

Exposure to Cold

Each year in Ontario, more than 1,400 people visit an emergency department and more than 150 are hospitalized due to exposure to excessive cold.

Results

During the 2004/05 fiscal year, there were a total of 1,425 visits to an emergency department and 152 hospitalizations due to exposure to excessive natural cold, such as weather conditions, in Ontario. Males accounted for 75% of emergency department visits and 69% of hospitalizations due to exposure to excessive cold. For emergency department visits in Ontario, peaks in the number of injuries were observed among females 13-20 years of age and males 14-23 years and 43-47 years of age (Figure 1). In some cases, detailed results for hospitalizations are not presented due to small numbers.

For emergency department visits and hospitalizations due to exposure to cold, frostbite was the most common type of injury, followed by hypothermia (Figure 2). The head was the most frequent site of frostbite for emergency department visits and the lower limb or foot was the most common location of frostbite for hospitalizations.

About 86% of persons who visited an emergency department due to exposure to cold were discharged home and nearly 11% were admitted to the reporting facility. For hospitalized cases, about 61% were discharged home, 15% were discharged to another facility providing inpatient care (e.g., rehabilitation centre), 13% were discharged to a long-term care facility, and 8% died after admission to hospital. The 152 hospitalized cases accounted for more than 1,400 days in acute care hospitals with an average length of stay of 9.5 days.

January was the most common month for exposure to cold, followed by December and February. This pattern was seen for both emergency department visits and hospitalizations.

For emergency department visits in Ontario, the injury rate due to cold exposure was 11.4 per 100,000 population and the hospitalization rate was 1.1 per 100,000 population (Table 1).

FIGURE 1. Emergency department visits for exposure to cold by age and sex (Ontario, 2004/2005)

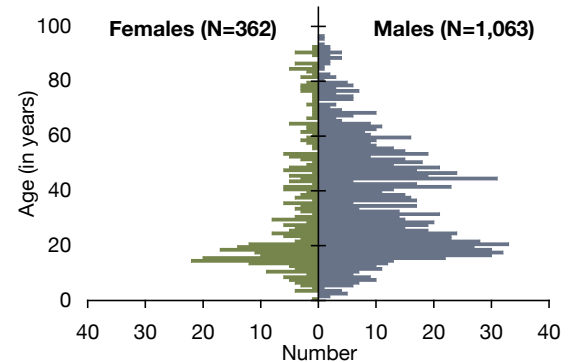
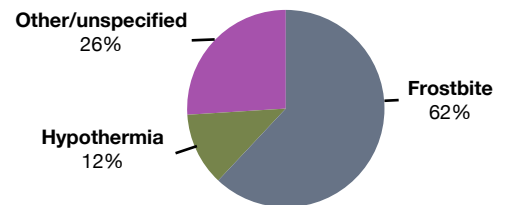


FIGURE 2. Type of injury due to cold exposure (Most responsible diagnosis, Ontario, 2004/05)

Emergency Department Visits



Hospitalizations

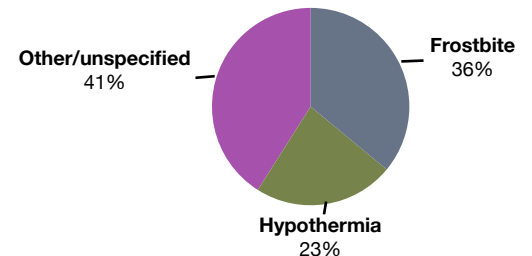


TABLE 1. Regional comparison of exposure to cold (Ontario, 2004/05)

	South West	Central South	Central West	Central East	Toronto	East	North	Ontario
Emergency Department Visits								
Number	134	111	127	234	224	229	337	1425
Rate per 100,000 ^a	8.5	8.9	5.5	11.0	8.3	14.1	39.3	11.4
Average age (in years)	34	40	31	35	42	32	34	35
% male	77	73	76	75	75	72	74	75
Hospitalizations								
Number	15	18	13	15	22	17	50	152
Rate per 100,000 ^a	0.8	1.2	0.5	0.7	0.8	0.9	5.3	1.1
Average age (in years)	64	59	55	57	52	64	49	55
% male	67	56	54	87	68	59	76	69

a. Age-standardized rate per 100,000 population.

Note: Region of residence unknown/outside of Ontario for 29 emergency department visits and 2 hospitalizations.



Ontario Injury Compass

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TABLE 2. Regional comparison of exposure to cold for select age groups (Ontario, 2004/05)

	South West	Central South	Central West	Central East	Toronto	East	North	Ontario
Emergency Department Visits - Rate per 100,000 population^a (Number)								
10-14 years	8.3 (9)	4.9 (<5)	9.5 (16)	13.7 (22)	7.4 (11)	20.1 (22)	59.3 (35)	14.4 (120)
15-19 years	20.8 (23)	26.8 (22)	9.9 (16)	22.9 (36)	13.6 (20)	38.4 (42)	93.9 (58)	27.0 (224)
20-24 years	11.7 (13)	11.1 (9)	11.6 (19)	14.7 (21)	11.7 (21)	23.5 (26)	64.5 (37)	17.7 (150)
25-29 years	7.1 (7)	4.2 (<5)	8.6 (14)	21.7 (27)	9.0 (20)	13.2 (14)	44.3 (20)	13.0 (108)
30-34 years	5.9 (6)	7.9 (6)	3.9 (7)	7.6 (11)	5.9 (14)	9.8 (11)	46.4 (24)	8.9 (80)
35-39 years	7.1 (8)	9.1 (8)	3.5 (7)	6.8 (12)	10.0 (22)	12.0 (15)	18.4 (11)	9.0 (88)
40-44 years	12.3 (16)	4.0 (<5)	5.2 (11)	10.3 (21)	9.6 (21)	9.7 (14)	39.1 (29)	10.8 (117)
45-49 years	7.4 (9)	12.9 (12)	3.9 (7)	6.7 (12)	8.9 (17)	17.5 (23)	43.4 (31)	11.6 (112)
50-54 years	4.7 (5)	8.6 (7)	4.7 (7)	10.7 (16)	13.3 (22)	8.7 (10)	25.4 (16)	10.4 (86)

a. Age-specific rate per 100,000 population.

Note: Region of residence unknown/outside of Ontario for 26 emergency department visits among those 10-54 years of age.

By region, the lowest rates of emergency department visits and hospitalizations were observed in the Central West region and the highest rates were seen in the North region (Table 1). Regional differences were also observed in the highest numbers and rates by age group (Table 2).

Discussion

This Compass highlights patterns of emergency department visits and hospitalizations due to exposure to excessive natural cold, such as weather conditions, in Ontario. Some Canadian research studies have examined injuries related to cold exposure, such as hypothermia or frostbite.¹⁻⁷

It is important to note that this Compass focuses on exposure to excessive natural cold. Exposure to excessive cold of man-made origin, such as prolonged exposure in a deep-freeze unit or to dry ice, would not be included in this analysis.

Cold-induced injuries and hypothermia can result from a variety of circumstances that may be related to social (e.g., homelessness, inadequate home heating), occupational (e.g., working outdoors), recreational (e.g., participating in outdoor winter activities), or situational (e.g., being involved in a motor vehicle crash or a vehicle breakdown) factors.^{1,3-4,6,8} Some other factors suggested to be associated with exposure to cold include: older age, mental impairment, substance use, and presence of a psychiatric condition.^{1,3-6,8-10}

References

1. Biem J, Koehncke N, Classen D, Dosman J. Out of the cold: management of hypothermia and frostbite. *CMAJ* 2003;168:305-11.
2. Biggart MJ, Bohn DJ. Effect of hypothermia and cardiac arrest on outcome of near-drowning accidents in children. *J Pediatr* 1990;117:179-83.
3. Koutsavlis AT, Kosatsky T. Environmental-temperature injury in a Canadian metropolis. *J Environ Health* 2003;66:40-5.
4. Miller BJ, Chasmar LR. Frostbite in Saskatoon: a review of 10 winters. *Can J Surg* 1980;5:423-6.
5. Urschel JD. Frostbite: predisposing factors and predictors of poor outcome. *J Trauma* 1990;30:340-2.
6. Valnicek SM, Chasmar LR, Clapson JB. Frostbite in the prairies: a 12-year review. *Plast Reconstr Surg* 1993;92:633-41.
7. Environment Canada. *Factoids*. In: Wind chill fact sheet. Available at: www.msc.ec.gc.ca/education/windchill/fact_quiz_e.cfm.
8. Rintamaki H. Predisposing factors and prevention of frostbite. *Int J Circumpolar Health* 2000;59:114-21.
9. Jurkovich GJ. Environmental cold-induced injury. *Surg Clin North Am* 2007;87:247-67.
10. Castellani JW, Young AJ, Ducharme MB, Giesbrecht GG, Glickman E, Sallis RE; American College of Sports Medicine. American College of Sports Medicine position stand: prevention of cold injuries during exercise. *Med Sci Sports Exerc* 2006;38:2012-29.

Managing the risk

In Ontario, the cold winter weather conditions can pose some risks for injury. Here are some tips that can be used to help reduce the risks:

- ❖ Dress according to the weather conditions. Layer clothing to protect against wind and cold. Wear mittens, boots, a hat, and a scarf. Try to cover as much exposed skin as possible.
- ❖ Stay dry. Wet or damp clothing chills the body rapidly. If you are sweating, remove layers of clothing or open your coat.
- ❖ Plan ahead and take frequent breaks from the cold to let your body warm up.
- ❖ Listen to the weather forecast before going out and be aware of the wind chill factor. With a wind chill of -28 to -39, exposed skin can freeze in 10 to 30 minutes.
- ❖ Keep moving. Limit the amount of time you spend sitting or standing. Staying active will help generate body heat and keep you warm.
- ❖ Know your limits. Some people are more susceptible to cold (e.g., children, older adults and people with circulation problems).
- ❖ Eat and drink. Food helps maintain body heat. Dehydration can lead to hypothermia. Substances, such as alcohol, caffeine, and certain medications, can increase your susceptibility to cold and interfere with the body's ability to regulate heat.

For Further Information

Environment Canada, Wind Chill
www.msc.ec.gc.ca/education/windchill/
Healthy Ontario- It's Cool to Be Warm
www.healthyonario.com/Health_Feature/It_s_Cool_To_Be_Warm.htm
Red Cross
www.redcross.ca
Canadian Health Network
www.canadian-health-network.ca
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Methods

Emergency department data were obtained from the National Ambulatory Care Reporting System and data for acute care hospitalizations were obtained from the Discharge Abstract Database at the Canadian Institute for Health Information for the 2004/05 fiscal year. Injuries due to exposure to excessive natural cold were classified according to the International Classification of Diseases, 10th revision (ICD-10) using code X31. Note that some persons were seen in an emergency department and then admitted to hospital; however, persons can be admitted to hospital without visiting an emergency department. Regions were defined according to place of residence using the Ontario Ministry of Health Region Codes.