

# Off-Road Vehicle Injuries

Each year in Ontario, children under 16 years account for more than one-fifth of all-terrain vehicle hospitalizations and one-tenth of hospitalized snowmobilers.

## Results

In Ontario, there were 855 off-road vehicle injury hospitalizations during the 2002/03 fiscal year. Of these, 54% were all-terrain vehicle injuries and 46% were snowmobile-related injuries. Males accounted for more than 80% of injury hospitalizations for both all-terrain vehicle and snowmobile incidents. These injuries occurred among people of all ages; however, there was a peak in the number of all-terrain vehicle injury hospitalizations among young people (Figure 1). More specifically, 22% of persons injured in an all-terrain vehicle incident were under 16 years of age, compared to 11% of hospitalized snowmobilers who were under 16 years of age.

Drivers of off-road vehicles accounted for 76% of the injury hospitalizations. Passengers represented 12% of the injury hospitalizations and the remaining 12% of cases were unspecified persons. Among those under 16 years, 65% were reported to be driving the all-terrain vehicle and 42% were driving the snowmobile at the time the injury occurred.

All-terrain vehicle injury hospitalizations were most frequent from July to September (Figure 2). In contrast, January and February were the most common months for snowmobile injury.

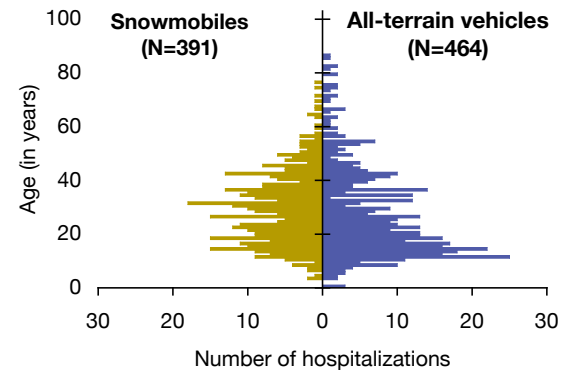
The 855 cases accounted for more than 4,000 days in an acute care hospital, with an average length of stay of 4.7 days. About 86% of cases were discharged home and 11% were transferred to another inpatient facility (e.g., rehabilitation centre).

A lower limb injury was the diagnosis most responsible for hospitalization in 35% of cases, followed by an injury to the back, chest, abdomen, or pelvis (24%), and an injury to the upper limb (18%) (Figure 3). A fracture was the most common type of injury sustained.

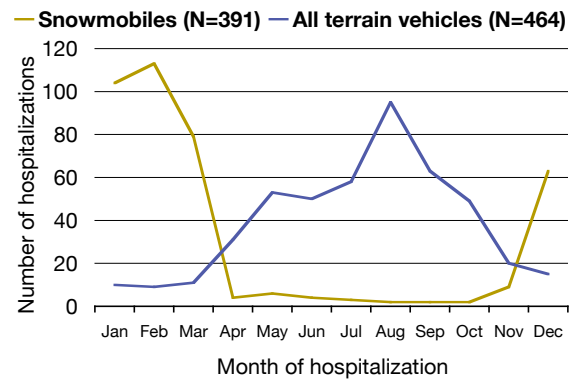
In Ontario, the age-standardized hospitalization rate for off-road vehicle injuries was 7.7 per 100,000 population (Table 1). By region, the highest number and rate were observed in the North and the lowest were seen in Toronto.

Different regional patterns were observed by age for all-terrain vehicle and snowmobile injury hospitalizations (Table 2). In general, the hospitalization rates were highest among the 15-29 year age group.

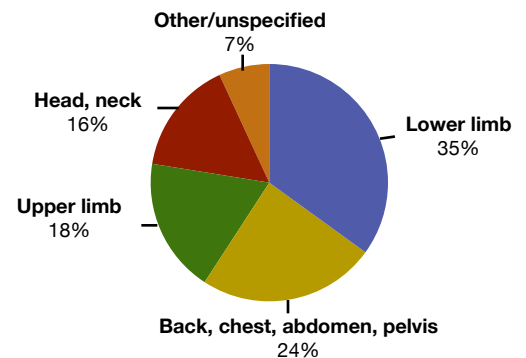
**FIGURE 1. Off-road vehicle injury hospitalizations by age (Ontario, 2002/2003)**



**FIGURE 2. Month of off-road vehicle injury hospitalization (Ontario, 2002/03)**



**FIGURE 3. Site of off-road vehicle injury hospitalization (Most responsible diagnosis, Ontario, 2002/03)**



**TABLE 1. Regional comparison of off-road vehicle injury hospitalizations (Ontario, 2002/03)**

	South West	Central South	Central West	Central East	Toronto	East	North	Ontario
Number	165	71	76	172	15	112	203	855
Rate per 100,000 <sup>a</sup>	11.5	7.0	3.8	9.6	0.6	7.4	23.6	7.7
Average age (in years)	28	25	35	31	39	33	30	30
% male	88	85	89	80	73	79	82	84

a. Age-standardized rate per 100,000 population. Note: Region of residence unknown/outside of Ontario for 41 hospitalizations.

## Ontario Injury Compass

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Edited by

**Philip Groff, PhD**

Director,  
Research and Evaluation  
SMARTRISK  
(416) 596-2718  
pgroff@smartrisk.ca

Principal Analyst

**Kelly Simpson, MSc**

Research Associate  
SMARTRISK  
(416) 596-2720  
ksimpson@smartrisk.ca

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please email your request to:  
compass@smartrisk.ca

**SMARTRISK**

790 Bay St.  
Suite 401  
Toronto, Ontario  
M5G 1N8  
(416) 977-7350  
info@smartrisk.ca  
www.smartrisk.ca

**TABLE 2. Regional comparison of off-road vehicle injury hospitalizations by age (Ontario, 2002/03)**

	South West	Central South	Central West	Central East	Toronto	East	North	Ontario
<b>All-terrain vehicle injury hospitalizations- Rate per 100,000 population<sup>a</sup> (Number)</b>								
<15 years	6.6 (20)	3.6 (8)	0.5 (<5)	3.3 (13)	- (0)	4.0 (12)	13.3 (23)	3.7 (84)
15-29 years	13.3 (41)	12.1 (27)	4.3 (18)	9.9 (35)	0.2 (<5)	7.8 (24)	23.0 (41)	8.4 (196)
30-49 years	5.2 (24)	2.6 (9)	1.8 (12)	5.9 (37)	0.5 (<5)	4.6 (23)	5.1 (14)	3.4 (128)
50+ years	1.4 (6)	- (0)	1.4 (7)	1.4 (7)	0.3 (<5)	3.1 (14)	7.1 (19)	1.8 (56)
<b>Snowmobile injury hospitalizations- Rate per 100,000 population<sup>a</sup> (Number)</b>								
<15 years	3.0 (9)	1.3 (<5)	0.7 (<5)	1.3 (5)	- (0)	0.7 (<5)	6.4 (11)	1.5 (33)
15-29 years	9.1 (28)	6.7 (15)	2.6 (11)	6.8 (24)	0.4 (<5)	4.9 (15)	25.8 (46)	6.5 (150)
30-49 years	6.5 (30)	2.3 (8)	2.1 (14)	7.1 (44)	0.6 (5)	3.8 (19)	13.9 (38)	4.5 (168)
50+ years	1.6 (7)	0.3 (<5)	1.9 (9)	1.4 (7)	0.1 (<5)	0.7 (<5)	4.1 (11)	1.3 (40)

a. Age-specific rate per 100,000 population. Note: Region of residence unknown/outside of Ontario for 41 hospitalizations.

## Discussion

This Compass highlights patterns of all-terrain and snowmobile injury hospitalizations in Ontario. Off-road vehicle injury hospitalizations are most frequent among males under 50 years of age. Similar patterns of injury have been reported in other provincial analyses.<sup>1-3</sup>

Snowmobiling, followed by all-terrain vehicle incidents, are the leading causes of severe injuries due to winter sport and recreation activities.<sup>4,5</sup> All-terrain vehicle injury hospitalizations increased by 50% over the five year period from 1996/97 to 2000/01.<sup>4</sup>

Injuries among children are an issue, as more than one-fifth of the all-terrain vehicle and one-tenth of snowmobile injury hospitalizations occurred among children under 16 years of age. Factors such as physical strength, coordination, judgment, and decision-making play a role and ways to prevent these injuries warrant further consideration.<sup>6</sup>

Alcohol has been identified as an important factor associated with off-road vehicle injuries. For example, in severe snowmobile-related injury hospitalizations where the blood alcohol concentration was recorded, 26% involved prior consumption of alcohol.<sup>5</sup> Other factors, such as lighting and speed, have also been associated with these injuries.<sup>6-8</sup> Location is also a factor. The Ontario Federation of Snowmobile Clubs (OFSC) estimates that 80% of fatalities occur "off trail".

## References

- Canadian Institute for Health Information (CIHI). *Ontario Trauma Registry Analytic Bulletin: All-Terrain Vehicle (ATV)-related Trauma Hospitalizations in Ontario, 2001-2002*. Toronto: CIHI; 2003.
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## Managing the risk

With the increased popularity of off-road vehicles, remember SMARTRISK's five key messages:

- ❖ **Buckle Up**– Wear an approved helmet
- ❖ **Look First**– Inform someone of your destination and arrival time. Ensure your vehicle is in full working order. Check weather and trail conditions. Slow down. Stay on the trail.
- ❖ **Wear the Gear**– Use the appropriate gear (e.g., warm and waterproof clothing with a built-in flotation device for snowmobiling).
- ❖ **Get Trained**– Receive proper instruction. Ride within your capabilities and the conditions.
- ❖ **Drive Sober**– Ride with care and control.

Examples of ways to prevent these injuries include:

- ❖ **Age and passenger requirements**
- ❖ **Completion of OFSC Driver Training Course** offered in partnership with the Ministry of Transportation and obtaining a Motorized Snow Vehicle Operator's Licence.
- ❖ **Equipment design**, such as rollover protection or speed governance
- ❖ **Use of helmet and other gear**, such as eye protection, gloves, and boots

## For Further Information

Injury Prevention Committee, Canadian Paediatric Society- Preventing injuries from all-terrain vehicles  
[www.cps.ca/english/statements/IP/IP04-01.htm](http://www.cps.ca/english/statements/IP/IP04-01.htm)

Ontario Ministry of Transportation-Safe Snowmobiling  
[www.mto.gov.on.ca/english/safety/quicknotes/snowmobile.htm](http://www.mto.gov.on.ca/english/safety/quicknotes/snowmobile.htm)

SMARTRISK Catalogue of Best Practices  
[www.smartrisk.ca/ListingSections.aspx?dd=4&sd=207](http://www.smartrisk.ca/ListingSections.aspx?dd=4&sd=207)

### Published Studies

- Aitken ME, Graham CJ, Killingsworth JB, et al. All-terrain vehicle injury in children: strategies for prevention. *Inj Prev* 2004;10:303-7.
- American Academy of Pediatrics. Committee on Injury and Poison Prevention. Snowmobiling hazards. *Pediatrics* 2000;106:1142-4.
- Committee on Injury and Poison Prevention. All-terrain vehicle injury prevention: two-, three-, and four-wheeled unlicensed motor vehicles. *Pediatrics* 2000;105:1352-4.
- Hoey J. Snowmobile injuries. *CMAJ* 2003;168:739.

## Methods

Hospitalization data included acute care hospitalizations for off-road vehicle injuries in Ontario from the 2002/03 fiscal year. Data were obtained from the Discharge Abstract Database at the Canadian Institute for Health Information (CIHI). Off-road vehicle injuries were classified according to the International Classification of Diseases, 10th revision (ICD-10) using code V86. Less than 1% of persons died during their hospital stay. Regions were defined according to place of residence using the Ontario Ministry of Health Region Codes.