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Injuries in Sport, Recreation and Exercise

Regular participation in sport, recreation and exercise is important to overall health. Higher levels of physical activity, along with proper nutrition and other factors, are generally associated with a lower likelihood of excess body weight and a lesser risk of developing certain chronic non-communicable diseases across the life course, such as diabetes, cardiovascular diseases, osteoporosis, and some forms of cancer. It is also linked to positive mental health and well-being.

About half (51.0 per cent) of New Brunswickers aged 12 and over reported being at least moderately active in the 2011 Canadian Community Health

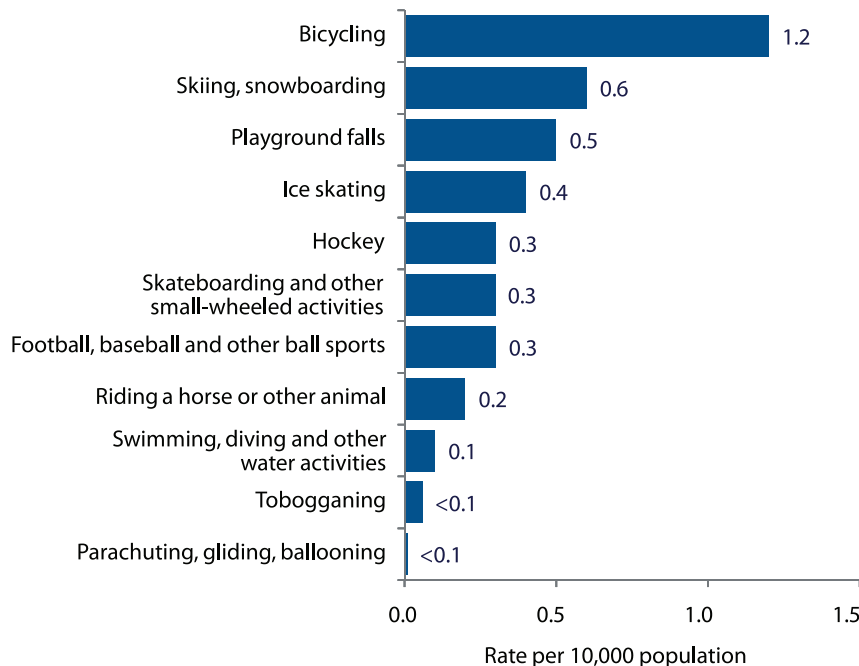
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Survey (CCHS), which is about the same as the national average (53.8 per cent) [1]. The most popular leisure-time activities across the country include walking, gardening, home exercise, jogging or running, swimming and bicycling [2].

Participation in sport, recreation and exercise contributes to good health, but there is also an inherent risk of injury in any physical activity. One-third (35 per cent) of injuries among Canadians serious enough to limit normal activities occur during participation in some type of sports or exercise [3]. In New Brunswick, each year a small but non-negligible proportion of injuries result in hospitalization or even death [4]. Injuries can happen at any age and in any environment. However, injury risks vary according to the type of activity. Bicycling, skiing or snowboarding, and playground-related injuries are among the most common categories of hospitalizations associated with sport, recreation and exercise in the province (Figure 1).

Figure 1
Hospitalization rates for injuries related to selected sport, recreation and exercise activities, New Brunswick



Note: Data for New Brunswick residents receiving acute inpatient hospital care for injuries, categorized according to the International Classification of Diseases and Related Health Problems (ICD-10-CA). Emergency and ambulatory care excluded.

Source: Office of the Chief Medical Officer of Health, using data from the Discharge Abstract Database for 2004-08 (total number of injury-related hospitalizations for selected sport, recreation and exercise activities: 1525 over the five-year period) and population estimates from Statistics Canada.

Injury risks vary across population groups. Males generally have higher rates of morbidity and mortality due to unintentional injuries than females [3,4], including higher rates of injury-related hospitalizations related to many types of sport, recreation and exercise activities (Figure 2). Sport and recreation injuries are an important cause of hospitalization, disability and mortality among children and youth [5,6]. Also, those living in lower income areas may have less access to safe playing environments, as parks and fields may be less well maintained, leading to greater risks of injury [7]. Injuries are an important reason why people may stop participating in potentially beneficial physical activity [8].

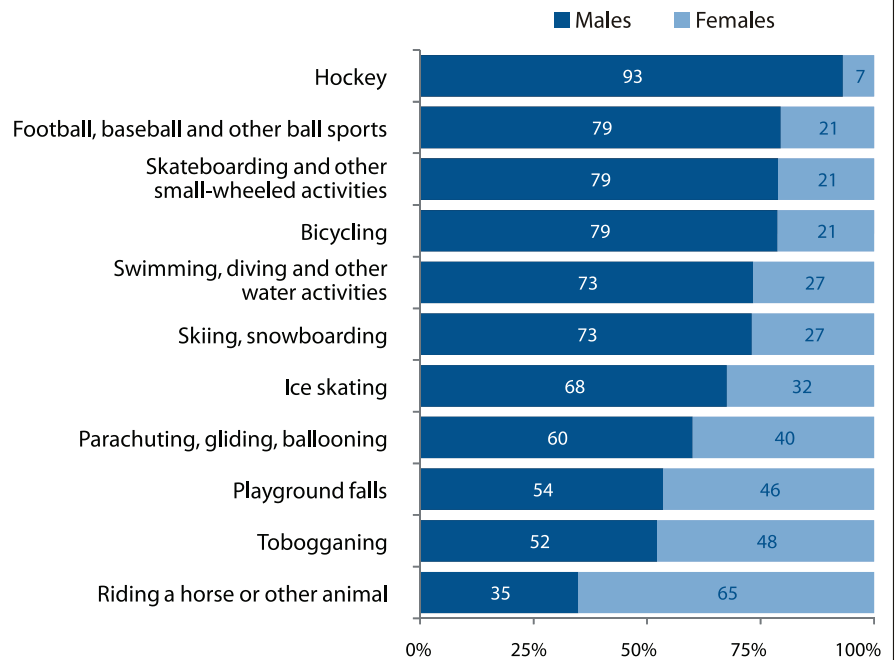
Certain exercises have been shown to reduce the risk of injury. For instance, Tai Chi programs targeted to older individuals are associated with preventing injuries from unintentional falls [9]. Enhancing efforts to advance the health of the entire population and mitigate adverse effects of injuries in sport, recreation and exercise entails strengthening surveillance and monitoring of injury indicators as well as of participation in different types of physical activity [10]. Understanding the risks and impacts of injuries can help ascertain priorities for prevention policies, programs and services to reduce the frequency and severity of injuries and to support everyone to fully engage and enjoy regular participation in sport, recreation and exercise.

Bicycling

Based on CCHS data, one-quarter of Canadians aged 12 and older (23.9 per cent) reported going bicycling at least once as a leisure-time activity in the previous three months [11]. Males were significantly more likely to have bicycled than females (28.7 per cent versus 19.3 per cent). People who are active during their leisure time are also more likely to be active in other aspects of their lives, such as using their bicycle as a

Figure 2

Sex distribution of injury-related hospitalizations for selected sport, recreation and exercise activities, New Brunswick



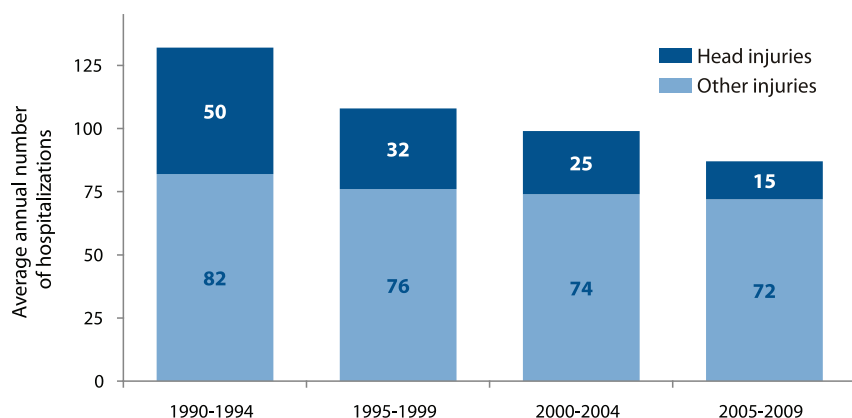
Source: Office of the Chief Medical Officer of Health, using data on acute-care hospitalizations from the Discharge Abstract Database (five-year period estimates 2004-08).

means of transportation to work, to school or to do errands. While the health benefits of bicycling for the most part far outweigh the safety risks, injuries still occur. Cycling injuries are the most common injury related to summer sport and recreational activity across Canada; half of these injuries occur in June, July and August [12].

In New Brunswick, an average of 87 acute-care hospitalizations (1.2 per 10,000 population) occur each year among cyclists due to injuries (Figure 3). This is down from the annual average of 132 hospitalizations (1.8 per

Figure 3

Trends in the number of hospitalizations of injured cyclists, New Brunswick, 1990-94 to 2005-09

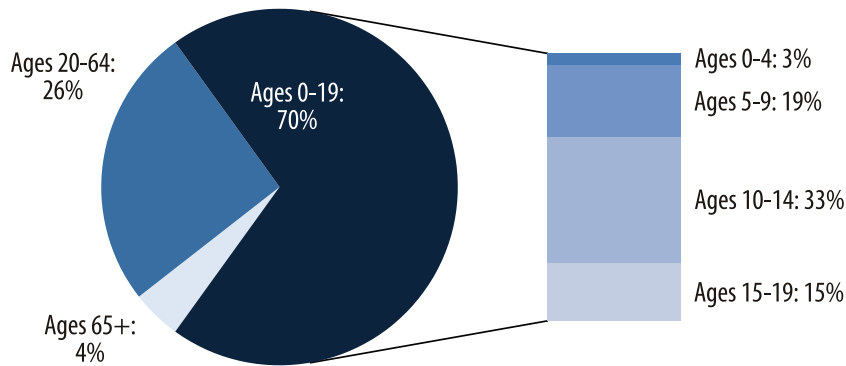


Note: Data for acute-care hospitalizations among injured cyclists [ICD-10-CA codes: E800-E807(.3), E810-E825(.6), E826-E829(.1), V10-V19].

Source: Office of the Chief Medical Officer of Health, using data from the Discharge Abstract Database (five-year period estimates).

Figure 4

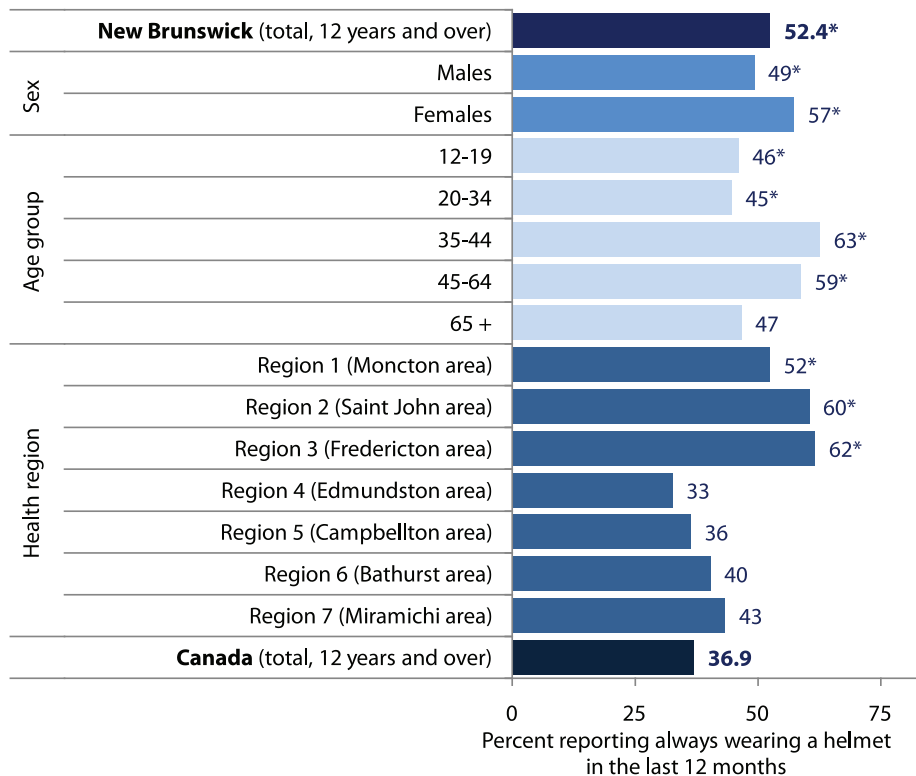
Distribution of hospitalizations of injured cyclists by age group, New Brunswick



Source: Office of the Chief Medical Officer of Health, using data on acute-care hospitalizations from the Discharge Abstract Database (five-year period estimates 2004-08).

Figure 5

Rates of helmet use when riding a bicycle among the population aged 12 and over, by selected characteristics, New Brunswick, Canada, 2009-10



Note: * = statistically higher than the Canadian rate ($p < 0.05$). Data are based on self-reports and subject to recall errors; estimates for small populations are associated with a higher degree of variability and should be interpreted with caution.

Source: Statistics Canada, Canadian Community Health Survey 2009-10 (two-year period estimates; sample size for New Brunswick: 4,598).

10,000 population) in the early 1990s. There is evidence that legislative change and educational campaigns for promotion of bicycle helmets, combined with area-wide environmental change on traffic speeds, can achieve positive safety effects [13]. Since the adoption of the province's all-ages bicycle helmet law in 1995, the decline in hospitalizations for cycling injuries in New Brunswick has been much greater for head injuries (70 per cent decline between 1990-94 and 2005-09) than for other types of bodily harm (12 per cent decline over the same period). Head injuries occur relatively less often, but are noteworthy because they may have serious consequences. Information gaps persist, however, notably in terms of differences in New Brunswickers' cycling habits and environments, impacts of public awareness initiatives, consistency of enforcement practices, and the social and economic environments which may contribute to an increased likelihood of injury and trauma among specific population groups.

Given their higher cycling participation rates, males account for the majority of hospitalizations for cycling-related injuries in New Brunswick (79 per cent). Hospital admissions for cycling injuries are most common among children and youth aged 19 and under (70 per cent), particularly in the 10-14 years age group (33 per cent) (Figure 4). It has been estimated that, for every hospital admission in New Brunswick for cycling-related injuries, another 12 cyclists are treated for injuries in an emergency department [14].

In 2009-10, among the 10 provinces, the hospitalization rate of cyclists with severe injury (requiring admission to a trauma care centre) was highest in British Columbia and Alberta and lowest in Ontario and Nova Scotia. After adjusting for inter-provincial differences in population age structure, New Brunswick ranked fifth [12].

National data indicate that 78 per cent of cyclists hospitalized with a severe head injury were not wearing a helmet when their injury occurred [12]. In New Brunswick, the rate of helmet uptake is significantly higher than the Canadian average: 52.4 per cent versus 36.9 per cent among those 12 and older (Figure 5) [15]. However there is room for improvement, particularly in Health Regions 4 to 7, where rates hover around the national average.

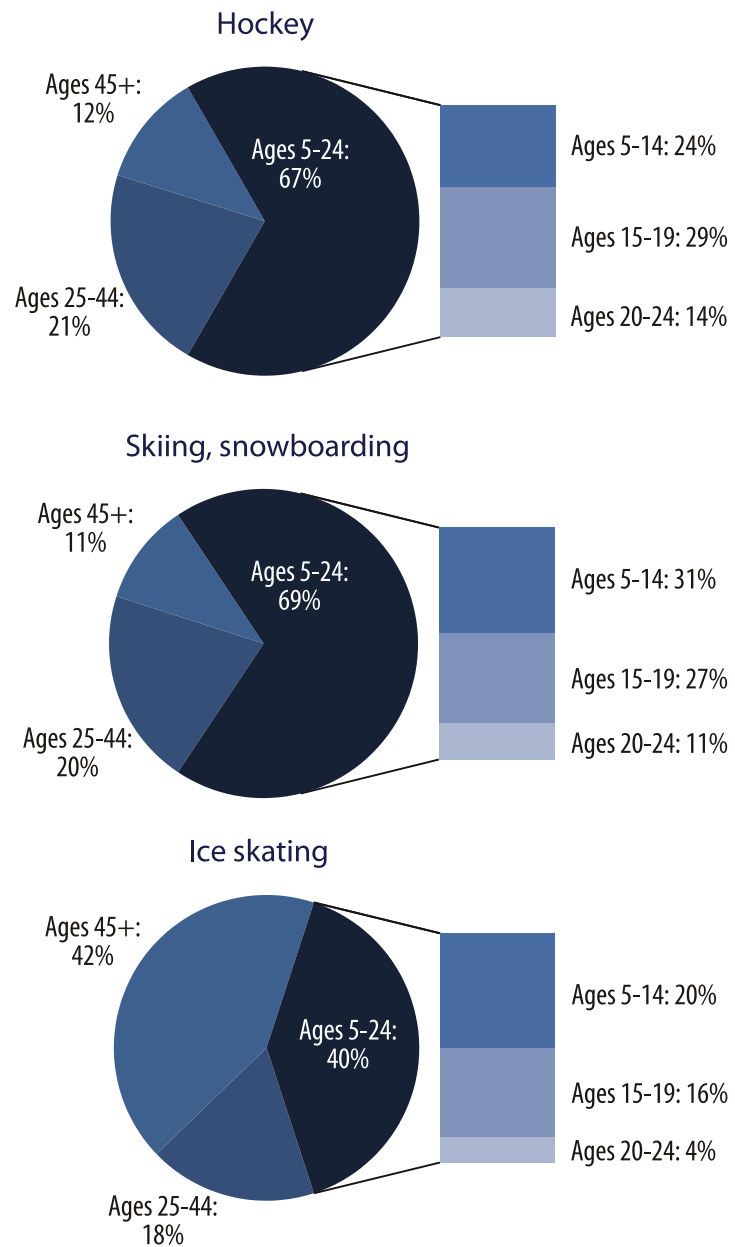
Between 2007 and 2011, five cyclists died in New Brunswick from injuries sustained as a result of a collision with a motor vehicle [16]. The economic burden of bicycling-related injuries in the province has been assessed at \$10 million per year, including \$6 million in direct costs to the health-care system (encompassing hospital, ambulatory, rehabilitation and home care) and \$4 million in indirect costs associated with reduced productivity from hospitalization, disability and premature death [14].

Winter sport and recreational activity

Winter sports are popular in Canada and ice hockey in particular is the most commonly practiced sport among adult men – although with the ageing of the population and other changing trends of Canadian families, active participation rates in many sports are decreasing [17]. About one in 50 New Brunswickers are registered hockey players (15,853 men, women and youth players in 2011-12), down by six per cent from a decade earlier (16,777 players in 2001-02) [18]. Others play unorganized hockey, or “pick-up” games. Many winter sports require special skills and involve motion at high speeds. Nine per cent of injuries seen in Canadian emergency departments among those aged five and over are related to ice and snow sport and recreation activities such as hockey, skiing, snowboarding and ice skating [19]. Twelve per cent of treated hockey injuries, nine per cent of skating injuries and

Figure 6

Age distribution of injury-related hospitalizations for selected winter sport and recreation activities, New Brunswick



Note: Data for acute-care hospitalizations for injuries sustained while engaged in certain winter sport and recreation activities: hockey [ICD-10-CA codes: W21(.02, .03), W22.02, W51.02], skiing/snowboarding [codes W02(.01, .04), W22.00], and ice skating falls [code W02.00].

Source: Office of the Chief Medical Officer of Health, using data from the Discharge Abstract Database (three-year period estimates 2009/10 to 2011/12).

seven per cent of downhill skiing or snowboarding injuries involve head injuries or concussions. Hockey injuries are the most commonly reported injury among school-aged boys [20].

In New Brunswick, approximately 30 hospital admissions occur each year (0.3 per 10,000 population) for injuries sustained while playing hockey, of which 93 per cent are among males. Two-thirds (67 per cent) are among youth and young adults aged 5-24 (Figure 6). Good equipment, proper skills, and educating coaches, athletes, families and spectators about risks of injury and their management are all important for safer play.

Approximately three per cent of Canadian youth and adults engage in downhill skiing or snowboarding [17]. These activities account for one of the most important numbers of hospitalizations for winter sport and recreation related injuries in New Brunswick: 44 per year on average (0.6 per 10,000 population), mostly males (73 per cent). Two-thirds (69 per cent) of hospitalizations are among those aged 5-24 (Figure 6). National survey results indicate that three out of five adolescents, and two out of five adults, wear a helmet for downhill skiing or snowboarding [3].

Ice skating injuries result in some 30 hospitalizations in New Brunswick each year (0.4 per 10,000 population), of which 68 per cent are among males. Skating related hospitalizations are less common among those aged 5-24 compared to selected other winter sport and recreation activities.

Playground activities

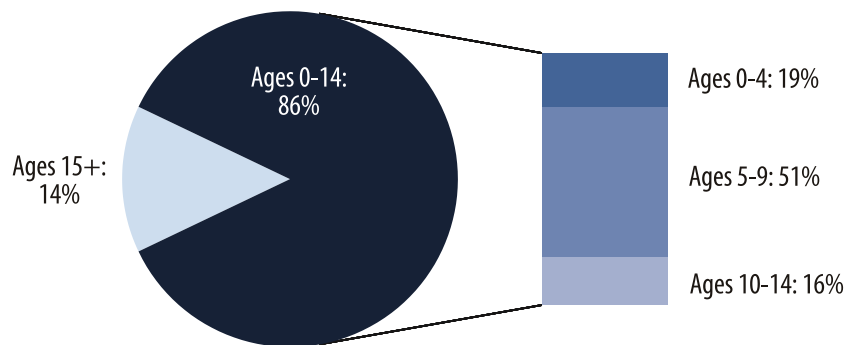
Climbing, jumping, swinging and running in a playground are positively linked with children's health, growth and development. Playgrounds are also associated with different types of injuries, some of which may have long-term consequences. In Atlantic Canada, approximately 12 per cent

of children up to age 14 hospitalized for playground injuries suffered severe head injuries [21]. Falls involving playground equipment, which constitute the majority of playground injuries, are one of the major causes of injury-related hospitalizations among children in New Brunswick and across Canada [21]. Knowledge about common playground injuries can help institute preventive measures. Some playground hazards are more obvious (e.g. trampolines) and others less so (e.g. a dangling scarf).

In New Brunswick, some 47 hospitalizations occur each year due to injuries from playground falls, the vast majority among children aged 0-14 (Figure 7). Just over half (54 per cent) are among males (see Figure 2). The most common type of playground equipment involved is a trampoline (Figure 8). It has also been estimated that there are 12 emergency department visits for

Figure 7

Distribution of hospitalizations for injuries from playground falls by age group, New Brunswick

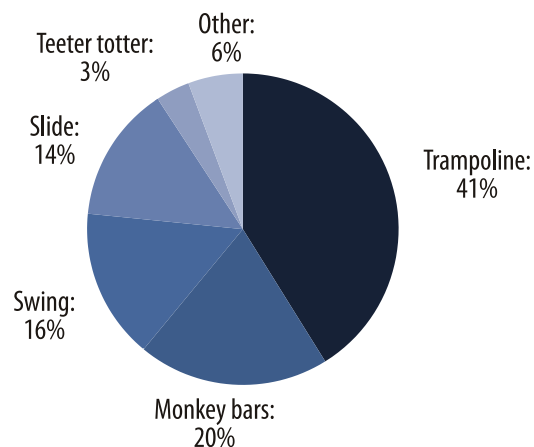


Note: Data for acute-care hospitalizations for injuries sustained from falls involving playground equipment [ICD-10-CA codes: W09(.01-.09)].

Source: Office of the Chief Medical Officer of Health, using data from the Discharge Abstract Database (three-year period estimates 2009/10 to 2011/12).

Figure 8

Distribution of hospitalizations for injuries from playground falls by type of equipment, New Brunswick



Note: Data for acute-care hospitalizations for injuries sustained from falls involving playground equipment [ICD-10-CA codes: W09(.01-.09)].

Source: Office of the Chief Medical Officer of Health, using data from the Discharge Abstract Database (three-year period estimates 2009/10 to 2011/12).

every one hospital admission due to a playground fall in the province [14]. Across Canada, schools and public parks are the most prevalent locations for playground injuries resulting in a child's visit to an emergency department (36 per cent and 34 per cent, respectively), followed by the home (19 per cent) [22]. The availability of relatively low-cost backyard trampoline models in Canada in recent years has been associated with increased frequency of trampoline-related injuries. The average number of emergency department visits due to falls from backyard trampolines increased nationally by 15.4 per cent annually between 1990 and 2007, with the median age of injured individuals being 10.1 years [23].

The economic burden of injuries from playground falls in New Brunswick has been assessed at \$4 million per year, with half being direct costs to the health-care system [14]. Deaths are rare; there has been one child death from a playground fall in Canada over the ten-year period from 2000 to 2009 [24].

Despite a prevailing attitude that childhood playground injuries are "accidental" events, generally unavoidable and often related to a lack of parental supervision, supporting evidence is limited. Most injuries are predictable and preventable. Safety legislation, equipment standards, and education and awareness initiatives help protect the younger population from playground-related injuries. Educational programs among communities, parents, caregivers and children have been shown to result in positive changes in safety-related behaviours during outdoor play and leisure [25]. Adult supervision is important, but alone is not scientifically linked to population-level reductions in childhood injury, in part because there is no definition of which supervisory practices are uniformly protective [26].

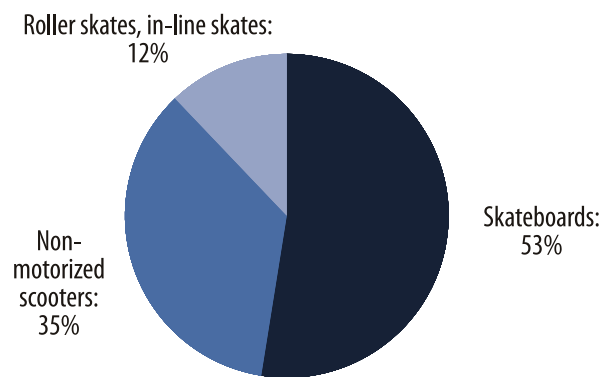
Other injuries in sport, recreation and exercise

Other sport, recreation and exercise activities where data on health impacts of injuries are available for New Brunswick include skateboarding and other activities using small-wheeled devices. Falls from skateboards, roller skates, in-line skates and non-motorized scooters result in an average of 33 hospitalizations in the province each year (Figure 9). Among skateboard-related hospitalizations, one-quarter entail a head or brain injury.

Injuries sustained while engaged in football, rugby, soccer, baseball and other ball sports account for another 21 hospitalizations each year in New Brunswick (Figure 10). The most popular ball sports regularly played among Canadian adults include golf, soccer, basketball, baseball and volleyball [17]. Soccer is the sport of choice for Canadian children aged 5-14 [17].

Figure 9

Distribution of hospitalizations for injuries related to selected small-wheeled recreational devices, New Brunswick

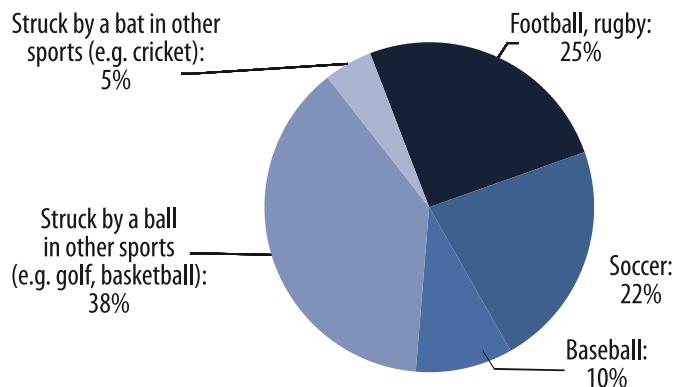


Note: Data for acute-care hospitalizations for injuries sustained from falls involving selected wheeled devices [ICD-10-CA codes: W02(.02, .03, .08)].

Source: Office of the Chief Medical Officer of Health, using data from the Discharge Abstract Database (three-year period estimates 2009/10 to 2011/12).

Figure 10

Distribution of hospitalizations for injuries related to selected ball sport activities, New Brunswick



Note: Data for acute-care hospitalizations for injuries sustained while engaged in selected sport and recreation activities involving a ball, bat or other equipment [ICD-10-CA codes: W21(.00-.01), W22 (.03-.05), W51(.03-.05)].

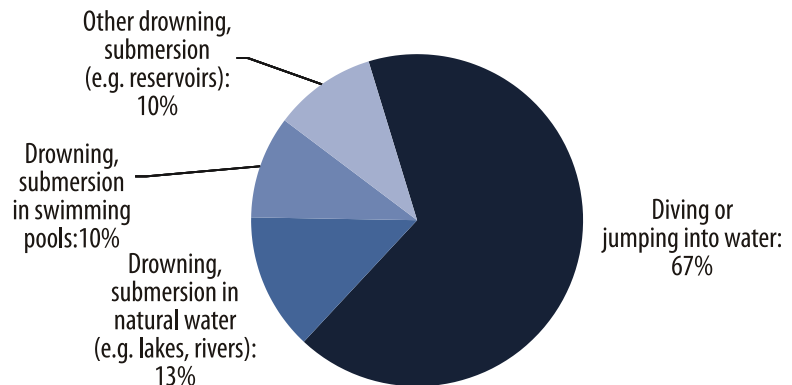
Source: Office of the Chief Medical Officer of Health, using data from the Discharge Abstract Database (three-year period estimates 2009/10 to 2011/12).

Swimming and other water related activities – in and around natural water, a swimming pool or other (not involving a watercraft) – lead to an average of six hospitalizations each year among New Brunswickers, mostly due to injuries resulting from diving or jumping into water but also due to drowning and submersion (Figure 11). Three-quarters of hospitalizations are among males and one-third occur in the 0-14 age group. Eight per cent of deaths due to drowning in New Brunswick during the period 2001-10 involved children less than 15 years old [16]. Young children have the highest drowning mortality rates worldwide [27]. Most of these fatalities are preventable. For example, research indicates that adequate four-sided fencing of swimming pools can prevent about three-quarters of all child drownings in pools [28]. In adults, the higher fatal and non-fatal drowning rates often observed among males is associated with increased exposure to water and riskier behaviours such as swimming alone and drinking alcohol before swimming [27]. Some evidence suggests Aboriginals populations in Atlantic Canada are at higher risk of drowning, attributed in part to the proximity of many communities to open water as well as limited access to swimming lessons and flotation devices [29].

Injuries related to sport, recreation and exercise can be measured in different ways. The present analysis largely draws on the hospital Discharge Abstract Database (DAD), using custom extractions of de-personalized records on clinical diagnoses for hospital stays due to external causes. Diagnoses are based on the underlying cause, defined as the circumstances of the incident or violence that produced the injury, and coded according

Figure 11

Distribution of hospitalizations for injuries related to selected water sport, recreation and exercise activities, New Brunswick



Note: Data for acute-care hospitalizations for injuries sustained in and around water [ICD-10-CA codes: W16, W67-W74]. Incidents involving watercrafts or other transport vehicles excluded.

Source: Office of the Chief Medical Officer of Health, using data from the Discharge Abstract Database (five-year period estimates 2004-08).

to the International Statistical Classification of Diseases and Related Health Problems, Tenth Revision, Canada (ICD-10-CA), the national standard for reporting morbidity statistics. Hospitalization data do not capture those treated and released from emergency departments, those treated in physicians' offices or clinics, or those who did not seek medical attention for an injury. In addition, there are some limitations to the ICD-10-CA. The classification system does not distinguish between certain sports (e.g. rugby grouped with football; golf, basketball and lacrosse categorized under "other") and does not enable identification of a number of exercises (e.g. weight-lifting, jogging). It does not enable identification of the intent of some physical activities (e.g. bicycling for recreation versus transportation to work; proximity to water for recreation versus everyday activities). Information from other health-related sources is used where readily available to complement the findings from the DAD and present a more holistic picture of the injury burden in New Brunswick, although data on participation in different kinds of physical activity remains fragmented. This analysis mainly focuses on human-powered activities, and not recreational activities requiring the use of a motor vehicle. Information on injuries related to recreational motor vehicles can be found in the previous issue of New Brunswick Health Indicators (Issue 6) [4].

Sport, recreation and exercise help promote and prolong good health. However, everyone needs to learn how to reduce the frequency and severity of injury at the individual, family and community levels in order to enjoy physical activities to the fullest. Effective injury prevention measures and initiatives could translate into significantly fewer sport, recreation and exercise related injuries each year, thereby reducing the burden on our health-care system while New Brunswickers benefit from better health in a safer environment.

For more information:

- [Public Health and prevention of unintentional injuries in New Brunswick](http://www2.gnb.ca/content/gnb/en/departments/ocmoh/healthy_people/content/injury_prevention.html): http://www2.gnb.ca/content/gnb/en/departments/ocmoh/healthy_people/content/injury_prevention.html
- [Public Health and injury prevention in Canada](http://www.phac-aspc.gc.ca/inj-bles/index-eng.php): <http://www.phac-aspc.gc.ca/inj-bles/index-eng.php>
- [Injury prevention for First Nations people in Canada](http://www.hc-sc.gc.ca/fniah-spnia/promotion/injury-bless/index-eng.php): <http://www.hc-sc.gc.ca/fniah-spnia/promotion/injury-bless/index-eng.php>
- [Safety tips related to recreation and sports](http://hc-sc.gc.ca/hl-vs/secureit/sports/index-eng.php): <http://hc-sc.gc.ca/hl-vs/secureit/sports/index-eng.php>
- [Safety tips to protect children at play](http://www.healthycanadians.gc.ca/kids-enfants/injury-blessure/index-eng.php): <http://www.healthycanadians.gc.ca/kids-enfants/injury-blessure/index-eng.php>

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