

At-a-glance

Injuries among Canadian children and youth: an analysis using the 2019 Canadian Health Survey on Children and Youth

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Abstract

This work provides an overview of injury patterns in Canadian children and youth aged 1 to 17 years. Self-reported data from the 2019 Canadian Health Survey on Children and Youth were used to calculate estimates for the percentage of Canadian children and youth who experienced a head injury or concussion, broken bone or fracture, or serious cut or puncture within the last 12 months, overall and by sex and age group. Head injuries and concussions (4.0%) were the most commonly reported, but the least likely to be seen by a medical professional. Injuries most frequently occurred while engaging in sports, physical activity or playing.

Keywords: children, youth, unintentional injuries, head injuries, concussions, fractures, punctures

Introduction

Childhood injuries are a major public health issue in Canada. Unintentional injuries are the leading cause of death, morbidity and potential years of life lost among Canadian children and youth.¹⁻⁵ During the 2018/19 fiscal year, there were 20 626 injury hospitalizations among those aged 0 to 19 years in Canada (excluding Quebec), 77% of which were unintentional.⁶ Injury hospitalizations only reflect the most severe injuries, and less severe injuries can also impact quality of life and development.^{6,7}

The majority of unintentional injuries in children and youth are preventable.^{2,8} Understanding patterns in self-reported injuries, including injury types and activities leading to injury, is necessary to inform prevention efforts. This article provides a national overview of self-reported injuries and injuries leading to medical consultation over a one-year period using data from the 2019 Canadian Health Survey on Children and Youth (CHSCY). The 2019 CHSCY captured both

severe and less severe injuries among children and youth, unlike hospitalization or emergency department data, which typically only capture severe injuries. The 2019 CHSCY collected data for a large sample of children aged 1 to 17 years, covering a broader age range of children compared to other national surveys such as the Canadian Community Health Survey (CCHS).

Methods

Data source and study population

This study used data from the 2019 CHSCY, a voluntary cross-sectional survey conducted by Statistics Canada. The 2019 CHSCY covered a national sample of the Canadian population aged 1 to 17 years living in all provinces and territories. Those living on First Nation reserves and other Indigenous settlements, those living in foster homes and the institutionalized population were excluded from the survey. The sampling frame for the CHSCY was the Canada Child Benefit file, which covers 98% of Canadians aged 1 to

Highlights

- Overall, head injuries or concussions were the most commonly reported injury (4.0%), among the types of injuries surveyed.
- Serious cuts and punctures were most common among young children (aged 1 to 4 years), fractures were most common among children aged 10 to 14 years and head injuries or concussions were most common in youth aged 15 to 17 years.
- The most common activities that children and youth were partaking in when the injury occurred were playing and engaging in sports or physical activity.
- The majority of self-reported injuries led to a consultation from a medical professional.

17 years in the provinces and 96% in the territories. Data collection occurred between February and August 2019. The data used in this study were collected via questionnaires administered to the person most knowledgeable (PMK) about the selected child or youth, which was usually a parent. A total of 92 172 individuals were sampled for the 2019 CHSCY, with an overall response rate of 52%.⁹ The sample for the current study was composed of 39 951 children and youth for whom injury data were available (43% of total sample).

Variables

Injury type

The 2019 CHSCY asked PMKs whether the child had (1) a head injury or concussion;

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(2) a broken or fractured bone; and (3) a serious cut or puncture during the past 12 months (response options: yes/no). Since these were the only categories used in the survey, this study is only able to present results based on these three injury categories.

Injury leading to a consultation from a health care professional

For each reported injury type, PMKs were asked whether a health care professional was consulted for that injury (response options: yes/no). For individuals who had multiple injuries of a single type, they were asked whether a health care professional was consulted for the most serious injury.

Activity during injury

For each reported injury type, PMKs were asked what the child was doing when the injury occurred. Responses were categorized as (1) riding a bike; (2) sports or physical activity other than riding a bike; (3) riding or driving an off-road or road motor vehicle; (4) playing; or (5) other, including household chores, outdoor yard maintenance or paid/unpaid work. Although these are not mutually exclusive activities, PMKs were only able to select one activity.

Statistical analysis

Descriptive statistics were used to calculate the weighted percentage and 95% confidence intervals for children who experienced each injury type in the past 12 months overall, and stratified by age (1–4, 5–9, 10–14, 15–17 years) and sex (male, female). Survey sampling weights were provided by Statistics Canada to generate nationally representative estimates, and 95% confidence intervals were estimated using the bootstrap method. Analyses were conducted in SAS EG 9.4 (SAS Institute Inc., Cary, NC, US).

Results

The percentages of self-reported injuries among children and youth are shown in Table 1. Among the surveyed injury types in children and youth, head injuries/concussions occurred most commonly (4.0%), followed by fractures (3.2%) and serious cuts/punctures (2.5%). Head injuries were most common among those aged 15 to 17 years and more common among males. Fractures were most common among those aged 10 to 14 years and more

common among males compared to females. Serious cuts/punctures were most common in the youngest age group (aged 1–4 years), and were more common among males.

Table 1 also presents the percentage of injuries that led to a consultation from a health care professional. The majority of fractures (93.9%) led to a consultation, compared to 80.7% of serious cuts/punctures and 76.5% of head injuries or concussions. The percentage of head injuries or concussions that led to a medical consultation was highest in the oldest age group (15–17 years). The percentages of injuries that led to a consultation from a health care professional were similar between males and females for all injury types.

Among the injuries surveyed, the most common activities that children and youth were partaking in when the injury occurred were playing, sports or physical activity, and other (Table 2). Children aged 1 to 9 years were most frequently playing at the time of injury, whereas children and youth aged 10 to 17 years were more frequently engaging in sports or physical activity at the time of injury (data not shown). The percentage of injuries that led to a consultation from a health professional differed by type of activity and injury type. Among head injuries and serious cuts/punctures, riding an on- or off-road motor vehicle was the activity most likely to lead to a medical consultation, whereas sustaining a fracture while riding a bike or playing was most likely to lead to a medical consultation.

Discussion

This study provides an overview of the prevalence of self-reported injuries and injuries leading to a medical consultation among Canadian children and youth. Of the injuries examined, head injuries/concussions occurred most commonly, followed by fractures and serious cuts/punctures. Injuries tended to be more common in males, regardless of injury type. The percentage of head injuries/concussions and fractures increased with increasing age, while serious cuts/punctures decreased with increasing age. These findings are in line with hospitalization patterns, indicating that males have higher rates of head injury and fracture-related hospitalization,¹⁰ and that head

injuries and concussions are more common in older children.¹¹

Notably, our findings differ from the results of the 2009-2010 CCHS, in which the most common self-reported, activity-limiting injuries in youth (aged 12–19 years) were sprains/strains, fractures and cuts, punctures or animal bites.¹² The 2009-2010 CCHS reported fewer concussions, brain injuries and head injuries, whereas our study suggests a relatively high rate of head injuries/concussions compared to the other injury types that were assessed (broken bones or fractures and serious cuts or punctures). This is to be expected based on the differences in injury types assessed by each survey. The rate of head injuries/concussions leading to medical consultation was relatively low in our study. Other studies have reported increasing trends of head injuries/concussions over the last several years, especially among sports, physical activity and playing injuries.¹³⁻¹⁶

The most frequently reported activities at the time of head injury leading to a medical consultation were related to sports or motor vehicles. Similarly, previous findings have shown that head injuries occur most commonly during sports, accounting for over 80% of traumatic brain injuries among youth in Canada.¹⁷ Motor vehicle collisions are also a frequent cause of head injury hospitalizations in Canada and the US.^{11,18,19} In our study, sports, physical activity and playing were the most common activities leading to fractures. Other studies have also shown that fractures are the most common type of sports-related injury in Canadian children and youth,²⁰ and also account for the majority (> 80%) of injuries sustained on a playground.²¹ The most common activity leading to serious cuts/punctures was playing, likely because the majority of serious cuts/punctures occurred in children aged 1 to 4 years.

Most respondents sought medical consultation for their injury. Fractures were most likely to lead to a medical consultation (94% of injuries), likely due to the need for medical imaging or for the fracture to be set. Among head injuries/concussions, 77% of cases were seen by a health professional; this lower percentage is perhaps due to fewer physical symptoms or wearing a helmet at the time of injury.²² Research from the US indicated that only

TABLE 1
Percentage of Canadian children and youth who had an injury and the percentage of injuries that led to a consultation from a health care professional, by injury type, in a 12-month period, overall and stratified by age and sex

Sex	Age (years)	Head injury or concussion % (95% CI)	Broken bone or fracture % (95% CI)	Serious cut or puncture % (95% CI)
Percentage of injuries				
Overall	1–17	4.0 (3.7–4.2)	3.2 (2.9–3.4)	2.5 (2.3–2.8)
Females	1–17	3.4 (3.0–3.8)	2.9 (2.6–3.2)	1.8 (1.6–2.1)
	1–4	2.6 (2.0–3.2)	1.2 (0.7–1.6) ^c	2.3 (1.8–2.8)
	5–9	2.6 (2.1–3.2)	2.1 (1.6–2.5)	1.7 (1.2–2.2)
	10–14	3.7 (3.0–4.5)	4.7 (3.9–5.5)	1.6 (1.1–2.0) ^c
	15–17	5.3 (4.3–6.3)	3.6 (2.7–4.6)	1.9 (1.0–2.8) ^c
Males	1–17	4.5 (4.1–4.9)	3.4 (3.1–3.8)	3.2 (2.9–3.5)
	1–4	3.3 (2.7–4.0)	1.1 (0.7–1.4) ^c	4.3 (3.5–5.0)
	5–9	3.9 (3.3–4.6)	2.3 (1.8–2.9)	3.3 (2.7–3.9)
	10–14	5.4 (4.5–6.2)	5.6 (4.8–6.5)	2.4 (1.9–3.0)
	15–17	5.8 (4.6–7.0)	4.8 (3.8–5.9)	2.8 (1.9–3.7) ^c
Percentage of injuries that required medical consultation				
Overall	1–17	76.5 (73.6–79.5)	93.9 (91.5–96.4)	80.7 (77.2–84.3)
Females	1–17	76.0 (71.2–80.8)	94.1 (91.0–97.2)	76.5 (69.7–83.2)
	1–4	70.8 (61.0–80.7)	98.6 (95.9–100.0)	84.9 (76.8–93.0)
	5–9	66.0 (55.5–76.5)	95.5 (90.8–100.0)	69.7 (55.3–84.1)
	10–14	74.6 (64.7–84.4)	92.0 (86.2–97.7)	65.6 (50.1–81.0)
	15–17	89.9 (84.3–95.5)	95.4 (89.5–100.0)	88.4 (75.0–100.0)
Males	1–17	77.0 (73.2–80.7)	93.8 (90.2–97.4)	83.1 (79.2–87.0)
	1–4	64.8 (55.8–73.8)	98.4 (95.2–100.0)	83.1 (76.1–90.2)
	5–9	67.5 (59.5–75.5)	95.2 (88.1–100.0)	86.4 (80.4–92.4)
	10–14	78.9 (71.6–86.1)	92.1 (86.1–98.1)	77.5 (68.7–86.3)
	15–17	94.6 (90.6–98.6)	94.7 (89.6–99.9)	84.7 (73.7–95.6)

Data source: 2019 Canadian Health Survey on Children and Youth.

Abbreviation: CI, confidence interval.

Note: Percentages and 95% confidence intervals are based on weighted data.

^c High sampling variability (coefficient of variation between 15.0% and 25.0%).

25% of injuries were severe enough to require medical attention, whereas Canadian studies align with our work, reporting that the majority of injuries required medical attention.^{23–25} The variation seen in seeking a medical consultation for the different types of injuries may be attributable to factors such as injury severity, general awareness, household income/education and health care access.^{13,23,26,27}

Strengths and limitations

The 2019 CHSCY was a national survey covering Canadians aged 1 to 17 years from all provinces and territories, and injury estimates were weighted to be nationally representative of this population. However, this study was subject to several limitations. The sample size was

insufficient to provide additional socio-demographic breakdowns (e.g. province/territory or socioeconomic status) that would provide further insight into injury patterns, considering that relatively few (< 5%) children in our sample reported an injury. Due to the survey design, only a few injury types were included, which reduces comparability to other research. Data were only collected at one time point, precluding the examination of self-reported injuries over time. Further, injuries were reported by PMKs, and may not have been clinically diagnosed. No definition of “serious” cut or puncture was provided in the questionnaire, likely resulting in subjective reporting. Data were also collected retrospectively, and may have been prone to response and recall biases.

Conclusion

Injuries among children and youth continue to be a public health concern in Canada. In our study, injuries most commonly occurred while playing or engaging in sports or physical activity, and injuries were more common among males. By capturing less severe injuries that are often missed in administrative databases, these results address a gap in Canadian injury surveillance. Understanding the variation in injuries across age groups and the activities taking place when the injury is sustained can help inform prevention efforts.

Conflicts of interest

The authors declare that they have no conflicts of interest.

TABLE 2
Percentage of injuries and injuries that led to a consultation from a health care professional, occurring during different types of activities, by injury type, in a 12-month period

Activity	Head injury or concussion % (95% CI)	Broken bone or fracture % (95% CI)	Serious cut or puncture % (95% CI)
Percentage of activities			
Riding a bike	2.0 (0.9–3.0) ^D	3.5 (2.1–4.8) ^C	7.0 (4.8–9.3) ^C
Sport or PA	44.8 (41.2–48.3)	51.9 (47.9–55.8)	13.2 (9.9–16.4)
Motor vehicle	2.7 (1.7–3.7) ^C	2.1 (1.0–3.2) ^D	— ^E
Playing	31.3 (28.2–34.5)	26.8 (23.3–30.2)	45.3 (41.1–49.6)
Other	19.3 (16.4–22.1)	15.8 (12.8–18.8)	31.6 (27.7–35.6)
Percentage of activities that required medical consultation			
Riding a bike	81.5 (59.9–100.0)	97.3 (93.6–100.0)	69.2 (53.3–85.0)
Sport or PA	83.3 (79.2–87.5)	93.1 (89.3–96.9)	77.3 (66.0–88.6)
Motor vehicle	93.2 (84.1–100.0)	89.4 (69.9–100.0)	100.0 (100.0–100.0)
Playing	65.4 (59.9–70.8)	97.3 (95.1–99.6)	83.1 (78.3–87.9)
Other	76.9 (70.1–83.6)	92.8 (86.1–99.4)	80.5 (74.3–86.6)

Data source: 2019 Canadian Health Survey on Children and Youth.

Abbreviations: CI, confidence interval; PA, physical activity.

Notes: Percentages and 95% confidence intervals are based on weighted data. “Sport or PA” refers to sports or physical activity other than riding a bike; “motor vehicle” refers to riding or driving an off-road or on-road motor vehicle; “other” refers to household chores, outdoor yard maintenance or paid/unpaid work.

^C High sampling variability (coefficient of variation between 15.0% and 25.0%).

^D High sampling variability (coefficient of variation between 25.0% and 35.0%).

^E High sampling variability, unreportable (coefficient of variation greater than 35.0%).

Authors’ contributions and statement

CW, ST, SZ, SRM and WT conceptualized the project and methodology. CW and ST conducted the analysis and led the writing of the manuscript. All authors provided feedback on the draft, and reviewed and approved the final manuscript.

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