

# Skiing, Snowboarding & Sledding: Hospitalizations from Alpine Sports Injuries in Canada

## Understanding the Issue

### Injury risk in alpine sports

Alpine sports carry some level of injury risk due to their very nature, which includes elements such as high speeds, the potential to hit objects or people, the quality of equipment used, the level of experience of the individuals, and changing weather conditions.<sup>1,2</sup> However, efforts can be made to reduce the incidence and severity of these injuries. This Canada Injury Compass highlights the causes and risk factors for alpine sports injuries, as well as prevention strategies to address this injury issue.

For the purposes of this report, the term “alpine sports” is used as a collective term for skiing, snowboarding, and tobogganing/sledding. The data used is from the Hospital Morbidity Database (HMDB) from the Canadian Institute for Health Information (CIHI), and includes inpatient separations from acute care hospitals across Canada.

## Causes & Nature of Injuries

### Falls involving skis most common cause

In 2010/2011, the most common cause for alpine sport hospitalizations in Canada was a fall involving skis (1,141). This was followed by a fall involving snowboard (999) and striking or being struck by an object

while skiing or snowboarding (182). (See Table 1).

Of the hospitalizations related to alpine sports injuries from either falls involving skis/snowboard, or struck by/against a ski/snowboard, in Canada in 2010/11, where the cause was identified and an injury was diagnosed, almost 40% of all injuries were to the lower extremities, almost 30% were to the upper extremities, and 13.6% were to the trunk. This excludes injuries classified as overexertion, exposure, and other/unknown (Figure 1).

When looking at tobogganing alone as a cause of injury, there were a total of 217 hospitalizations as a result of being struck by or against an object or person, or from falling from a toboggan. Of these, 39% (n=85) were lower extremity injuries, and 26% (n=56) were injuries to the head, face, or neck.

## Risk Factors

### Age

In 2010/11, the highest number of hospitalizations from alpine sports injuries (falls involving skis, falls involving snowboard, or tobogganing injury) occurred in the 15-19 age group for males, followed by the 20-24 age group (Figure 2). For females, there were equally high numbers in the 15-19 and 20-24 age groups (Figure 3).

TABLE 1. Hospitalizations related to alpine sports, by external cause, HMDB, Canada, 2010/2011

External Cause	Count
Fall involving skis	1,141
Fall involving snowboard	999
Struck by/against object while skiing/snowboarding	182
Struck by/against object while tobogganing	148
Struck by/against person while skiing/snowboarding	55
Fell from toboggan	38
Overexertion	36
Struck by/against person while tobogganing	31
Exposure	16
Other/unknown*	27
<b>Total</b>	<b>2,673</b>

\*Includes avalanches, falls from chairlifts/gondolas, and other incidents on chairlifts/gondolas

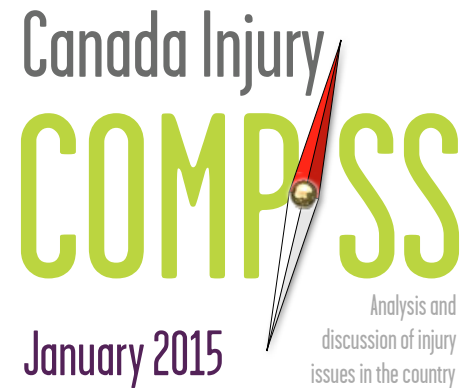
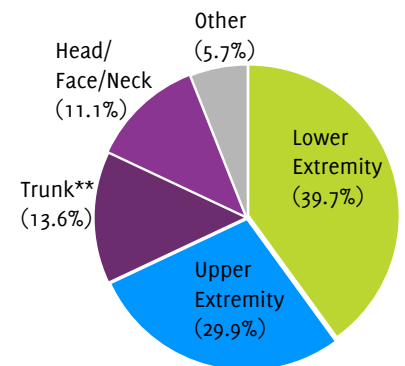


FIGURE 1. Injury diagnosis related to alpine sports, by most responsible diagnosis, HMDB, Canada, 2010/11\*



\*Excludes injuries where the external cause is classified as “Overexertion”, “Exposure” or “Other/Unknown”.  
\*\*Trunk excludes cervical spine injuries, which are included under “Head/Face/Neck”.

We see patterns emerging for hospitalizations by age, depending on the alpine sport. Tobogganing and falls involving snowboarding were heavily concentrated in the younger ages, and for both sexes. For the 1-9 age group, more individuals were hospitalized for tobogganing than from snowboarding or skiing. For the 10 - 34 age group, more individuals were injured from a fall involving a snowboard than from tobogganing or from a fall involving skis. After the age of 34, more hospitalizations occur from skiing (defined as a fall involving skis) than from tobogganing or snowboarding.

### Sex

Males accounted for more hospitalizations related to alpine sport injuries than females, across all categories for which data was available. This is consistent with general sport injury trends.<sup>3</sup> For falls involving skis or snowboards, 1465 males were hospitalized (Figure 2), compared with 675 females (Figure 3). There were also more hospitalizations from tobogganing for males (120) than females (97).

## Prevention Strategies

The strategies described here draw from a combination of the research evidence and recommendations from recognized bodies.

### Properly-fitted Protective Equipment

A review of the evidence shows helmets reduce the incidence and severity of head injuries in skiing and snowboarding.<sup>4</sup> Organizations such as Parachute and Health Canada recommend helmets for tobogganing.

Wrist guards have been shown to reduce wrist injury for snowboarders.<sup>5</sup> Proper fit is important for ensuring the effectiveness of equipment, especially helmets and bindings.<sup>4</sup> It's important to maintain and check your equipment, whether you own, rent or borrow.<sup>2</sup>

### Alpine Responsibility Code

These codes are used around the world and outline expectations for behaviour on the slopes. Examples of guidelines included in the code are:

- Always stay in control and be able to stop or avoid other people or objects.
- Do not stop where you obstruct a trail or are not visible from above.
- Stay off closed areas and observe all posted signs and warnings.

[Read the full code](#)

### Environmental Considerations

For skiing and snowboarding, slope conditions and maintenance, facility design, and policy enforcement may impact injury incidence and severity.<sup>5</sup>

When choosing a tobogganing area, these are some factors to consider:

- Ensure the hill is free of obstacles (e.g. large rocks, poles, trees), located a safe distance from roads, parking lots, and bodies of water, and has a long, clear run at the bottom.<sup>2</sup>
- In the evening, only use hills that are properly lit for visibility.<sup>2</sup>
- Check the conditions and do not go if it is icy or excessively cold.<sup>2</sup>

### Acknowledging Skill Level

Beginners to skiing and snowboarding should receive formal instruction before participating. All skiers and snowboarders should choose runs and equipment that

FIGURE 2. Comparison of hospitalizations for three causes of alpine sport injury for all males, by age, 2010/11

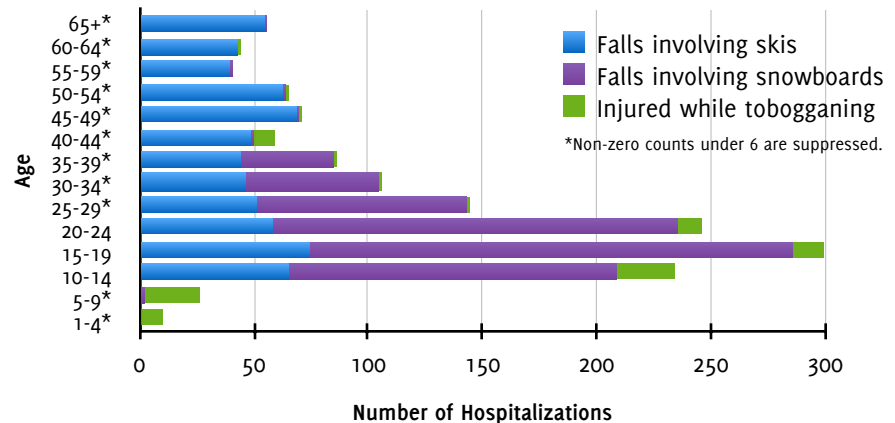
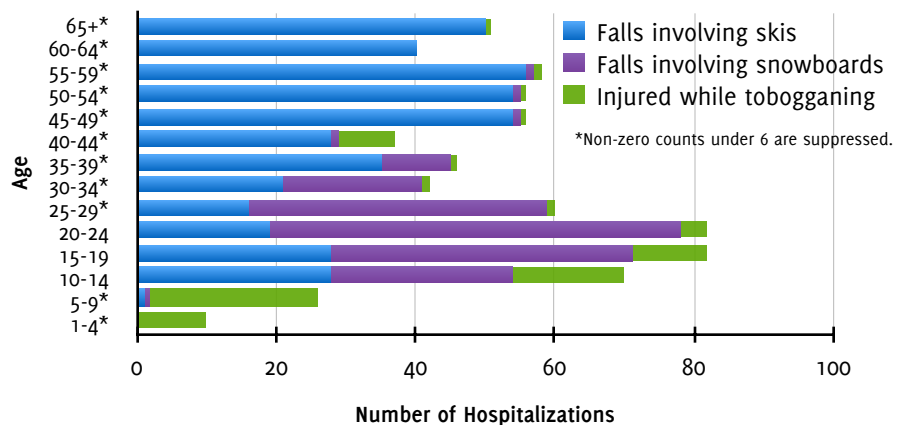


FIGURE 3. Comparison of hospitalizations for three causes of alpine sport injury for all females, by age, 2010/11



are appropriate for their skill level; exposure to more challenging runs should be gradual.<sup>5</sup>

## Methodology

Hospital separation data were obtained from the HMDB at CIHI, for fiscal year 2010/2011 (April 1- March 31). The Public Health Agency of Canada (PHAC) provided the data and the analysis for this report. The International Statistical Classification of Disease and Related Health Problems, 10th Revision (ICD-10) is an international standard for classifying diseases and external causes of injury. ICD-10 coding was used to isolate all hospitalizations related to alpine sports injuries (W02.01, W02.04, W21.08, W22.00, W22.01, W51.00, W51.01, U99.040, U99.043, U99.044).

## References

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Suggested citation: Quirk, J., Cowle, S., Subaskaran, J., & McFaul, S.R. (2015). Skiing, Snowboarding & Sledding: Hospitalizations from Alpine Sports Injuries in Canada. *Canada Injury Compass, January 2015*. Toronto: Parachute.

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