

Canadian winters can be severe, which means it is essential to understand how to avoid the serious effects of extreme cold while continuing to enjoy outdoor activities.

Populations at increased risk from extreme cold weather include:

- older adults (over the age of 65)
- infants and young children
- outdoor workers
- people planning outdoor sports or activities
- people with chronic illness
- people experiencing homelessness and lacking shelter, warm clothing or food

Other contributing factors (e.g. underlying infection, low income, physical disabilities, etc.) may also increase the risk of cold weather injuries.

Symptoms of extreme cold exposure:

Exposure to extreme cold can be divided into two categories:

Frostnip and frostbite

Is a condition where the freezing of skin and the underlying tissues (fat, muscle) occurs. The frozen tissue dies because there is a lack of blood and oxygen. This injury mostly affects the extremities such as toes, fingers, ears and the nose. These body parts are at the greatest risk because they tend to be exposed to the cold more often and they do not have major muscles to produce heat.

Environment Canada web links and resources:

Wind Chill Index:

<https://www.canada.ca/en/environment-climate-change/services/weather-health/wind-chill-cold-weather/wind-chill-index.html>

Wind Chill Calculator: https://weather.gc.ca/windchill/wind_chill_e.html

Being Prepared for Winter:

<https://www.canada.ca/en/environment-climate-change/services/seasonal-weather-hazards/be-prepared-for-winter.html>

Public Alerting Criteria:

<https://www.canada.ca/en/environment-climate-change/services/types-weather-forecasts-use/public/criteria-alerts.html>

How to use public Weather Alert Maps and Tables:

<https://www.canada.ca/en/environment-climate-change/services/types-weather-forecasts-use/public/criteria-alerts.html>

Alternate formats of this document are available upon request.

Is frostnip/frostbite serious?

Frostnip/frostbite can permanently damage tissue. In some cases the damage is so severe that an amputation (of the fingers, hand, arm or leg) may be necessary.

Signs and symptoms

- pale gray, waxy skin (cold to the touch)
- swelling and blistering
- numbness and localized pain

Hypothermia

Is a condition where the core body temperature drops below 35°C (95°F) due to exposure to cold temperatures or cold water.

Is hypothermia serious?

Hypothermia can lead to death. As the body loses heat, organs begin to shut down and the heart can stop.

Signs and symptoms

- shivering, confusion, weakness
- mumbling, stumbling, and/or fumbling
- pale skin colour (cold reddish skin and low energy)

How to avoid a cold related injury:

Listen to the weather forecast

- Check the Environment Canada weather forecast before going outside.
- Listen for a wind chill warning. Wind chill warnings, based on local climate, are issued when the wind is going to make it feel a lot colder than it is and there may be a risk to your health.

Plan ahead

- Groups and organizations should develop a plan in advance, to ensure that safety concerns are addressed when it's very cold or when the wind chill is significant.
- For example, schools may hold recess/lunch indoors, outside workers may schedule warm-up breaks, and those involved in winter recreation may reduce the amount of time they spend outdoors.

Dress warmly

- dress in layers, with a wind resistant outer layer
- wear a hat (a large portion of body heat is lost from the head), mittens or insulated gloves
- wear a scarf, neck tube or face mask
- when the wind chill is high, try to cover as much exposed skin as possible – your body's extremities, such as the ears, nose, fingers and toes lose heat the fastest
- wear warm and waterproof footwear

Seek shelter – When the wind chill is significant, get out of the wind and limit the time you spend outside.

Stay dry

- wet clothing chills the body rapidly – remove wet clothing if possible
- remove outer layers of clothing or open your coat if you are sweating

Keep active

- walking or running will help warm you by generating body heat

Be aware

- watch for signs of frostnip, frostbite and hypothermia
- children, the elderly, and those with circulation problems are more susceptible to the cold
- the use of alcohol, tobacco and certain medications will increase your susceptibility to cold

Caregivers of children:

- Infants are at high risk of developing hypothermia very quickly during extreme cold weather days.
- Children have less muscle mass and have more surface area (in relation to their body mass) than adults. This makes it harder for them to maintain their body temperature and heat leaves their body faster. If the clothing or footwear of a child becomes wet they are at risk of a cold injury. Bring the child into a warm environment and remove wet items.

How to help someone with a cold injury:

Frostbite

- get medical attention as soon as possible
- at the first sign of redness or pain in any skin area, get out of the cold or protect the exposed skin
- get into a warm room as soon as possible
- remove any wet clothing
- do not rub or massage the area as it causes more damage
- warm the area gradually – use body heat such as an armpit, or warm water (40 – 42°C)
- do not use direct heat (heating pad, heat lamp, radiator) which can burn the skin
- unless absolutely necessary, do not walk on frostbitten feet or toes

Hypothermia

- get medical attention as soon as possible
- get into a warm room as soon as possible
- remove any wet clothing
- warm the center of the body first – chest, neck, head, and groin
- use warm blankets, towels, wrapped hot water bottles or heating pads, or skin to skin contact to warm a person while waiting for medical help
- if a person is awake warm drinks can help
- do not give alcoholic beverages

Wind chill hazard and what to do:

Wind Chill	Exposure risk	Health concern	What to do
0 to -9	Low risk	<ul style="list-style-type: none"> Slight increase in discomfort 	<ul style="list-style-type: none"> Dress warmly Stay dry
-10 to -27	Moderate risk	<ul style="list-style-type: none"> Uncomfortable Risk of hypothermia and frostbite if outside for long periods without adequate protection 	<ul style="list-style-type: none"> Dress in layers of warm clothing, with an outer layer that is wind-resistant Wear a hat, mittens and scarf and insulated, waterproof footwear Stay dry Keep active
-28 to -39	High risk: exposed skin can freeze in 10 to 30 minutes	<ul style="list-style-type: none"> High risk of frostnip or frostbite: Check face and extremities (fingers, toes, ears and nose) for numbness or whiteness High risk of hypothermia if outside for long periods without adequate clothing or shelter from wind and cold 	<ul style="list-style-type: none"> Dress in layers of warm clothing, with an outer layer that is wind-resistant Cover exposed skin Wear a hat, mittens and a scarf, neck tube or face mask and insulated, waterproof footwear Stay dry Keep active
-40 to -47	Very high risk: exposed skin can freeze in 5–10 minutes*	<ul style="list-style-type: none"> Very high risk of frostbite: Check face and extremities (fingers, toes, ears and nose) for numbness or whiteness Very high risk of hypothermia if outside for long periods without adequate clothing or shelter from wind and cold 	<ul style="list-style-type: none"> Dress in layers of warm clothing, with an outer layer that is wind-resistant Cover all exposed skin Wear a hat, mittens or insulated gloves, a scarf, neck tube or face mask and insulated, waterproof footwear Stay dry Keep active
-48 to -54	Severe risk: exposed skin can freeze in 2–5 minutes*	<ul style="list-style-type: none"> Severe risk of frostbite: Check face and extremities (fingers, toes, ears, nose) for numbness or whiteness Severe risk of hypothermia if outside for long periods without adequate clothing or shelter from wind and cold 	<ul style="list-style-type: none"> Be careful. Dress very warmly in layers of clothing, with an outer layer that is wind-resistant Cover all exposed skin Wear a hat, mittens or insulated gloves, a scarf, neck tube or face mask and insulated, waterproof footwear Be ready to cut short or cancel outdoor activities Stay dry Keep active
-55 and colder	Extreme risk: exposed skin can freeze in less than 2 minutes*	<p>DANGER!</p> <ul style="list-style-type: none"> Outdoor conditions are hazardous 	<ul style="list-style-type: none"> Stay indoors

*In sustained winds over 50 km/h, frostbite can occur faster than indicated.

Source: Environment Canada. 2017.

<https://www.canada.ca/en/environment-climate-change/services/weather-health/wind-chill-cold-weather/wind-chill-index.html>

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