden, to society.

Canada's Road Safety Vision

Canada's Road Safety Vision is a national campaign aimed at making Canada's roads the safest in the world. It was officially launched in 1996 and the successor plan, Road Safety Vision 2010, was renewed in 2000.

The objective of Road Safety Vision 2010 is to decrease the average number of road users killed and seriously injured by 40 percent by 2010. Increasing seat belt use and child occupant protection are key initiatives to help achieve that target. Canada's Road Safety Vision 2010 recognizes the contribution of seat belt use and child safety seats in the reduction of traffic fatalities. (3)

Road Safety Vision is supported by all levels of government, as well as by instrumental public and private sector stakeholders. The plan makes use of a broad range of initiatives that focus on road users, roadways and motor vehicles:

- Raise public awareness of road safety issues
- Improve communication, cooperation and collaboration among road safety agencies
- Toughen enforcement measures
- Improve national road safety data collection and quality.

Motor vehicle restraints

“Restraints in vehicles (e.g., seat belts and safety seats) are designed to limit and control the body's rate of deceleration during a crash, thus reducing the forces acting on the body's surface to minimize the differential motion between the skeleton and the internal organs”. (4) Table 1 presents a list of restraint types and guidelines for their effective use.

Table 1 Restraint types and user guidelines

Age	Type of seat	Guideline
Infants	Infant-only rear facing convertible seat	All infants should always ride rear-facing until they are 1 year of age and weigh at least 20-22 pounds. There are some infant seats used for special needs purposes which are designed to allow the infant to lie flat.
Toddlers Preschoolers	Convertible, combination-forward facing seat	Children 1 year of age and at least 20 pounds can ride forward-facing. It is best to ride rear-facing as long as possible. Models with higher weight limits are ideal for children over 40 pounds who are under ages 3-4 years, or not ready to sit properly in a booster seat with a lap/shoulder belt.
School-aged children	Booster seat	Booster seats are for older children who have outgrown their forward-facing car safety seats. Children should stay in a booster seat until the adult seat belts fit correctly (usually when a child reaches about 4' 9" in height and is between 8 and 12 years of age and up to 80 pounds or upper weight limit listed on seat).
Older children	Seat belts	Children who have outgrown their booster seats should ride in a lap and shoulder belt at least until 12 years of age.
Adults	"Seat belt assembly"	Seat belt assembly refers to a device or assembly suitably fastened to the motor vehicle composed of straps, webbing or similar material that restrains the movement of a person in order to prevent or mitigate injury to the person. Seat belt assembly includes a pelvic restraint, an upper torso restraint, or both. Legislation around the use of seat belts varies among different provinces. However, the use of seatbelts by drivers, front seat occupants and back seat occupants is strongly encouraged, particularly on highways. For legislative details refer to Appendix 1.

Seat belts

Seat belts have been clearly shown to reduce overall morbidity and mortality in automobile crashes. (4-10) In a US study, it was estimated that over \$26 billion could be saved each year if seat belt use was a universal mandate. (7, 8)

Wearing a shoulder and lap restraint significantly reduces the risk of severe injury and death for drivers, front seat passengers, and rear seat passengers (5), particularly for

children. (5, 6) According to the National Highway Traffic Safety Administration (NHTSA), shoulder and lap belt use in automobiles reduces the risk of death by 45 percent and the risk of severe injury by 50 percent (11), while their use in light trucks lowers the risk of death by 60 percent and severe injury by 65 percent .(7)

Canada has one of the highest rates of seat belt use in the world. In Canada, 90.5% ($\pm 0.2\%$) of occupants of light-duty vehicles (e.g., passenger cars, pickup trucks, minivans and sport utility vehicles) use restraints. In urban communities, an estimated 91.1% ($\pm 0.2\%$) of all occupants, while an estimated 86.9% ($\pm 0.7\%$) of all occupants of light-duty vehicles in rural communities use restraints. (12).

Child restraint seats

When correctly installed and used, child restraint seats (CRS) have been shown to be effective in reducing severe life threatening injuries by as much as 71 percent. (12-14) The NHTSA and the American Academy of Pediatrics (AAP) recommend the use of appropriate child restraint seats (CRS) for children to reduce injury risk. (11, 16)

Current seatbelt legislation in BC

In BC, active use of seatbelts is compulsory for any motorized vehicles, except buses. All passengers and drivers are required to be contained in a seat and properly wearing the complete seat belt assembly (as required by the Traffic Safety Act –Vehicle Equipment Regulation Section 78 (2)(a)(b). Under section 220(4) of the Motor Vehicle Act (MVA), both drivers and passengers can be charged with a fine of \$167 for not wearing a seat belt. In addition, under section 39.02(d) of the MVA, drivers carrying more passengers than the given number seats, and without a seat belt, can be fined \$311. Under section 39.021 (a)-(c) of the MVA, registered car owners can be charged \$589 for allowing too many passengers in the vehicle, or for a car to be operated with inoperative seatbelts. Details of restraint use legislation and fines in other provinces across Canada are presented in Appendix 1.

Risk of morbidity and mortality among non-restraint users in BC

While seat belts may be installed in vehicles, protection in a crash only occurs when drivers and passengers actively use them. While population seat belt usage rates have risen dramatically with the passage of mandatory seat belt laws in 1977, the rate of seat belt use in British Columbia has been reported to be lower than other provinces. According to Transport Canada's 2001 National Survey, the seat belt wearing rates for all occupants of light-duty vehicles exceeded 90 percent in five Canadian provinces while the seat belt wearing rates in BC and the three territories were reported to be below 85 percent. (3)

According to the Insurance Corporation of British Columbia (ICBC) data, in 2003, of all victims killed in passenger cars, 41 percent were unrestrained, and, of the victims killed in light trucks, 56.8 percent were unrestrained. (1) Similarly in 2003, 83.6 percent of drivers involved in casualty collisions who did not use restraints were either injured or

killed, while 51.6 percent of those that did use the standard lap and harness restraint system were either injured or killed. Data on occupants ejected from vehicles demonstrate that ejection carries a very high risk of injury or death. Among those drivers who were ejected, or partially ejected, 16.2 percent were killed and another 76.8 percent were injured. Similarly, 12.5 percent of passengers who were ejected or partially ejected were killed and 81.2 percent were injured. (1)

In addition to enhancing awareness of restraint use via educational campaigns, enforcement of legislations plays a vital role in preventing injuries. Information on Provincial/Territorial Motor Vehicle Occupant Restraint Legislation and its associated fines and demerits in all provinces across Canada is available through the Canadian Council of Motor Transport Administrators' *Annual Monitoring Report 2004* (http://www.ccmta.ca/english/committees/rsrp/norp/pdf/norp_report04.pdf). It is interesting to note that Quebec is the only province where seat belt use is mandatory for drivers, front seat and back seat occupants.

Factors that have shown to influence restraint use include 'deviant' behaviors such as drug use and the consumption of alcohol. (17,18) Studies have demonstrated that alcohol-impaired drivers are more likely to be speeding and less likely to be wearing safety restraints in the event of a crash (1, 18), thus highlighting the need for creative and carefully focused interventions which target the high-risk drinking and driving population in BC.

Restraint use among Aboriginal populations

There is a lack of Canadian data on motor vehicle crashes and restraint use among Aboriginal populations. However, there are a few international studies on restraint use among Aboriginal populations which have demonstrated the following findings:

- Failure to wear a seat belt is one of the major risk factors for motor vehicle fatalities among the Australian Aboriginal community. (19)
- American Indian children traveling in motor vehicles are inadequately restrained, thus at an increased risk for injury and/or death from motor vehicle crashes. (20-22)
- Enactment and enforcement of child restraint laws is an effective injury prevention strategy for American Indian children (20, 22), as well as the community at large. (20-23)

Study Purpose

In BC, motor vehicle crash-related fatal injuries have decreased in recent years, however, they still remain a significant health problem, accounting for 19 percent of fatal injuries in 2004. Injuries are the number one cause of death among Aboriginal populations (24), and research has shown that Aboriginal people are over-represented in motor vehicle crashes in Canada. (2, 25) Unfortunately, limited information exists on Aboriginal populations' risk factors for motor vehicle crashes in BC and Canada.

The purpose of this report is to:

1. Estimate prevalence rates of motor vehicle restraint use among BC Aboriginal populations during fatal motor vehicle crashes.
2. Understand factors influencing the use of motor vehicle restraints among BC Aboriginal populations involved in a motor vehicle crash.
3. Provide evidence based practices to reduce motor vehicle occupant risk taking behaviours among Aboriginal people.
4. Provide information on data strengths and gaps related to motor vehicle restraint use among BC Aboriginal populations during fatal motor vehicle crashes.

Methodology

Ethics approval for this report was obtained from the Behavioral Research Ethics Board (BREB) at the University of British Columbia, and BC Children Hospital's Research Ethics Review committee.

The data used for this report was based on BC Coroners Service reports of all sudden, unexpected and unexplained deaths in British Columbia. The Insurance Corporation of British Columbia (ICBC) provided a list of MVC fatalities from 2003-2005 to the Office of the Chief Coroner of BC. The Office of the Chief Coroner gathered a list of MVC fatalities and abstracted available files chronologically by alphabetical names, case numbers and date of death. Abstractors retrieved data under the following categories:

- Judgment of inquiry
- Crash factors
- Medical factors

Records were input into a Microsoft Access database and then exported to SPSS Version 15.0 for analysis. Based on ethnicity, data specific to Aboriginal people was filtered into a new database for analysis, presenting a total of 87 MVC-related fatalities during the period 2003-2005. The study population is referred to as Aboriginals in the following sections.

The dataset included a comprehensive record of all reported fatal MVCs during the period 2003 to 2005 in BC. This data included information about the demographics of the victims involved (age, sex, ethnicity, occupation, marital status), vehicle factors (restraint use, speed), collision factors, circumstances of collision and type of injury sustained.

Descriptive statistics including fatality incidence, frequencies and percentages were analyzed to examine the MVC mortality profile among Aboriginals. Age ranges were established using an interval of five years. Chi-square tests were used to determine the significance of various MVC-related factors. Variables of interest were aggregated into major categories based on their relevance to restraint use and MVCs:

- Age
- Sex

- Occupant type
- Time of day
- Location
- Alcohol use
- Speeding
- Fatigue
- Driving without due care
- Use of drugs

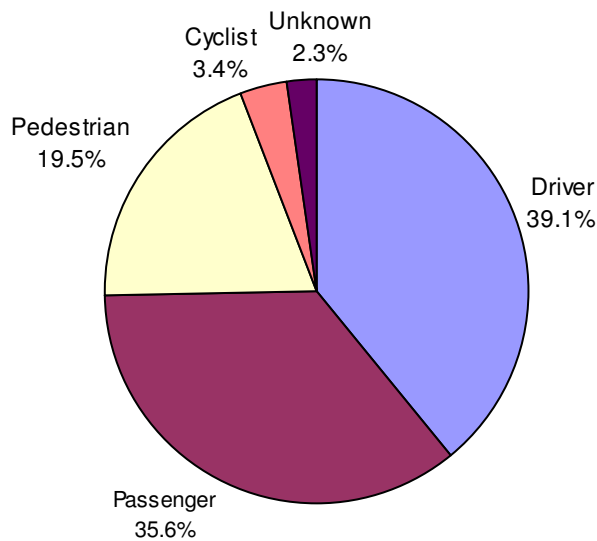
The relationship between potential contributing factors and restraint use was examined using a conditional logistic model on SPSS software. Data related to pedestrians, cyclists and those categorized as 'unknown' or 'others' were excluded from the model. The model incorporated factors influencing only drivers and passengers.

Results

Overview

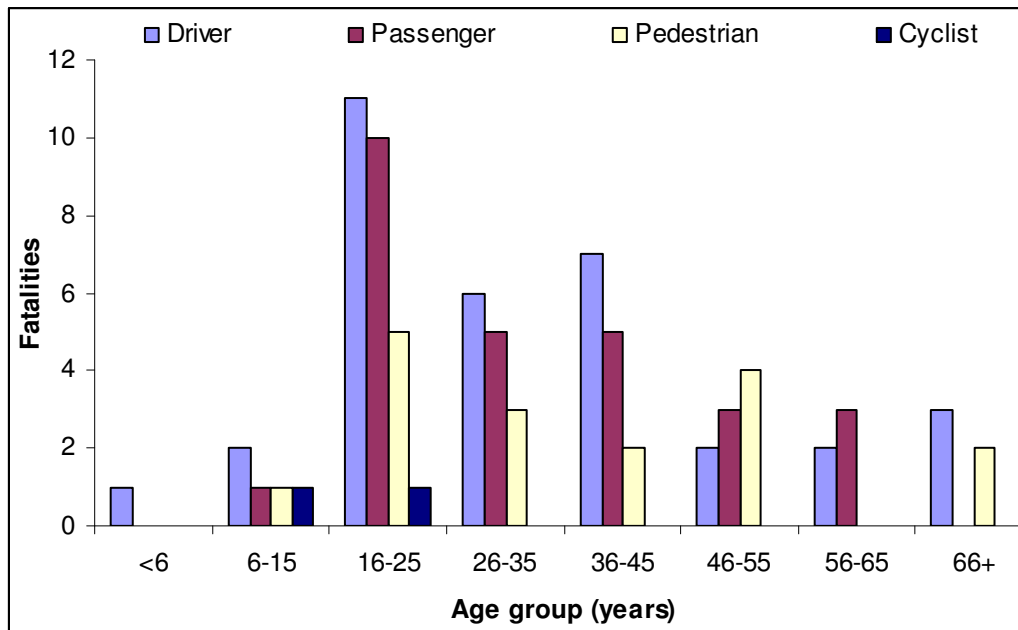
A total of 87 MVC-related fatalities were reported as Aboriginal people during the period 2003-2005. Of those, 43 were males (49.4%) and 34 (39.1%) were drivers, followed by 31 (35.6%) passengers and 17 (19.5%) pedestrians (Figure 1).

Figure 1 MVC-related fatalities among Aboriginals by type of victim



About one-third (33.3%) of all fatalities were reported to be aboriginals aged 16-25 years. These young adults had the highest number of MVC-related deaths for driver, passenger and pedestrian (Figure 2).

Figure 2 MVC-related fatalities among Aboriginals by age group and type of victim



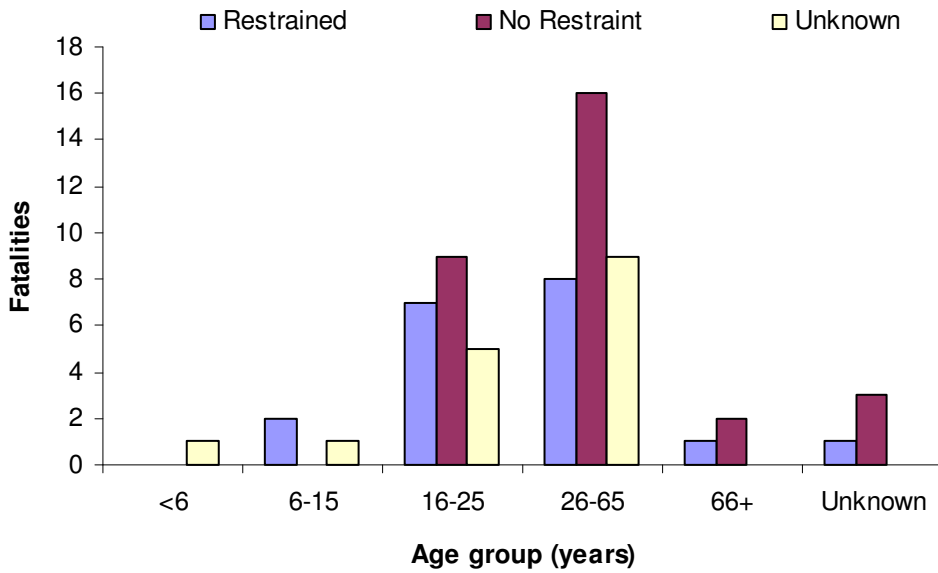
The following section highlights the use of restraints by motor vehicle occupants, including 34 drivers and 31 passengers, at the time of collision. Of the 65 Aboriginal occupants who died from a fatal motor vehicle collision:

- 30 were reported to be non-restrained (46.2%)
- 19 reported using restraints (29.2%)
- the remaining 16 fatalities were unknown of restraint use (24.6%)

Restraint use by age group

Figure 3 presents restraint use by age group among Aboriginal occupants who died in a fatal MVC. The majority of occupants aged 26-65 years were reported to be non-restrained at the time of collision. These adults aged 26-65 years had the highest percentage of MVC mortality (49.4%), as well as the highest percentage for non-restraint use (50.8%). The percentage of restraint use was similar across gender – 51% of male occupants used restraints and 48% of female occupants.

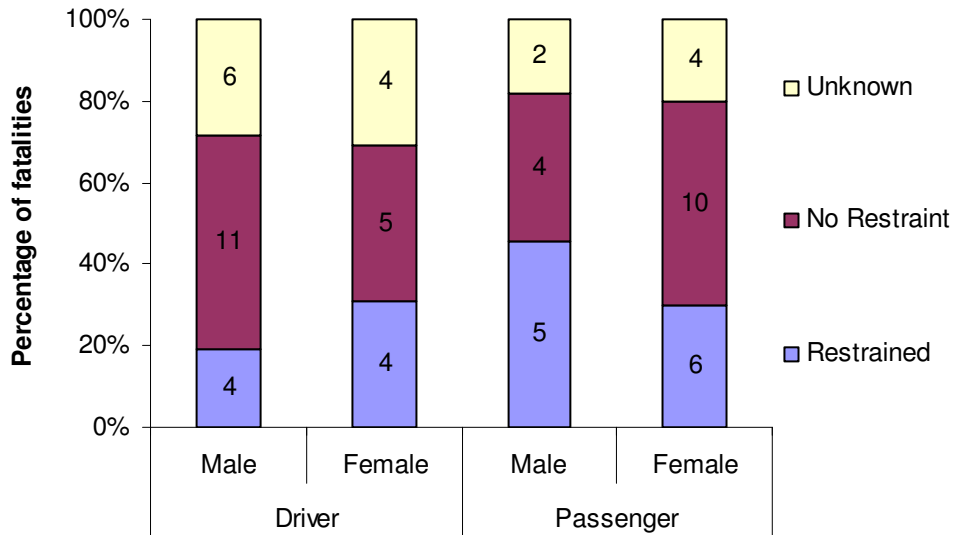
Figure 3 Restraint use by MV occupant's age group



Restraint use by occupant type

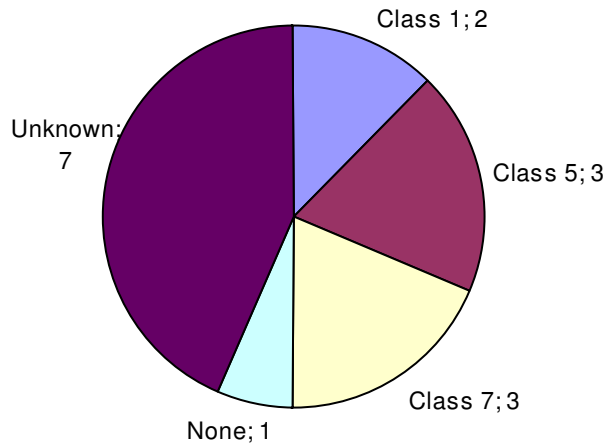
Over half of non-restrained victims (53.3%) and 42.1% of restrained victims were drivers. Of the 34 Aboriginal drivers, sixteen (47.0%) were reported to be non-restrained, and 14 of 31 (35.5%) Aboriginal passengers were non-restrained at the time of collision. The non-restrained victims were more likely to be male drivers and female passengers (Figure 4). Of the 19 occupants who were restrained, 17 used a lap harness, and 2 were reported to have used lap belts.

Figure 4 Restraint use by occupant type and sex



Of the 16 non-restrained Aboriginal drivers involved in fatal MVCs, two drivers had a Class 1 license, three drivers had a Class 5 license and three were reported to have had a Class 7 license (Appendix 1: Classes of BC Drivers Licenses). One driver had no license and information on license type was missing for seven non-restrained drivers.

Figure 5. Non-restrained Aboriginal drivers by class of driver's licence

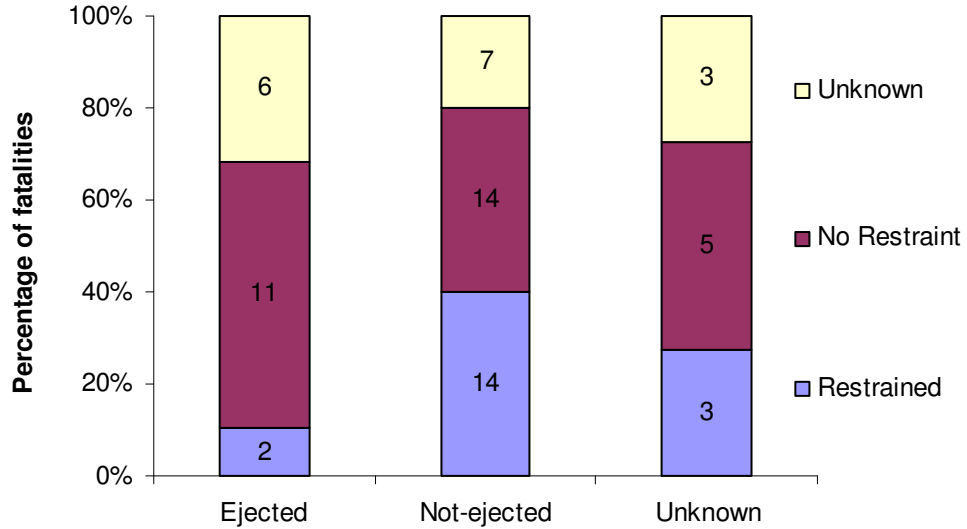


Of 31 passengers, 11 were seated in the back seat. Of these 11 back seat passengers, 5 were non-restrained at the time of collision, 3 were reported to be restrained and information on restraint use was unknown for 3 passengers. Of the 15 front seat passengers, 6 were non-restrained and 8 were restrained.

Occupants ejected and restraint use at the time of fatal MVC collision

There were 19 occupants who were reported to have been ejected from the vehicle during the collision. Of these 19 occupants, only two were restrained to be restrained, 11 were non-restrained and information was unknown for six occupants.

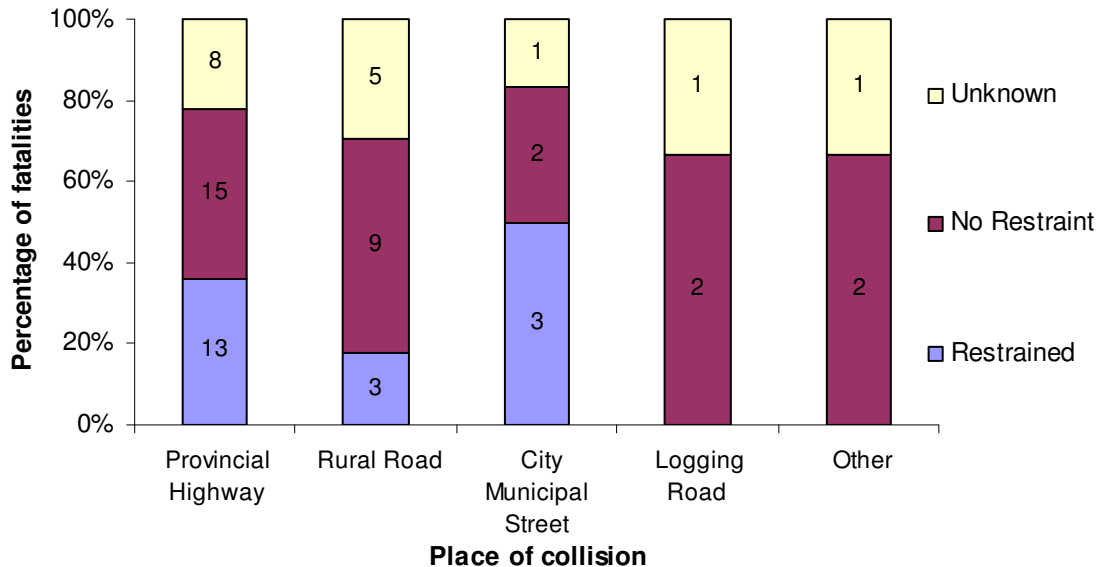
Figure 6. Non-restrained Aboriginal drivers by class of driver's licence



Restraint use by place of collision

Over half of fatalities were reported on the provincial highway (55.4%), followed by rural road (26.2%) and city municipal street (9.2%). Among 36 Aboriginal victims on provincial highway, 13 were restrained and 15 were non-restrained. Among 17 Aboriginal victims on rural road, only 3 were restrained and 9 were not (Figure 7).

Figure 7. Restraint use by place of collision



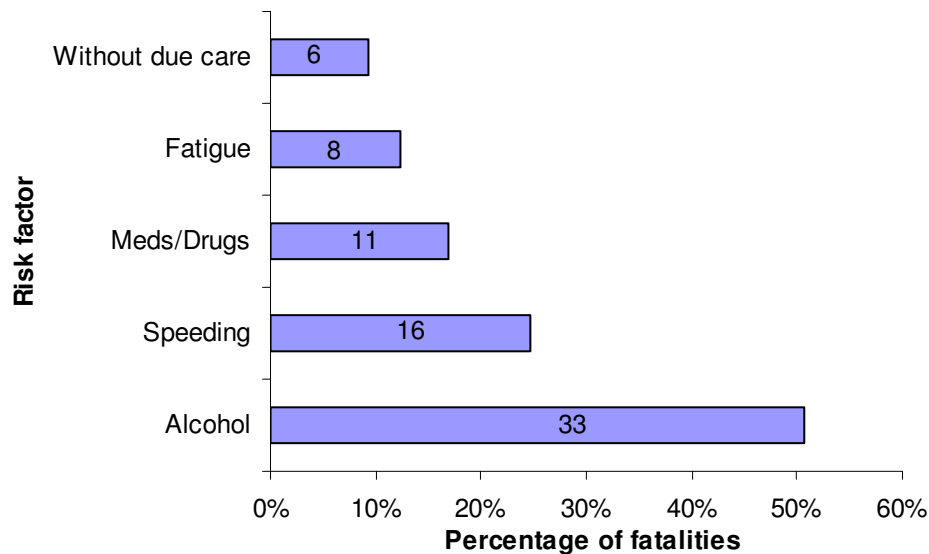
Restraint use by time of collision

About 73.3% of non-restrained Aboriginal occupants were reported to be involved in the fatal MVCs between 3:00 p.m. and 2:59 a.m.. This period of time also accounted for nearly two-third of MVC fatalities (64.6%).

Risk factors contributing to the MVC fatalities

The leading risk factors contributing to these fatal MVCs were alcohol involved (50.8%), speeding (24.6%), medications/drugs (16.9%), fatigue (12.3%) and driving without due care (9.2%) (Figure 8).

Figure 8. leading risk factors contributing to the MVC



- **Restraint use and alcohol consumption**

Of 33 occupants who were reported to have evidence of alcohol consumption at the time of the fatal collision, 18 were not restrained (54.5%), 7 occupants were restrained (21.2%) and information was unknown for 8 occupants. Of the 32 occupants that had not consumed alcohol, 12 were not restrained (37.5%), 12 were restrained (37.5%) and information was missing for 8 occupants.

- **Restraint use and Speeding among drivers**

Sixteen fatalities were reported to be related to speeding. Only 3 of them were restrained (18.8%) at time of collision and 8 were non-restrained (50.0%). Of the 49 fatalities which were not related to speeding, 16 were reported to be restrained (32.7%) and 22 were non-restrained (44.9%).

Nine of these 16 victims were drivers. Of these 9 drivers, only 1 driver was restrained at the time of collision, 5 did not use restraints and information on restraint use was missing for 3 drivers.

- Restraint use and medications/drugs consumption
Eleven MVC victims were reported to have evidence of having consumed medications and/or drugs at the time of collision. Of these 11 occupants, 5 were not restrained (45.5%), 3 were restrained (27.3%) and information was missing for 3 occupants. Of the 54 occupants who were reported to have not consumed medications/drugs, 25 were non-restrained (46.3%) and 16 were restrained (29.6%) at the time of collision. Data on restraint use was unknown for the remaining 13 cases.
- Restraint use and fatigued occupants
Of the 8 occupants who were reported to be fatigued at the time of fatal collision, 3 were non-restrained (37.5%), 4 were restrained (50.0%) and restraint use was unknown for one occupant. Of the 57 non-fatigued occupants, 27 were non-restrained (47.4%), 15 were restrained (26.3%) and data on restraint use was missing for 15 non-fatigued occupants. fatigued
- Restraint use and drivers driving without due care
Six fatalities were reported to be driving without due care at the time of fatal collision. Of these 6 occupants, 2 were restrained and 2 not.
Three of these 6 occupants were drivers and one driver did not use a restraint. Of the 31 drivers who were not reported to be driving without due care, 17 were non-restrained.

However, none of above differences of percentage of non-restrained occupants between the risk factor involved and not involved were statistical significant. Multivariate regression could not identify significant correlations of no restraint use with these five risk factors, and sex, age and occupant type. This may be due to too small numbers and many unknowns.

Discussion

The purpose of this study was to determine the prevalence of motor vehicle restraint use among Aboriginal occupants during fatal motor vehicle crashes in BC. The study examined fatal motor vehicle crash reports from the BC Coroners Service that involved Aboriginal people for the years 2003-2005. The data provided information on the specific circumstances of the fatal crashes and, therefore, provided useful information in order to describe the overall context in which the crashes occurred.

As reported in the motor vehicle literature, the percentage of motor vehicle restraint use among the general population in BC has been comparatively lower than in other provinces. Restraint use among Aboriginal populations in BC has not been compared to other provinces due to the lack of available data. However, this study found limited restraint use (46%) among the reported Aboriginal MVC fatalities which certainly highlights the need to increase restraint use in this population in order to reduce injury-related morbidity and mortality.

Previous Canadian research has shown that young drivers and passengers have the lowest rates of seat belt use compared to other age groups. (26) Our study shows that age groups 16-25 years and 26-65 years among Aboriginal populations have the highest non-compliance rates for seat belt use. This finding is consistent with the work of Lerner et al. (27), who showed the demographic factors associated with reported seatbelt use included age, gender and race.

As previously discussed, 54.5 percent of drivers that had consumed alcohol did not use restraints at the time of the fatal collision, while 37.5 percent of non-drinking drivers were unrestrained. Similarly, 45.4 percent of occupants under the influence of drugs did not use restraints, and 37.5 percent of occupants that were not under the influence of drugs were unrestrained. Although the logistic regression model in this study did not reveal a significant predictor of restraint use, most likely due to small numbers, evidence does suggest that alcohol-impaired drivers are more likely to speed and less likely to wear a seat belt. (28, 29)

Furthermore, Kuran (30) observed that alcohol plays a major role in motor vehicle crashes among Aboriginal populations. A National Survey on Drinking and Driving reported that 80 percent of Aboriginal drivers involved in fatal motor vehicle crashes had been drinking. (30) Similarly, the Provincial Health Officers Annual Report suggests that alcohol is a major cause of injuries among Aboriginal populations in British Columbia. (24)

As noted by Kuran, the prevalence of seatbelt use is an issue in many Aboriginal communities because the communities are located in rural areas and, therefore, seatbelt enforcement rates are low. (30) Additionally, a common belief among members of Aboriginal communities is that seatbelts do not work and will not actually save them, thereby reducing the prevalence of their use among community members. In some Aboriginal communities, the usage rate has been shown to be as low as 54%. (30) In contrast, the restraint use rate for other Canadian drivers has recently exceeded 90 percent. (12) The need to redouble efforts to increase restraint in the Aboriginal population in Canada is apparent.

Previous studies have shown the effectiveness of occupant restraints, and continued research shows that vehicle occupants are approximately 50 percent more likely to be hospitalized from crash-related injuries if they were not wearing a seatbelt at the time of the crash. (22, 31) A recent meta-analysis (32) identified six main interventions to increase seat belt use by motor vehicle occupants: (a) seat belt laws; (b) primary enforcement of seat belt laws (allowing police to stop and charge drivers for not wearing seat belts, as opposed to charging drivers only if they are stopped for another offence); (c) enhanced enforcement programs; (d) incentives; (e) mass media; and (f) education programs. The perception of traffic laws and penalties is likely more important in influencing behavior than the actual laws and penalties. Because of this, some countries aggressively publicize their safety belt laws and penalties. (33)

Targeted programs to increase motor vehicle restraint use have proven to be effective. (22) As noted in the Provincial Health Officers Annual Report, motor vehicle deaths

among Aboriginal populations could be prevented if society works strategically to improve road conditions, increase seat belt usage rates, enforces traffic laws on reserves and deters those who drive under the influence of alcohol and drugs. (24)

Graduated Driver Licensing (GDL) laws that explicitly include requirements for seat belt use in all phases, and sanctions that prohibit “graduation” to the next licensing phase if there is a seat belt citation, could increase seat belt use substantially. Zero-tolerance for non-use of seat belts could be implemented, with immediate loss of license or other administrative penalties resulting for non-compliance.

The combination of enforcement and public education campaigns appears to be key in achieving meaningful, lasting increases in restraint use. Recent studies by Desapriya et al, Shinar et al and Zaza et al show that public education efforts alone, without an enforcement component, are generally not successful. (3, 18, 22) Enhanced public education, especially when coupled with another prevention strategy, on restraint use could prove to be beneficial when targeting vulnerable population groups with low compliance rates; however, there is also still a need to educate all vehicle occupants around the importance of using motor vehicle restraints in BC.

The level of enforcement of seat belt use can affect usage rates. The effect of the current level of enforcement can be seen in the results of Transport Canada’s survey of seat belt use across the country, where dramatic decreases in enforcement have resulted in corresponding declines in seat belt usage rates. (26, 35) Efficient legislation, together with adequate surveillance and enforcement of unlawful driving behaviors, are essential in order to increase the number of road users who use restraints. Extensive enforcement of seat belt laws should result in increases in the proper use of safety devices which, in turn, can decrease morbidity and mortality related to motor vehicle crashes in Aboriginal populations in BC.

Evaluation studies, summarized by Salzberg and Moffat, show conclusively that high-visibility of enforcement increases seat belt use and decreases vehicle occupant injuries. (33) In addition, driver license demerit points may be a more severe penalty than fines, and may be effective in increasing seat belt use among vehicle drivers and occupants in BC. The principle of a demerit point system is that points accumulate and can lead to additional sanctions for repeated convictions, and ultimately license suspension or revocation. As a strategy to increase vehicle restraint use, BC could add additional provisions for the accumulation of demerit points which would have implications for the cost of insurance.

Simons-Morton and Winston have shown, comprehensively written restraint laws could change peoples’ perceptions of the value of the safety practices. (36) Importantly, laws are capable of communicating public health safety values of the restraint use. Legislation should guide the proper use of restraints, and as noted previously, only Quebec motor vehicle legislation has explicit language that rear passengers should wear the seat belt. We know that BC legislation has a similar provision, yet not explicit in the legislation. Therefore, it is necessary to explicitly underline the rear seat occupant requirement to

use restraints while traveling in motor vehicles. We assume that this will increase rear seat passenger restraint use in the future.

Study Limitations

To better understand the MVC-related injury profile among Aboriginal populations, it is imperative to have access to comprehensive, good quality data. To illustrate restraint use and MVC-related morbidity and mortality among Aboriginal peoples in BC, various potential data sources were explored, and data requests were submitted to appropriate agencies. Despite these efforts and, as a result of a lack of data sharing agreements, we had limited access to applicable data for this study.

BC Coroners Service provided the data for analysis for this report. The data had a high percentage of missing or unknown variables which impacted the quality of data for analysis.

It is evident that accurate and timely health-related data are essential to understand the burden of injury among Aboriginal populations. As noted by Auer and Anderson, and Probert, difficulties exist in collecting health information specific to Aboriginal populations in Canada. (37, 38) Issues in regards to record linkage, protection of privacy and confidentiality of personal information often make obtaining Aboriginal-specific health data unfeasible.

We suggest that efforts be dedicated to establishing a sustainable surveillance system to capture variables, such as ethnicity and restraint use that address data gaps, direct community-based research and support evidence-based prevention strategies. Developing and maintaining comprehensive data collection methods is necessary to better identify and understand traffic safety patterns among Aboriginal people in BC. Opportunities for data sharing, by way of data sharing agreements, through agencies that collect data should be provided, such that evidence can be constructively used to capture the injury burden in a given community and population, and in turn, design community specific interventions.

Recommendations:

The motor vehicle injury problem affects all British Columbians. The cost of personal pain and suffering, the loss of a loved one, and serious injury to a family member cannot be measured. Every person in British Columbia bears the economic costs of motor vehicle crashes. These include the costs of the emergency response providers, higher medical and insurance costs, and lost productivity. When individuals don't wear seat belts, these costs increase considerably due to more serious injuries. In-patient health care costs for unrestrained drivers and passengers following a crash are fifty percent greater than for properly restrained individuals. (39)

Because all levels of the BC government pay some of the costs of traffic injuries, all levels of government also share the responsibility to reduce traffic injuries and costs. Severe impacts occur to publicly funded health programs whenever someone is injured in a

motor vehicle crash. Therefore traffic injury prevention should become a priority for every health authority.

Health Authorities' priorities for motor vehicle crash reduction should broadly focus on collaborative action with other stakeholders in road safety to reduce deaths and hospitalizations, as well as health care costs in this province. Previous literature shows that seat belt non-use motor vehicle crash injuries cost our health care system significantly and therefore all Health Authorities should form partnerships with law enforcement and community education awareness programs around the province to encourage appropriate restraint use. Health Authorities could use the data in targeting education and motor vehicle crash prevention initiatives, in an effort to improve seat belt use among Canadian Aboriginals. The ultimate goal is to reduce the number and severity of injuries and fatal injuries on all British Columbia roads.

Reliable data on the extent of road trauma are required to develop adequate road safety countermeasures in Canadian Aboriginal communities. There is clearly a need for improved information and more refined data on the extent and burden of motor vehicle crashes in the Canadian Aboriginal population. Health Authorities in BC could take initiative to collect ethnic information with the traffic crash data that would be suitable for research and prevention efforts.

Health Authorities could invest in strategies that persuade people to reduce their driving speed on roads, and to help achieve a change of culture that presents speeding with the same stigma as drinking and driving. Perhaps Health Authorities could collectively bargain to implement the proven cost effective speed cameras back on BC roads. Health Authorities could use this data to influence police jurisdictions to encourage extensive enforcement of seat belt laws; alcohol impaired driving laws, safe speed limits and traffic calming initiatives in our communities. No policy can be effective unless it is adequately implemented and enforced, and there must be awareness of both the policy and the enforcement efforts on the part of the intended targets.

Excess alcohol consumption has a serious impact on the Canadian Aboriginal community and is a proven danger to the road traffic crash fatality rate of Canadian Aboriginals. Health Authorities can invest in effective education strategies and targeted mass media campaigns to prevent alcohol related crashes in these communities. Perhaps collaborative work will need to continue across the transport, insurance, police and health authorities, and at a Canadian Aboriginal community level, to educate on the dangers of drunk driving, speeding, non restraint and find ways to make them change their driving behavior.

In addition Canadian Aboriginals could benefit from education on the traffic safety benefits of restraint use by messages placed in a variety of accessible settings. Potential settings include primary care offices, community-based organizations and emergency rooms. Health Authorities could increase their involvement in education efforts as previous work recognized that injury prevention education for patients and families should be a priority area for counseling during routine health maintenance visits. (40,

41) From a primary prevention perspective, education materials could target drivers to encourage safety belt use when driving. From a secondary prevention perspective, emergency room nurses or physicians could reinforce values of restraint use among drivers and occupants who visit emergency rooms for motor vehicle crash related injuries. A recent review by Gittelman and Durbin (42) has suggested that an emergency room visit for an injury represents a "teachable moment" for the patient and their family, which may make the injured and their families more receptive to educational information.

A recent randomized controlled trial (RCT) (43) demonstrates that emergency rooms can be a venue for behavior change counseling if the right resources are available. Counseling was provided to teens following a motor vehicle crash that led to an emergency room visit. While at the emergency room, young people aged 12 to 20 years were provided with a brief counseling session intended to change risky behavior. Safety belt use was one behavior addressed within the counseling session and the researchers found that the counseling was effective in increasing future self-reported safety belt use. Health Authorities should adopt this counseling process in their respective hospital emergency rooms as it has shown traffic safety benefits.

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APPENDIX 1: Classes of BC Driver's Licenses

Class	Typical Vehicles	Minimum Age
Class 1	Semi-trailer trucks and all other motor vehicles or combinations of vehicles except motorcycles	19
Class 2	<ul style="list-style-type: none"> • Buses, including school buses, special activity buses and special vehicles • Trailers or towed vehicles may not exceed 4,600 kilograms except if the bus and trailers or towed vehicles do not have air brakes • Any motor vehicle or combination of vehicles in Class 4 	19
Class 3	<ul style="list-style-type: none"> • Trucks with more than two axles, such as dump trucks and large tow trucks, but not including a bus that is being used to transport passengers • Trailers may not exceed 4,600 kilograms except if the truck and trailers do not have air brakes • A tow car towing a vehicle of any weight • A mobile truck crane • Any motor vehicle or combination of vehicles in Class 5 	18
Class 4 (unrestricted)	<ul style="list-style-type: none"> • Buses with a maximum seating capacity of 25 persons (including the driver), including school buses, special activity buses and special vehicles used to transport people with disabilities • Taxis and limousines • Ambulances • Any motor vehicle or combination of vehicles in Class 5 	19
Class 4 (restricted)	<ul style="list-style-type: none"> • Taxis and limousines (up to 10 persons including the driver) • Ambulances • Special vehicles with a seating capacity of not more than 10 persons (including the driver) used to transport people with disabilities • Any motor vehicle or combination of vehicles in Class 5 	19
Class 5 or 7	<ul style="list-style-type: none"> • Two axle vehicles including cars, vans, trucks and tow trucks 	16

	<ul style="list-style-type: none"> • Trailers or towed vehicles may not exceed 4,600 kilograms • Motor homes (including those with more than two axles) • Limited speed motorcycles** and allterrain vehicles (ATVs) • Passenger vehicles used as school buses with seating capacity of not more than 10 persons (including the driver) • Construction vehicles • Three-wheeled vehicles - does not include three-wheeled motorcycles (trikes) or motorcycle/sidecar combinations • Does not include Class 4 vehicles or motorcycles 	
Class 6 or 8	Motorcycles, all-terrain cycles, allterrain vehicles (ATVs)	16
Class 4 or 5 with heavy trailer endorsement	<ul style="list-style-type: none"> • Trailers or towed vehicles exceeding 4,600 kilograms provided neither the truck nor trailer has air brakes • Any motor vehicle or combination of vehicles in Class 5 	18
Class 4 or 5 with house trailer endorsement	<ul style="list-style-type: none"> • Recreational (house) trailers exceeding 4,600 kilograms provided neither the truck nor trailer has air brakes • Any motor vehicle or combination of vehicles in Class 5 	18

Source; http://www.icbc.com/Licensing/lic_getlic_types.asp