Preventing unintentional injuries in Indigenous children and youth in Canada

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Abstract

Unintentional injuries are the leading cause of death in Canadian Indigenous children and youth, occurring at rates three to four times the national average. Death and disabling injuries not only devastate families and communities but take a heavy toll on health care resources. The lack of statistics, ongoing surveillance or injury prevention programs for Indigenous children and adolescents further compound human and health care costs. Indigenous communities are heterogeneous culturally, in terms of access to resources, and even as to risks and patterns of injury. Yet in general, they are far more likely to be poor, to have substandard housing and to have difficulty accessing health care, factors which increase the risk and impact of injury. There are urgent needs for injury surveillance, research, capacity-building, knowledge dissemination, as well as for injury prevention programs that focus on Indigenous populations. Effective injury prevention would involve multidisciplinary, collaborative and sustainable approaches based on best practices while being culturally and linguistically specific and sensitive.

Key Words: Death; Determinants of health; Disability; Indigenous; Injury; Injury prevention; Surveillance

Injuries are the leading cause of death in Canadian children [1-3]. For Indigenous children and youth, injuries occur at disproportionately higher rates and remain the leading cause of potential years of life lost (PYLL) [4].

Approximately 1.2 million people, or about 5% of the Canadian population, self-identify as being Indigenous (or Aboriginal) [5], meaning they are First Nations, Inuit and Métis. Although injury and injury prevention (IP) data for Inuit and Métis children and youth are extremely limited, one trend is clear: while injury mortality rates have declined in both the Indigenous and general paediatric population over the last few decades, the adjusted relative risks remain much higher in Indigenous children and youth across all categories of injury [6].

Often, children or youth in remote communities have limited access to health care or are less likely to seek care for an injury, factors which skew a true estimation of injury rates among Indigenous children and youth. No system for tracking injury patterns among Indigenous populations, let alone Indigenous child- and youth-specific injuries, exists in Canada.

Mortality

While the unintentional death rate in Indigenous children and teens is estimated to be three to four times higher on average than the rate for other children in Canada [1-3], there are also regional variants. First Nations people in Manitoba, Saskatchewan and British Columbia may have death rates 6.5 times higher than the general population, and some specific rates of injury in certain populations are as high as 22 times the Canadian average [1][6][9]. Fully 26% of all deaths among First Nations people are caused by injuries, compared to only 6% of deaths in the Canadian population. A report based on the First Nations Regional Health Survey estimated the rate of deaths from unintentional injury at four times higher in infants, five times higher in preschoolers, and three times higher in teenagers compared with general Canadian averages for the same groups [9]. Because injuries are more likely to occur in the young, they have a disproportionate
impact in Indigenous communities where people are statistically younger [10]. Injury is the leading cause of PYLL in First Nations peoples [4], accounting for more PYLL than all other causes of death combined at approximately 4.5 times the Canadian average [7][11].

The most common causes of death due to injury are fires and motor vehicle collisions (MVCs) in children younger than 10 years of age, with MVCs and drownings causing more deaths in children and youth aged 10 to 19 years [12]. Injuries (both intentional and unintentional) were the leading cause of death in Métis children and youth in Manitoba (1 to 19 years of age), constituting 71.6% of total fatalities compared with 63.1% for other Manitoba children [13].

**Morbidity**

The disproportionately high rate of injury in Indigenous populations has devastating short- and long-term consequences for the children and youth affected, their families and the community. In general, First Nations children and youth experience the same types of injuries as their mainstream peers but at higher rates. Numerous longitudinal surveys document higher rates of severe injuries (i.e., that limit activity and require medical attention). For example, 17.5% of First Nations children living on-reserve were injured compared with 12% of their peers living off-reserve, with 10% as the Canadian average [14][15]. For Indigenous youth, 30% had sustained a significant injury in the preceding 12 months [16]. Injury rates in males were higher than for females in all age categories [16]. The Inuit Tapiriit Kanatami (ITK) statistical profile indicated that 7% to 11% of Inuit children younger than 14 years of age had sustained an injury severe enough to require medical attention in the preceding 12 months, and also suggested this figure was an underestimate, due to the lack of health services [17]. The rate of injury in Métis children was similar to the general Canadian population, at 12% [18].

More severe injuries can result in disability and interfere with education, growth and development, impact future employability and may contribute to depression and substance abuse [12]. One assessment of severe trauma in Calgary, Alberta, found that First Nations peoples had a nearly fourfold greater risk of experiencing severe trauma than the general population, and were five times more likely to have severe trauma resulting from an MVC [19]. Manitoba First Nations individuals were 3.7 times more likely to be hospitalized due to injury than their fellow Manitobans [20]. While Indigenous populations are more likely to experience serious trauma, they are much less likely to receive rehabilitation or have access to other post-discharge resources. In Saskatchewan, for example, 66.7% of First Nations had no resources post-discharge for treating or helping with traumatic brain injury compared with only 9.6% of their non-First Nations peers [21].

**Why the discrepancy?**

The reasons for the disproportionate risk of injury among Indigenous children and youth are numerous and complex. According to Statistics Canada, Indigenous families tend to have lower incomes, less education and higher unemployment compared with other Canadians, while being generally younger and more likely to live in a rural area [15]. They are also likelier to live in unsafe, substandard housing, and to encounter local shortages in health care personnel and resources [22]. Historical inequities, cultural alienation and loss of connectedness within the environment, as well as the grim legacy of residential schools, have contributed to depression, to alcohol and substance abuse and associated risk-taking behaviours, and to inadequate parenting skills for some. Alcohol is a significant contributor to MVCs, lack of seat belt use and drowning incidents [1][19][23]. The lack of culturally appropriate or targeted IP programs continues to be a barrier. Rural Indigenous children and youth have not benefitted to the same degree as other Canadians from vehicle safety (e.g., car seat, seat belt) programs or campaigns against impaired driving, nor from swimming lessons, first aid/CPR training or even the enforcement of existing safety laws [6].

**Why injury prevention programs are required in Indigenous communities**

In resource-poor Indigenous communities, injury-related deaths and disabilities feed the cycle of poverty and despair. According to one cost analysis by SMARTRISK, the total economic burden of injury in 2004 in Canada was estimated at $9.5 billion in direct and $6.5 billion in indirect costs [24]. Reducing injury mortality and morbidity and diverting funds to more constructive uses would benefit poor and remote communities immeasurably. Well-designed IP strategies for American Indians have been effective in reducing hospitalizations, injury severity, and mortality rates, in addition to being cost-effective [25][6].

**Mechanisms of injury**

This section focuses on the major causes of injury-associated morbidity and mortality.
Motor vehicle collisions

MVCs cause the most injuries and deaths in First Nations children and youth, especially in males [22]. Indigenous peoples generally are at a higher risk of MVCs because their communities are isolated, health care facilities are harder to get to, road conditions are generally poor, and hazardous machines such as all-terrain vehicles (ATVs) and snowmobiles [1] are used frequently or in unsafe conditions, often by necessity. Additional contributors to injury incidence include the underuse of child restraints in motor vehicles, inadequate enforcement of restraint laws, lack of helmet use, and substance abuse. In one study of Indians in the American Northwest, 41% of children were not being properly restrained in motor vehicles [26]. Studies show that rural American Indian occupants who did not use safety belt restraints had a higher than twofold risk of injury or death compared with those wearing seat belts [26]. Alcohol has been implicated as the major determining factor for the lack of seatbelt usage [23]. A study assessing the enforcement of motor vehicle restraint laws in the Navajo Nation showed that an increase of seat belt use from 7% to 40% in children reduced both the rate of MVC-related hospital admissions and the severity of injuries significantly [26].

Drowning

Drowning remains a common cause of death, especially for males [1]. Although Indigenous peoples comprise about 5% of the Canadian population, they account for approximately 26% of drownings which involve a snowmobile, 16% of drownings after a fall, 10% of drownings during recreational aquatic activities, and 9% of drownings related to boating activities [1][8].

Falls into a body of water are the leading cause of drowning fatalities, followed by boating and other aquatic activities (1). The Canadian Surveillance System for Water-related Fatalities showed that Indigenous people drowned at six times the rate of other Canadians in 1996; in Manitoba this rate was 10 times the provincial average. Toddler drownings occurred at 15 times the Canadian average and 22 times the provincial average in Manitoba [1][8]. For Indigenous communities the risk of drowning increases with their proximity to water, the risk of hypothermia (e.g., in northern regions), snowmobiling on thin ice and the underuse of personal flotation devices (PFDs). Only 6% of Indigenous drowning victims in 1996 were wearing a PFD [1]. Alcohol use contributes to drowning deaths, with 64% of these same victims having a blood alcohol level higher than the legal limit compared to 27% for non-Indigenous drowning fatalities [1].

Fires

In one 1991/93 survey, about 31% of deaths by fire in Indigenous populations occurred in children between one and 14 years of age, compared with 16% in the general Canadian population [1]. A 1991/98 B.C. study showed that status First Nations had a fire-related mortality rate eight times the provincial average, and that First Nations children in Manitoba in 1996/97 were five times more likely to die in a house fire [1]. Increased risk of death from fire is due to a higher proportion of smokers at home, wood-framed, standard housing, the underuse of working smoke detectors, longer travel times for fire rescue equipment and personnel [12], and a shortage of trained firefighters.

A framework for injury prevention

The Canadian Paediatric Society [28][32] and the Public Health Agency of Canada [33] have several resources on specific prevention strategies. Special considerations for IP in Indigenous populations are emphasized here. Optimally, these initiatives would involve multidisciplinary approaches and target individuals, parents, health care providers, and community/local government leaders. Strategies need to be easily adaptable, so they can be modified to meet the language, culture and political needs of different communities. They also need to facilitate communication and build local capacity [34][35]. Successful IP programs are always based on best practices, collaboration and sustainability. Indigenous programs should involve communities at each stage of intervention: in planning, implementation and evaluation. Demonstrating respect for local autonomy by obtaining consent before an intervention or evaluation, and by ensuring that appropriate data-sharing mechanisms are in place, are essential for program success.

Several organizations have embarked on IP strategies targeting Indigenous communities. The First Nations Regional Longitudinal Health Survey offered recommendations on IP for communities [36]. The Assembly of First Nations passed resolutions on the need for action and the development of a National Comprehensive IP Strategy guided by the First Nations Regional Injury Prevention (FNIRIP) Advisory Group [37]. The National Indian and Inuit Community Health Representatives (NIICHRO) hosted the National Aboriginal IP Conference in 2004 [38]. The Pauktuutit Inuit Women of Canada passed a resolution on the need for action on IP and developed an Inuit Five-Year Injury Prevention Strategic Plan 2010-2015 in 2010. However, recent federal budget cuts have largely eliminated or jeopardized such initiatives [37][39].
Aboriginal Head Start on Reserve includes an IP program to teach workers and parents about providing safe and healthy environments for children. Health Canada’s Maternal Child Health program provides home visits by nurses and family visitors to high-risk families and to pregnant women living in First Nation communities. Such visits involve assessing the home for safety, parent education and providing training resources. Culturally sound and effective IP programs targeted to the Métis do not exist, and Métis children and youth are not entitled under the Non-Insured Health Benefits available to other Aboriginal children.

### The six ‘E’s in successful IP

Education, empowerment, enabling, engineering, enforcement and employment are the so-called ‘E’s’ of IP. They are adapted for Indigenous populations in Table 1.

#### Education

- Identify community champions to help disseminate safety messages over local media and in school-based programs.
- Use anticipatory guidance with families on personal safety measures, such as using helmets, PFDs and seat belts.
- Develop IP programs such as First aid and CPR training, swimming lessons, water safety, fire prevention, emergency preparedness.

#### Empowerment

- Incorporate Indigenous culture, language and beliefs into IP planning.
- Ensure local participation in the design and implementation of IP strategies.

#### Enabling

- Provide easier access and affordability to IP education and devices through combined community purchasing, installation or subsidies (e.g., smoke detectors, bicycle helmets and PFDs).

#### Engineering

- Design safer products and environments (e.g., safer, well-lit roads and sidewalks, fencing around domestic animals, or designing winter clothing with built-in inflatable devices).

#### Enforcement

- Involve band council members and community leaders in policy implementation and reinforcement.

#### Employment

- Build capacity while designing and implementing IP programs, to enhance community participation and create revenue.
<table>
<thead>
<tr>
<th>Injury type</th>
<th>Education</th>
<th>Empowerment</th>
<th>Enabling</th>
<th>Engineering</th>
<th>Enforcement</th>
<th>Employment</th>
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</table>
| MVC         | - avoid alcohol and intoxicants  
    - appropriate child restraints and seatbelts | Community plan for safety education and promotion for alcohol reduction, child restraints | - affordable and accessible child restraints  
    - car pooling  
    - designated drivers | - improved road and lighting conditions  
    - separation of pedestrian and motor vehicles  
    - restraining livestock | - speed limits  
    - child restraints  
    - alcohol and drug usage | - local enforcement and education  
    - first response team |
| All-terrain vehicles | - helmet use  
    - avoid alcohol and intoxicants | Community involvement with policies such as helmet use promotion, advocacy for age restriction | - accessible and affordable helmets | - stability improvements to vehicles  
    - limit speed capabilities | - age restrictions  
    - mandatory helmet use | - local educators |
| Fires       | - never leave children or fires unattended  
    - do not obstruct exits  
    - avoid alcohol and intoxicants around fires | Community involvement in developing, communicating fire plans | - subsidizing smoke detectors  
    - adequate fire fighting equipment  
    - safe disposal of cigarettes | - fire plans in place for home and community  
    - improved housing standards | - mandatory smoke detectors  
    - removal of fire hazards in the community | - train local fire fighters  
    - fire hazard educators  
    - inspectors and maintenance of smoke detectors |
| Poisonings  | - identification and labeling of toxic and hazardous substances  
    - hazardous substances stored locked and out of reach and sight of children | Community input on hazardous materials | - access to child-proof storage  
    - child-proof locks  
    - accessible hazard disposal sites | - child-proof containers  
    - proper disposal sites  
    - proper disposal of toxins | - proper labeling  
    - child-proof containers  
    - proper disposal of toxins | - hazards educators |
| Drowning    | - swimming lessons  
    - first aid/CPR training  
    - use of life jackets  
    - active supervision  
    - avoid intoxicants | Community plan for water safety | - subsidized life jacket purchasing  
    - subsidized or free swimming lessons  
    - lifeguards | - floatation devices built into winter jackets  
    - building safer houses  
    - life jackets  
    - speed limits  
    - supervised swimming areas | - alcohol limits on boats  
    - speed limits  
    - supervised life jackets  
    - speed limits  
    - minimum housing standards  
    - building inspectors  
    - swimming instructors  
    - first aid/CPR educators  
    - local lifeguards  
    - signage for unsafe ice and water conditions | - train local lifeguards  
    - first aid/CPR instructors  
    - local lifeguards  
    - signage for unsafe ice and water conditions |
| Falls       | - supervision of children, especially around water  
    - barriers around construction or other dangerous sites | - community to identify dangerous sites  
    - development of strategies and resources to address danger zones | - affordable construction materials and tools for building safer communities  
    - reduction of substandard housing  
    - building safer houses  
    - building inspectors  
    - minimum housing standards | - barriers around construction sites  
    - minimum housing standards | First aid and emergency response team  
    - construction of better houses  
    - building inspectors |
Recommendations
To reduce the rate and severity of unintentional injuries in Indigenous children and youth in Canada, the Canadian Paediatric Society makes the following recommendations:

1. **To focus surveillance**: Better data collection and research, using community-based, participatory approaches, are critical to defining the extent and nature of injuries in this population. Data collection should focus on location, age, ethnicity and mechanism of injury. Including Indigenous identifiers in the Canadian Paediatric Surveillance Program for injury studies would help narrow the focus.
2. **To improve education**: Conferences, public debates, and meetings of coalitions, specialists, community members and leaders are all forums for sharing surveillance data, successful programs and knowledge translation.
3. **To strengthen advocacy**: The federal government needs to work with provincial/territorial governments and nongovernmental organizations to develop a national injury-prevention (IP) strategy. Indigenous communities need to develop local programs to reduce specific injuries, and to reinforce and evaluate them regularly. ATV and snowmobile safety legislation have special relevance for Indigenous communities, and are being tracked in the Canadian Paediatric Society’s status report, *Are We Doing Enough?* <www.cps.ca/en/advocacy-defense/status-report>
4. **To reduce barriers**: Improving the social determinants of health, such as poverty and substandard housing, enhancing parental support, and increasing access to alcohol and drug rehabilitation programs, will help communities to be more responsive to IP strategies.
5. **To evaluate initiatives**: The impact of IP programs must be measured, both for success and to identify areas needing improvement.
6. **To provide resources**: Better funding for IP surveillance, research, building capacity, consultation, disseminating knowledge, monitoring and evaluating IP programs is required.

Acknowledgements
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