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Analysis in Brief
Taking health information further

February 14, 2008

National Trauma Registry: 2007 Injury Hospitalizations Highlights Report (In Focus: Pediatric Injury Hospitalizations in Canada, 2005–2006)

Introduction

The *National Trauma Registry 2007 Injury Hospitalizations Highlights Report* provides an overview of patients hospitalized due to trauma in all acute care facilities in Canada for the 2005–2006 fiscal year (April 1, 2005, to March 31, 2006).

In addition, in response to suggestions from stakeholders to provide in-depth analysis surrounding current or emerging issues, this year's report includes a focus on pediatric injury hospitalizations in Canada. More specifically, the analysis provides a description of pediatric injuries resulting in hospitalization in Canada, provincial and territorial rates, factors associated with pediatric injuries, the leading causes of injury hospitalization and the types of injuries sustained. The pediatric population will be the focus of each trauma registry report for the upcoming year, with system and patient-level analysis planned.

The data source for this report is the National Trauma Registry Minimum Data Set (NTR MDS), which is managed by the Canadian Institute for Health Information (CIHI). NTR MDS data are a subset of the Hospital Morbidity Database (HMDB), which is also managed by CIHI. Data for this report are based on the fiscal year of discharge and reports are based on the patients' residence where applicable in order to facilitate the development and implementation of appropriate injury prevention strategies.

Trauma or injury cases were included if their external cause of injury codes met the NTR definition of trauma; generally, these are injuries resulting from a transfer of energy applied clinically. Examples of cases that are *excluded* from this definition are poisonings by drugs or gases, adverse effects of drugs or medicine and late effects of injury.

2005–2006 NTR MDS Highlights

In Canada, there were 195,782 acute care hospitalizations due to injury in 2005–2006, a decrease from 196,865 admissions in 2004–2005. These hospitalizations accounted for 1,922,704 days in hospital. The national average (mean) hospital length of stay (LOS) was 10 days. Males comprised 52% of all cases and the mean age of all hospitalized cases was 53 years. In general, the mean LOS increased with age.

In 2005–2006, there were 7,007 injury cases that resulted in a death in hospital. This represented 4% of all injury hospitalizations. These cases spent 122,120 days in hospital, representing 6% of all days in hospital due to injury. Of those who died, 85% were 60 years of age and older. The mean number of injuries per case for those who died in hospital was 8.0, compared to 3.8 injuries for cases where the individual survived. The mean LOS for cases where the individual died in hospital was 17.4 days. The mean LOS for those who survived was 9.5 days.

The leading cause of injury hospitalizations in Canada in 2005–2006 was unintentional falls, which represented 57% (n = 111,577) of all injury hospitalizations. The second most common cause of injury was motor vehicle collisions (13%, n = 26,163). Motor vehicle traffic collisions accounted for 75% (n = 19,576) of all motor vehicle injury hospitalizations. Injury purposely inflicted by another person (that is, assault) (5%, n = 8,871) was the third leading specific cause of injury followed by being struck by objects or colliding with another person (4%, n = 8,728).

In Focus:

Pediatric Injury Hospitalizations in Canada, 2005–2006

Injury is the leading cause of death and disability among children and adolescents in Canada. The number of children injured each year in Canada has declined steadily over recent years. This may be the result of numerous public health programs aimed at preventing injuries in children.¹ The analysis that follows provides a current picture of pediatric hospitalizations and deaths in Canada for fiscal year 2005–2006.

In 2005–2006, there were 29,244 pediatric (<20 years of age) injury admissions to Canadian hospitals, representing 15% of all injury admissions in Canada (n = 195,782) (Table 1). The national pediatric injury hospitalization rate was 37.3 per 10,000 persons under 20 years of age.ⁱ The injury hospitalization rate overall, among all age groups, was 60.4 per 10,000 persons.

i. This rate is a *crude rate*, which does not take into account the age distribution of a population.

Pediatric injury hospitalizations accounted for 102,103 hospital days in total, about 5% of all days in hospital due to injury in 2005–2006 ($n = 1,922,704$ total days) (Table 1). The average length of stay in hospital for pediatric injuries in Canada in 2005–2006 was 3.5 days. The median length of stay was 1 day.

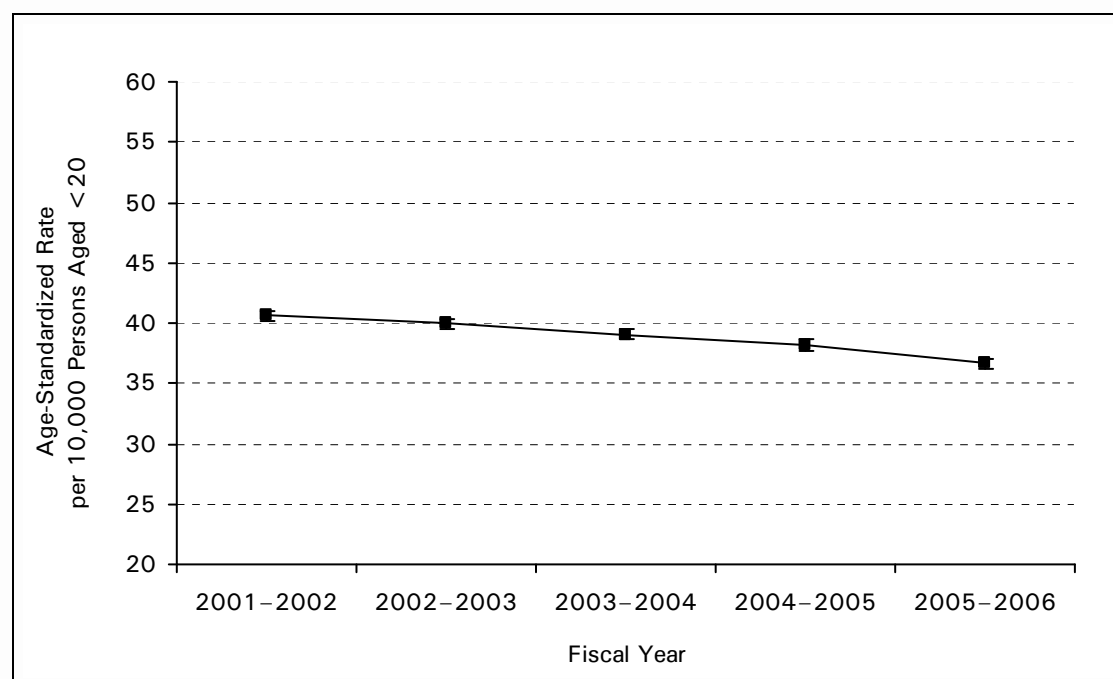
Table 1 Pediatric Injury Hospitalization, Canada, 2005–2006

Number of admissions	29,244	
Crude hospitalization rate (per 10,000 persons aged <20)	37.3 ¹	
Sex, number (%)		
Male	19,864	(67.9)
Female	9380	(32.1)
Age group, number (%)		
< 1	1,260	(4.3)
1–4	4,160	(14.2)
5–9	5,242	(17.9)
10–14	7,323	(25.0)
15–19	11,259	(38.5)
Total in-hospital days	102,103	
Length of stay (days)		
Mean (standard deviation)	3.5	(8.4)
Median (inter-quartile range)	1	(1–3)
In-hospital deaths, no. (%)	182	(0.6)
Causes of injury, no. (%)		
Unintentional falls	10,852	(37.1)
Motor vehicle	5,231	(17.9)
Struck by or against objects/persons	3,233	(11.1)
Other road vehicle	1,994	(6.8)
Assault and injury purposely inflicted	1,693	(5.8)
Other/unspecified	6,241	(21.3)

Trends in Pediatric Injury Hospitalizations in Canada

From 2001–2002 to 2005–2006, the age-standardized pediatric injury hospitalization rate, which takes into account changes in the age distribution of the population over time, decreased steadily (Figure 1). The age-standardized rate (using 1991 Canada census data as a reference) in 2005–2006 was 36.7ⁱⁱ per 10,000 persons under 20 years of age, compared to 40.6 per 10,000 persons under 20 years of age in 2001–2002. The decrease in pediatric injury hospitalization could be due to a variety of factors, including improved injury-prevention programs, changing practice patterns with changing hospital admission criteria, administrative changes and legislation designed to target child safety concerns.

Figure 1 Age-Standardized Pediatric Injury Hospitalization Rate (per 10,000 Persons Under 20 Years of Age) by Year, Canada, 2001–2002 to 2005–2006



Source

National Trauma Registry Minimum Data Set, 2001–2002 to 2005–2006, Canadian Institute for Health Information.

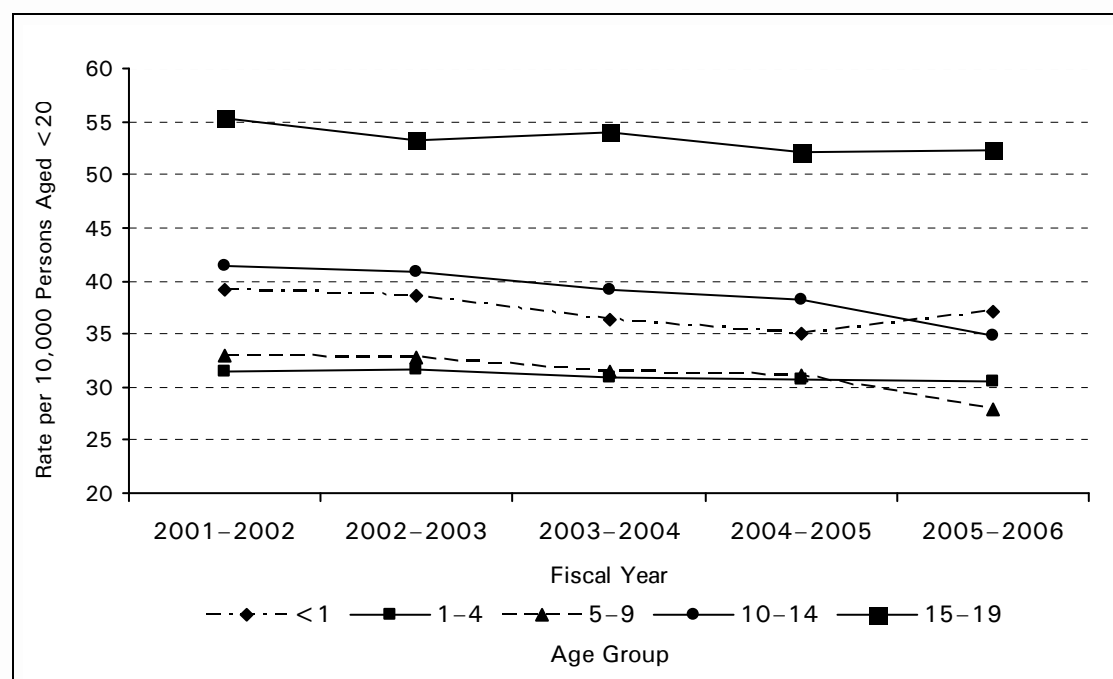
ii. This rate is an *age-standardized rate*, which takes into account changes in the age distribution of the population over time, using 1991 Canadian census data as a standard.

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Looking at sub-groupings of the pediatric population, between 2001–2002 and 2005–2006, the largest decrease was seen in children aged 10 to 14 years. In this age group, the pediatric hospitalization rate fell from 41.5 per 10,000 persons in 2001–2002 to 34.8 per 10,000 persons in 2005–2006. During the same time period, the pediatric hospitalization rate among children aged 5 to 9 also decreased from 32.9 to 27.9 per 10,000 persons. The rate of pediatric injury hospitalizations decreased slightly among the youngest (under 5 years) and oldest (15 to 19 years) age groups (Figure 2) between 2001–2002 and 2005–2006.

Figure 2 Pediatric Injury Hospitalization Rate (per 10,000 Persons) by Year and Age Group, Canada, 2001–2002 to 2005–2006



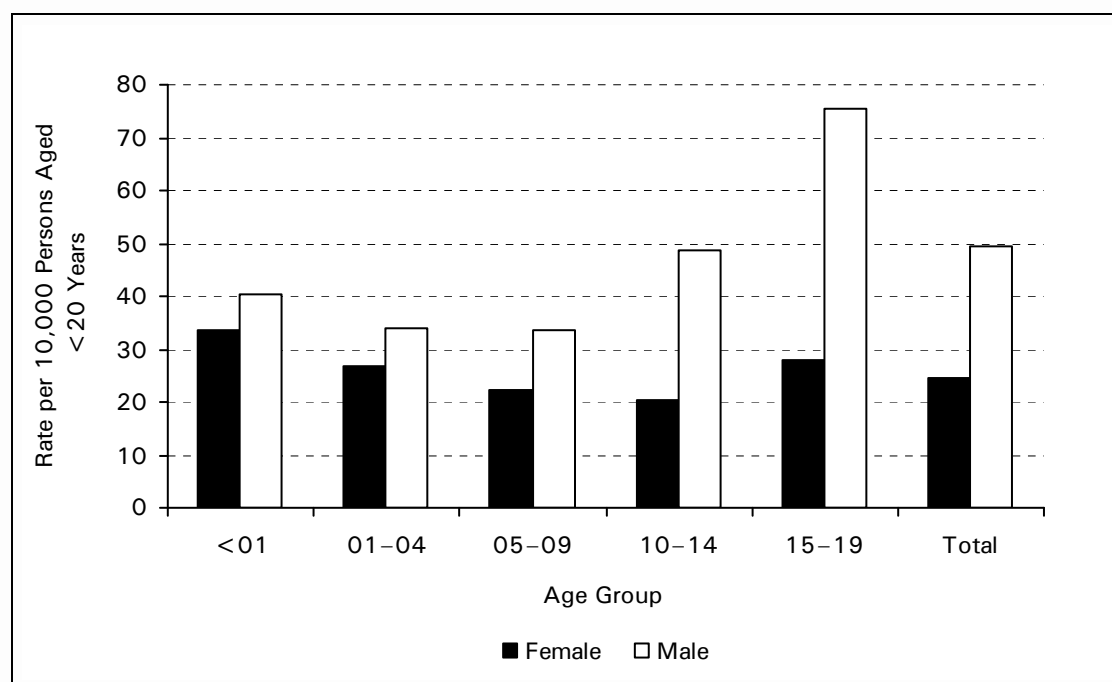
Source

National Trauma Registry Minimum Data Set, 2001–2002 to 2005–2006, Canadian Institute for Health Information.

Pediatric Injury Hospitalizations by Age and Sex

In 2005–2006, the majority of pediatric injury hospitalizations were male (67.9%) and between 15 and 19 years of age (38.5%) (Table 1). Those aged 10 to 14 years comprised the second-largest proportion of admissions to an acute care hospital in Canada (25.0%). The pediatric hospitalization rate was higher among males for all age groups (Figure 3); however, the difference between males and females was most pronounced in the 15-to-19-year age group. While the pediatric injury hospitalization rate was consistent for females across age groups, the rate of admissions increased noticeably for males aged 10 years and older (Figure 3).

Figure 3 Rate of Pediatric Injury Hospitalizations by Age Group and Sex, Canada, 2005–2006



Source

National Trauma Registry Minimum Data Set, 2005–2006, Canadian Institute for Health Information.

Leading Causes of Pediatric Injury Hospitalization

In 2005–2006, *unintentional falls* were responsible for 37.1% of all pediatric injury hospitalizations in Canada (Table 1) and were responsible for 24,433 hospital days. Pediatric admissions to an acute care hospital due to a fall required 2.3 hospital days, on average, with a median of 1 day. Falls were the leading cause of pediatric injury hospitalizations for all age groups with the exception of the oldest (age 15 to 19), where the leading cause of injury admission was motor vehicle collision (Figure 4). In 2005–2006, the proportion of hospitalizations caused by falls ranged from 20.4% in those aged 15 to 19 years to 54.7% in children aged 5 to 9 years.

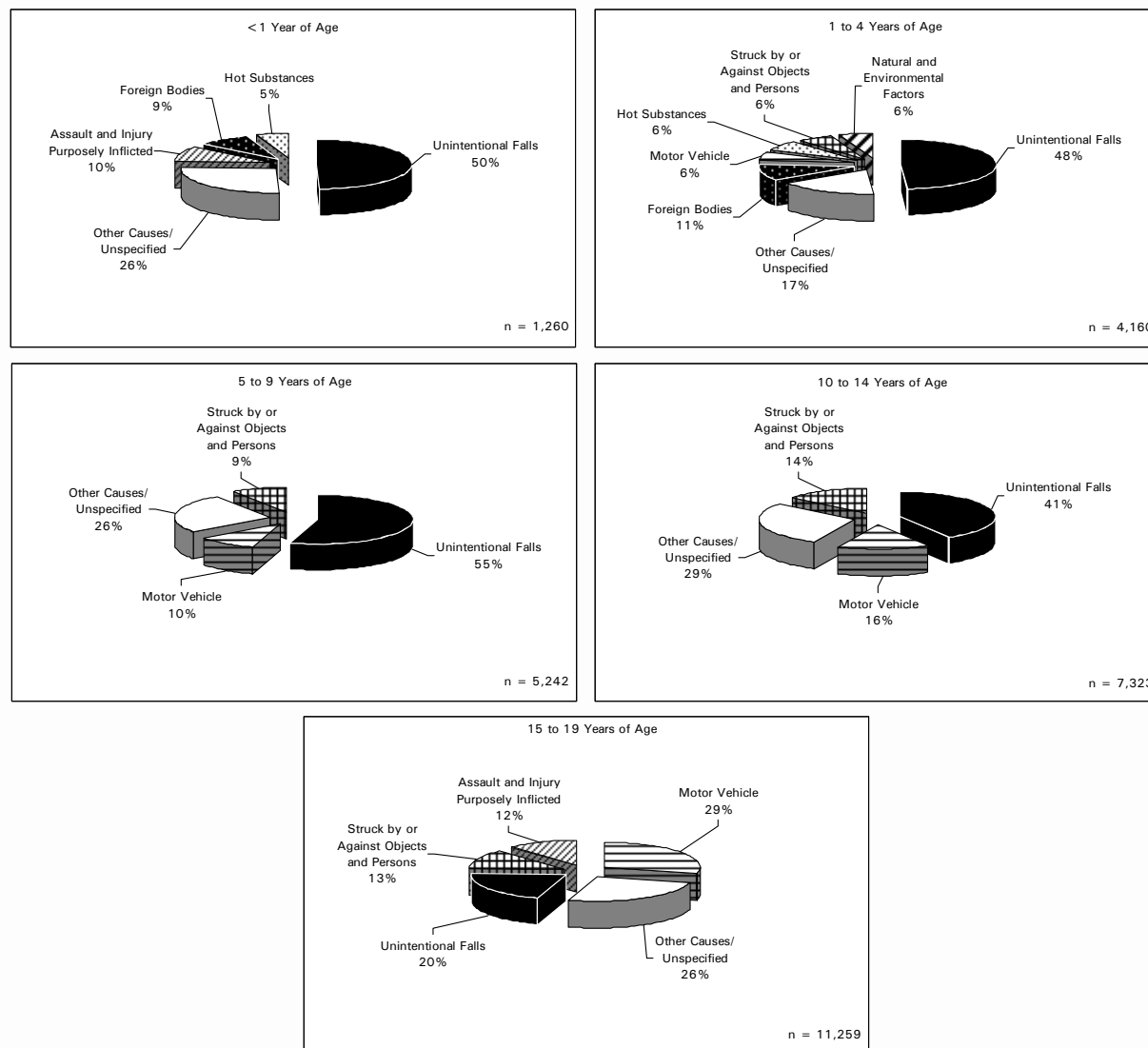
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Motor vehicle collisions accounted for 17.9% of all pediatric hospital admissions in 2005–2006 and were responsible for 32,118 hospital days in Canada. The average length of stay in hospital was 6 days, with a median of 3 days. Motor vehicle collision was among the top six specified causes of injury hospitalizations for all of the age groups with the exception the youngest (< 1 year of age) (Figure 4). The proportion of hospitalizations caused by motor vehicle collisions ranged from 6% in children aged 1 to 4 years and was highest in those aged 15 to 19 years. Among those aged 15 to 19 years, motor vehicle collisions were responsible for 29.3% of all pediatric injury hospitalizations.

In 2005–2006, *being struck by a person or an object* was the third leading cause of pediatric injury in Canada, accounting for 11.1% of admissions in Canada and responsible for 8,456 hospital days. The average length of stay in hospital was 2.6 days, with a median of 1 day. Being struck by a person or an object was among the leading specified causes of injury for all age groups except those under 1 year (Figure 4). The proportion of hospitalizations due to this cause ranged from 6% in those aged 1 to 4 years and was highest among those aged 10 to 14 years, where it was responsible for 14% of all admissions to hospital in 2005–2006.

Figure 4 Leading Causes of Pediatric (Age < 20) Injury Hospitalizations, by Age Group, Canada, 2005–2006



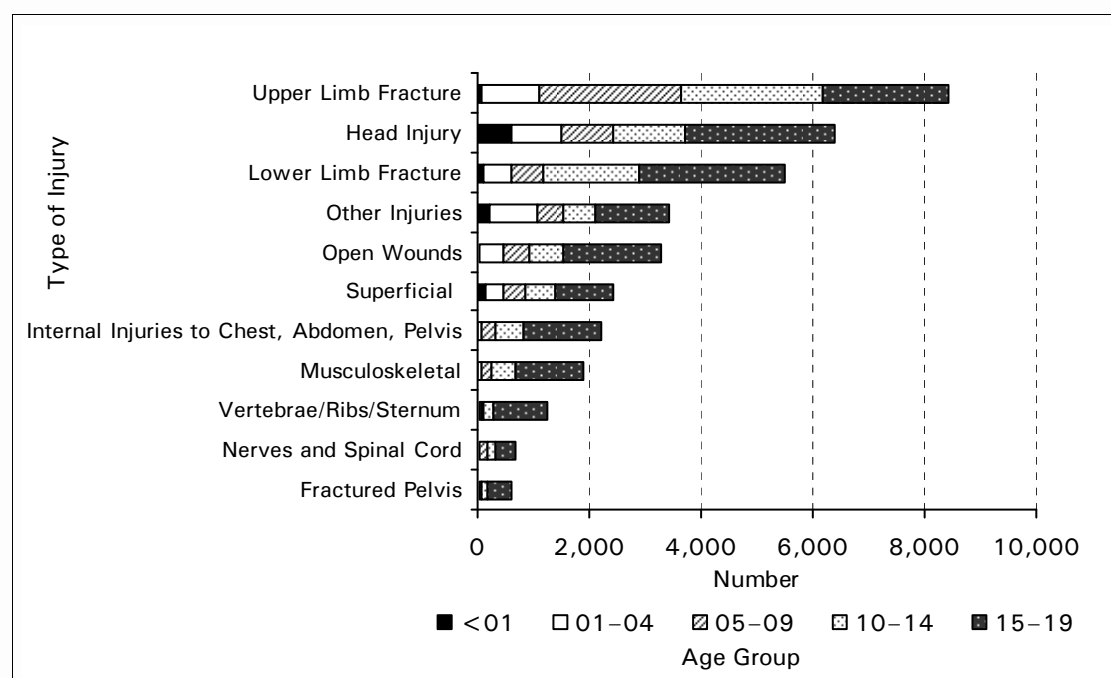
Source

National Trauma Registry Minimum Data Set, 2005–2006, Canadian Institute for Health Information.

Injuries Sustained

Looking at all pediatric trauma hospitalizations, two of the top three most commonly reported injuries were orthopedic in nature, with 8,437 upper limb fracture injuries and 5,515 diagnoses of lower limb fractures (Figure 5). Head injuries were the second most common injury, reported in 6,382 cases. These three injury types were also among the most common diagnoses when examined by age group, with the exception of those aged <1 year. In this group, head injuries were the most common, followed by superficial and orthopedic injuries.

Figure 5 Types of Injuries Sustained Among Pediatric Injury Hospitalizations by Age Group, Canada, 2005–2006



Source

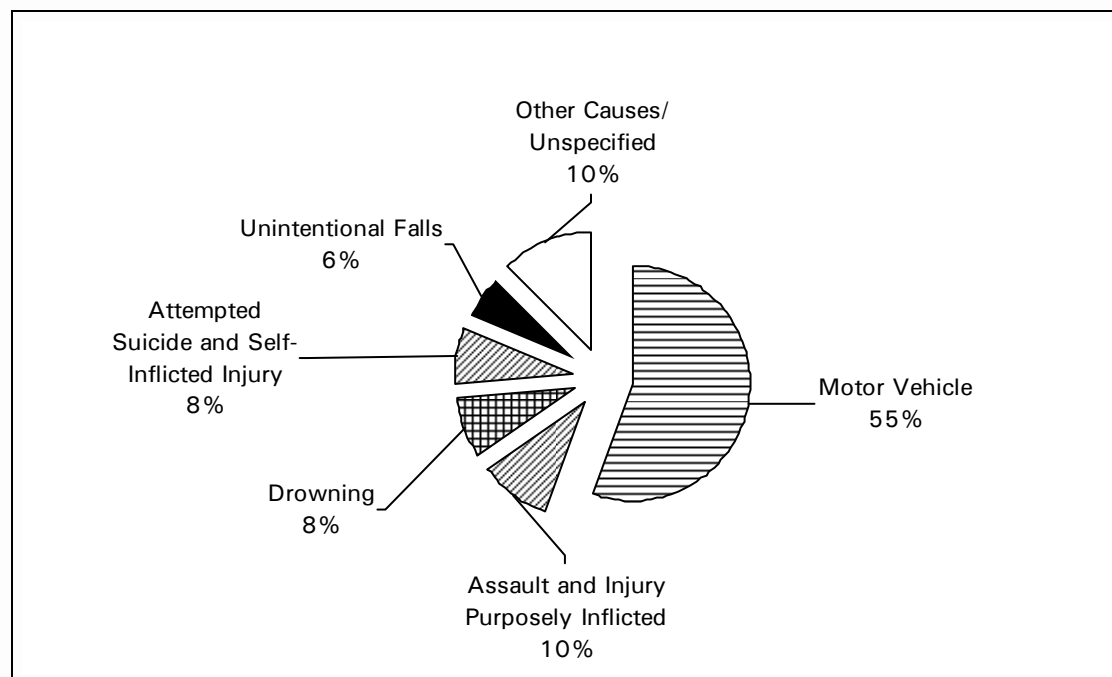
National Trauma Registry Minimum Data Set, 2005–2006, Canadian Institute for Health Information.

Leading Causes of In-Hospital Deaths

In 2005–2006, there were 182 in-hospital deaths among pediatric injury hospitalizations, representing 3% of all in-hospital deaths due to injury in Canada (n = 7,007).

The leading causes of injury that resulted in death among those under age 20 years were motor vehicle collisions (55.5%), followed by assault and injury purposely inflicted (9.9%), drowning (8.2%), attempted suicide and self-inflicted injury (7.7%) and unintentional falls (6.0%) (Figure 6). Other causes, such as being struck by or against objects and persons, suffocation and incidents involving other road vehicles, were among the causes accounting for the remaining 13% of deaths.

Figure 6 Leading Causes of Pediatric Injury Hospitalizations Among In-Hospital Deaths, Canada, 2005–2006 (n = 182)



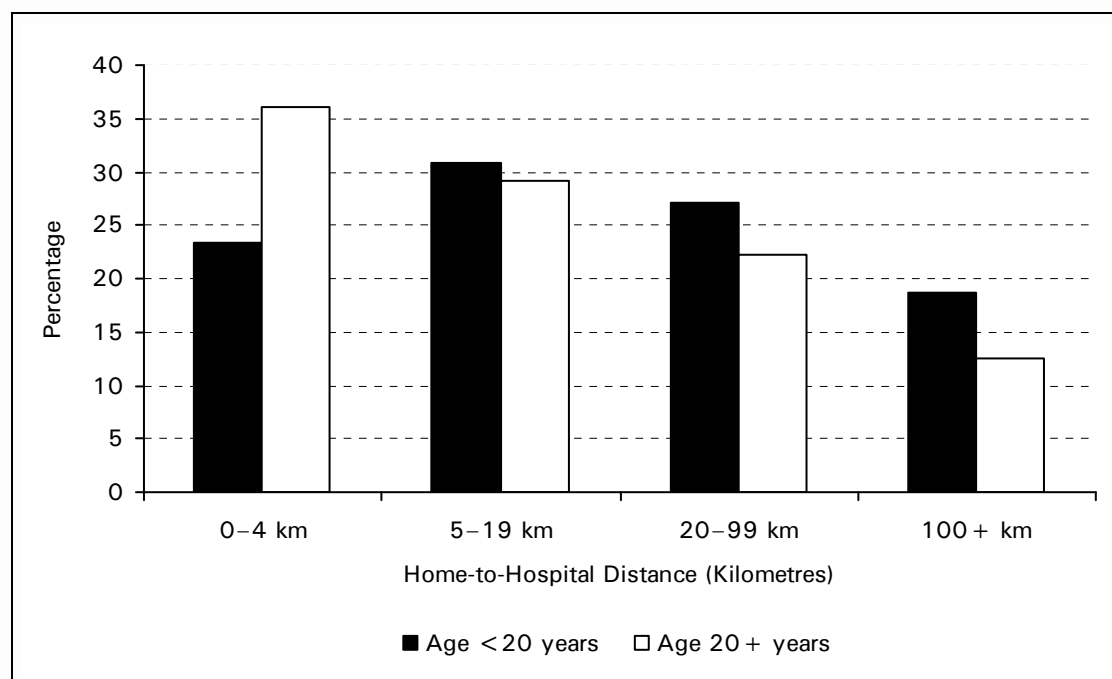
Source

National Trauma Registry Minimum Data Set, 2005–2006, Canadian Institute for Health Information.

Home-to-Hospital Distance

Effective trauma care has been associated with early intervention and treatment of injuries.² In light of this view, efforts are focused on ensuring that patients receive treatment as quickly as possible after a traumatic injury. In 2005–2006, 18.7% of those aged less than 20 years were admitted to an acute care hospital that was 100 kilometres or more away from their home (Figure 7). Among those aged 20 years or more, 12.5% were admitted to a hospital located 100 kilometres away or more. Pediatric trauma services are highly specialized and not available at all facilities. The higher proportion of patients under age 20 years who were required to travel longer distances for care is consistent with the fact that not all hospitals are equipped to provide specialized trauma care to pediatric patients, resulting in children travelling farther for in-patient care.

Figure 7 Home-to-Hospital Distance (in Kilometres) by Age Group, Canada, 2005–2006



Note

Information on home-to-hospital distance is missing for 29% of cases.

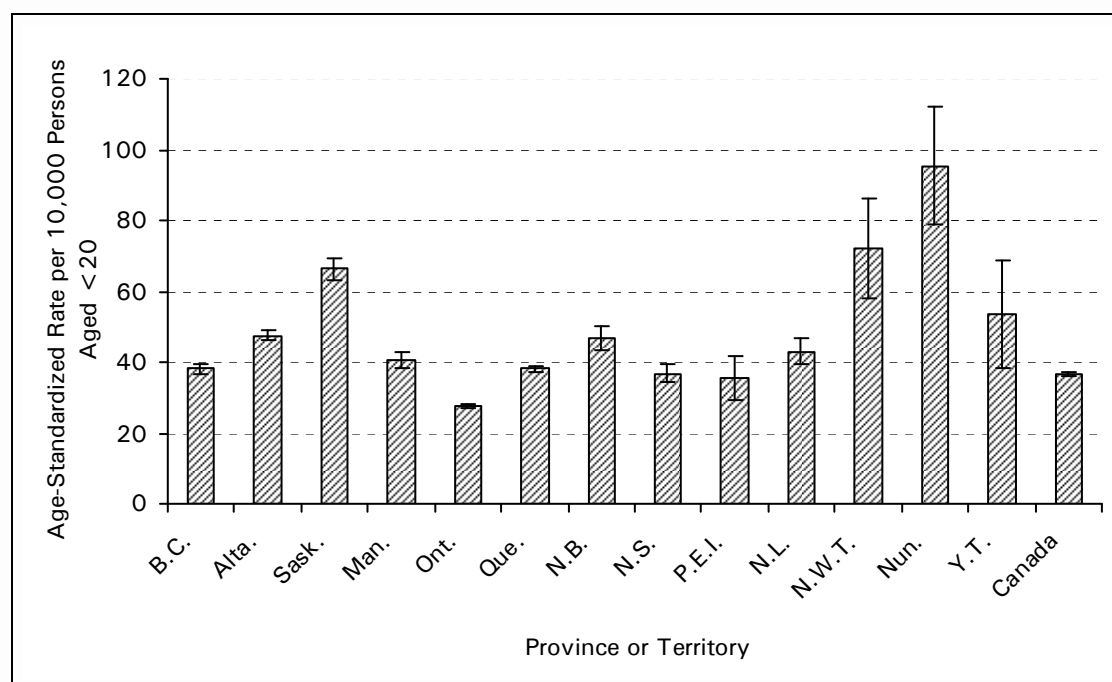
Source

National Trauma Registry Minimum Data Set, 2005–2006, Canadian Institute for Health Information.

Pediatric Injury Hospitalizations by Province and Territory

The age-standardized pediatric injury hospitalization rate varied among the provinces and territories (Figure 8). In 2005–2006, rates were highest in Nunavut (95.3 per 10,000 persons under 20 years of age) and the Northwest Territories (72.1 per 10,000 persons under 20 years of age) and lowest in Ontario (27.4 per 10,000 persons under 20 years of age). These differences speak to the fact that there are local factors involved in hospital admissions for injury including, but not limited to, the availability of trauma services, injury prevention programs, differing clinical practice patterns, lifestyle factors and administrative or legislative variations.

Figure 8 Age-Standardized Pediatric Injury Hospitalization Rate (per 10,000 Persons Under 20 Years of Age), by Province and Territory, Canada, 2005–2006



Source

National Trauma Registry Minimum Data Set, 2005–2006, Canadian Institute for Health Information.

Conclusions

The number of children hospitalized for an injury each year in Canada has steadily declined in recent years. In 2005–2006, males and those aged 15 to 19 years were most likely to be admitted to hospital with an injury. The analyses show that for those aged less than 15 years, the leading cause of injury is unintentional falls. For those aged 15 to 19 years, motor vehicle collision is the leading cause of injury. Injuries most often sustained were orthopedic and head injuries. Among pediatric injury hospitalizations, motor vehicle collision was the leading cause of death. Pediatric trauma patients are more likely to be admitted to hospital farther from home than adult trauma patients.

Injuries, intentional and unintentional, are a large health concern in all regions of the world, accounting for 16% of the global burden of disease in 1998.³ In Canada and the United States, injuries are the leading cause of death for those between the ages of 1 and 44 years, as they are in many other countries and regions, including Taiwan, Thailand, Latin America and China.^{4, 5, 6, 7} Trauma is increasingly recognized as a global public health concern. At the same time, injuries are also considered one of the most preventable major health problems; it has been estimated that 90% of injuries are preventable.⁸

The National Trauma Registry at CIHI strives to be the primary source of comparative pan-Canadian trauma information in support of system planning and management, policy-making and quality improvement.

The prime objectives of registries are to collate information collected from defined groups over time that may be used toward:

- The prevention or treatment of disease or injury;
- The provision of care;
- The monitoring of changing patterns of disease or treatments; and
- The evaluation and planning of services provided.

Trauma registries play an important role in supporting the goal of decreasing morbidity and mortality by providing accurate and comprehensive information on injury. Effective injury-prevention strategies can be developed and improved through the accumulation and assessment of local, regional, provincial and national trauma statistics.⁹

Acknowledgements

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