

Skiing, Snowboarding & Sledding: Alpine Sports Injuries in Ontario

Understanding the Issue

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, and a variable environment.¹ However, efforts can be made to reduce the incidence and severity of these injuries. This Ontario Injury Compass highlights 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.

Causes & Nature of Injuries

In 2011/12, the most common cause for ED visits in Ontario related to alpine sports was a fall involving a snowboard (5,326). This was followed by falls involving skis (3,904) and striking or being struck by an object while tobogganing (751). (Table 1)

TABLE 1. ED visits related to alpine sports, by external cause, NACRS, Ontario, 2011/12

External Cause	Count
Fall involving snowboard	5,326
Fall involving skis	3,904
Struck by/against object while tobogganing	751
Struck by/against object while skiing/snowboarding	698
Struck by/against person while skiing/snowboarding	255
Overexertion	178
Struck by/against person while tobogganing	157
Fall from toboggan	138
Exposure	59
Other/unknown*	157
Total	11,623

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

Of all ED visits in Ontario in 2011/12 related to alpine sports where the cause was identified and an injury was diagnosed, 47% of the injuries were to upper extremities, 22% to lower extremities, and 19% to the head, face or neck (Figure 1).

Considering tobogganing on its own, most ED visits (34.5%) in 2011/12 were related to injuries to the head, face or neck. 61 concussions related to tobogganing were identified.

Risk Factors

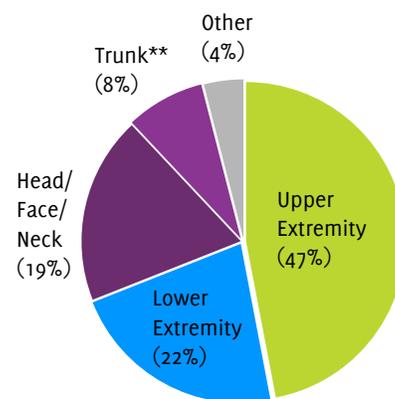
Age

In 2011/12, the highest number of ED visits for alpine sports injuries occurred in the 10-14 age group (Figures 2, 3 & 4). This is consistent with general sport injury trends.² For skiing and snowboarding, ED rates were highest for 10-14 year-olds as well. For tobogganing-related visits, highest rate was among 5-14 year olds (39.32 per 100,000).

ED visits for tobogganing and for falls involving snowboarding were heavily



FIGURE 1. Injury diagnosis related to alpine sports, by most responsible diagnosis, NACRS, Ontario, 2011/12*



*Excludes injuries where the external cause is classified as “Other/Unknown”.

**Trunk excludes cervical spine injuries, which are included under “Head/Face/Neck”.

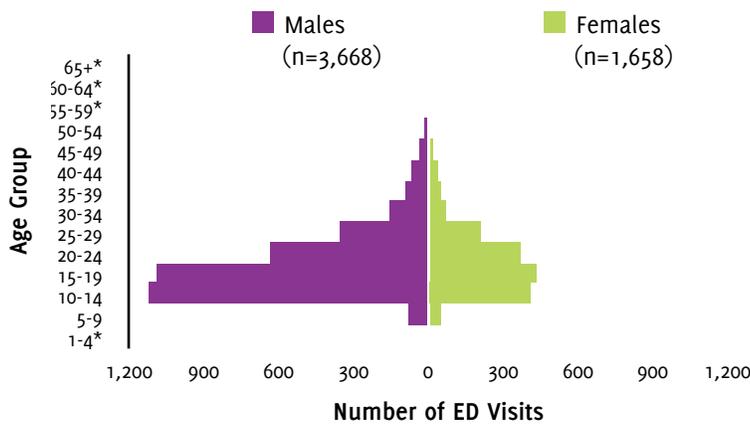
concentrated in the younger ages (5-19). For skiing-related falls, ED visits showed greater distribution across all ages.

Sex

Males accounted for more ED visits related to alpine sports injuries than females. For falls involving skis or snowboards, 5,795 males visited EDs in 2011/12, versus 3,435 females (Figures 2 & 3). It is interesting to note that for ski-related falls, the rates of ED visits for females were higher than for males in the 35-54 age range.

For tobogganing injuries, there were 537 ED visits for males and 509 visits for females in 2011/12 (Figure 4). Relatively speaking, the number of ED visits for tobogganing injuries did not differ according to sex.

FIGURE 2. ED visits for falls involving snowboards, by age and sex, NACRS, Ontario, 2011/12



*Non-zero counts under 6 are suppressed.

FIGURE 3. ED visits for falls involving skis, by age and sex, NACRS, Ontario, 2011/12

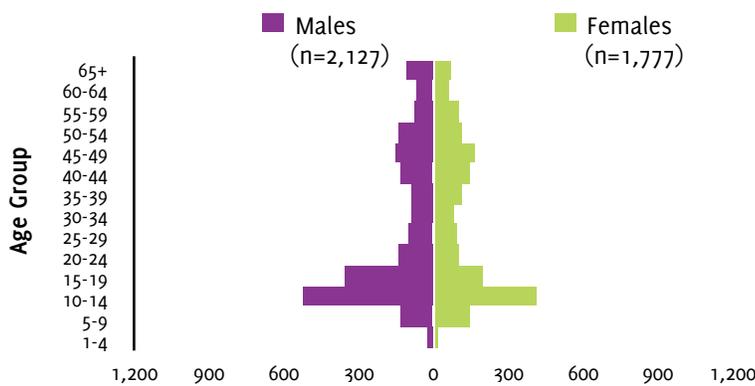
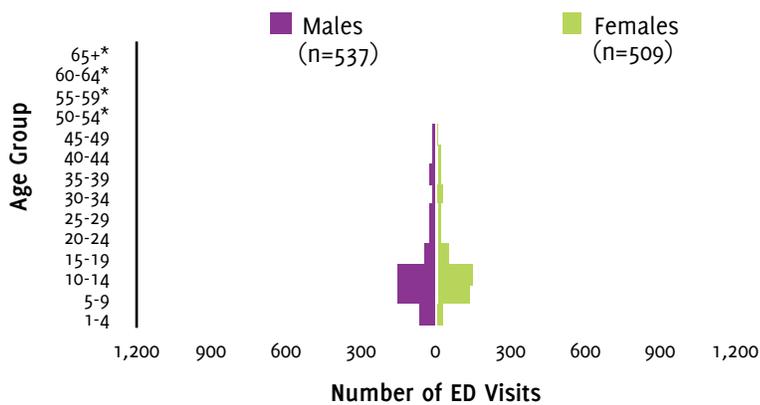


FIGURE 4. ED visits for injuries related to tobogganing/sledding, by age and sex, NACRS, Ontario, 2011/12



*Non-zero counts under 6 are suppressed.

Prevention Strategies

There is a gap in the research regarding evaluated prevention strategies for skiing, snowboarding, and sledding injuries. The strategies described here are drawn 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.³ Organizations such as [Parachute](#) and [Health Canada](#) recommend helmets for tobogganing. To date, there isn't sufficient evidence indicating which helmet type - skiing, snowboarding or hockey - is most effective for reducing head injuries in sledding.

Wrist guards have been shown to reduce wrist injury for snowboarders. Suggestion that wrist guards may also prevent or reduce upper arm injury is not yet proven in the evidence.⁴

Proper fit is important for ensuring the effectiveness of equipment, especially helmets and bindings. Skiers and snowboarders using rented or borrowed equipment may be more likely to suffer an injury than individuals who use their own equipment.⁴

Alpine Responsibility Code

These codes are used around the world and outline expectations for behaviour on the slopes. Canada's code, supported by the Ontario Ski Resorts Association, includes these guidelines:

- Always stay in control. You must be able to stop or avoid other people/objects.
- Do not stop where you obstruct a trail or are not visible from above.
- Stay off closed areas.

[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.⁴

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

- Ensure the hill is free of obstacles (e.g. large rocks, poles, trees) and has a long, clear run at the bottom.
- Choose a hill that is located a safe distance from roads, parking lots, and bodies of water.
- In the evening, only use hills that are properly lit for visibility.
- Check the conditions. If it is icy or excessively cold, it is best not to toboggan that day.⁵

Acknowledging Skill Level

Beginners to skiing and snowboarding should receive formal instruction before participating. All skiers and snowboarders should choose runs and equipment that are appropriate for their skill level;

exposure to more challenging runs should be gradual.⁴

Methodology

Emergency department data were obtained from the National Ambulatory Care System (NACRS) at the Canadian Institute for Health Information (CIHI) for fiscal year (April 1 - March 31) 2011/12. The International Statistical Classification of Disease and Related Health Problems, 10th Revision (ICD-10) is an international standard for classifying diseases and external cause of injury. ICD-10 coding was used to isolate ED visits 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).

The Ontario Injury Prevention Resource Centre is supported by Public Health Ontario, the Ministry of Health and Long-Term Care and the Province of Ontario.

The views expressed in this publication are the views of the OIPRC and do not necessarily reflect the views of Public Health Ontario, the Ministry of Health and Long-Term Care or the Province of Ontario.

References

1. Scanlan, A., & MacKay, M. (2001). *Sports and Recreation Injury Prevention Strategies: Systematic Review and Best Practices*. BC Injury Research & Prevention Unit, Plan-it Safe, Children's Hospital of Eastern Ontario.
2. Fridman, L., Fraser-Thomas, J.L., McFaul, S.R., & McPherson, A.K. (2013). Epidemiology of sports-related injuries in children and youth presenting to Canadian emergency departments from 2007-2010. *BMC Sports Science, Medicine & Rehabil.* 5.30. Retrieved from: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3878023/>
3. Haider, A.H., et al. (2012). An Evidence Based Review: Efficacy of Safety Helmets in Reduction of Head Injuries in Recreational Skiers and Snowboarders. *Journal of Trauma and Acute Care Surgery.* 73(5). 1340-1347.
4. Warda, L.J., & Yanchar, N. (2012). Position Statement: Skiing and snowboarding injury prevention. Canadian Paediatric Society. Retrieved from: <http://www.cps.ca/documents/position/skiing-snowboarding-injury>
5. Parachute. (n.d.). *Preventing injuries for tobogganing & sledding*. Retrieved from: http://www.parachutecanada.org/downloads/resources/PARA_Tobogganing.pdf

Suggested citation: Cowle, S., McFaul, S.R., & Subaskaran, J. (2015). Skiing, Snowboarding & Sledding: Alpine Sports Injuries in Ontario. *Ontario Injury Compass, Issue 7, January 2015*. Toronto: Parachute.

