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. 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)

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. For skiing and snowboarding, ED rates were highest for 10-14 year-olds as well. For toboggan-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 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.

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

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

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

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

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

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

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.

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.

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 it best not to toboggan that day.

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).

References


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