



## Cold as a Risk Factor

### THE CHALLENGES OF EXERCISING IN THE COLD:

#### Key Points

- The colder the environment, the faster a participant's body temperature will decrease.
- During exercise in a cold environment, the skin can become wet as a result of sweating, or exposure to rain or snow. A wet skin surface cools the body faster than when it is dry.
- The wind magnifies the perception of cold, and increases the rate at which the body loses heat. This effect can be further amplified if the skin is wet.
- In cold weather, high humidity makes the temperature feel colder than air temperature indicates it is.
- Cold, dry air makes it difficult to breathe for some individuals with asthma, although it is generally easier to tolerate the cold when the air is dry.
- Skin can freeze when exposed to very cold temperatures, and when this happens circulation slows. Tissue can be damaged if frostbite is prolonged and extensive. Extremities (e.g. toes, fingers, nose, ears) are particularly at risk in cold temperatures, because the body shunts blood flow to central organs and tissues to maintain the body's core temperature.
- In severe cold, brain function can slow down, and so risk of further injury in prolonged exposure increases.
- Children get cold much faster than adults, and their skin is more prone to freeze. People with less body fat usually have less tolerance for cold than those with more body fat.
- Muscles and other soft tissues that are cold are more susceptible to injuries such as pulls and tears, in particular if the efforts produced are sudden and intense.

- In very dry cold environments, water vapour lost through breathing and evaporation of sweat from exposed surfaces may lead to dehydration.
- Wearing appropriate clothing can be a challenge when exercising in the cold. Clothes must protect against the cold, but at the same time they must not impair the body's ability to get rid of the heat produced during exercise. Heavy clothing can be cumbersome and interfere with movement; it can also increase air resistance in some sports where speed is critical. On the other hand, the thin clothing used in many sports often offers little protection from the cold and the wind.
- The type of fabric worn can either wick water from the body surface (i.e. synthetics such as polypropylene or Gore-Tex ®) which results in less risk of heat loss, or trap it there (i.e. cotton or nylon) which results in greater risk of heat loss.

### *Safety Measures to Avoid Cold Injuries*

- Ensure participants wear sufficient clothing for the conditions, and layer clothing as follows:
  - Layer closest to skin: Polypropylene, close fitting (wicking effect)
  - Second layer: Fleece or wool, slight room between first layer and second layer for “trapped air” effect
  - Third layer: Wind-breaking, water repellent, breathable
- When it is very cold, ensure exposed surfaces are kept to a minimum.
- Once the body has warmed up, and if the temperature is not too cold, consider removal of the second layer of clothes during exercise to avoid excessive sweating. Have participants add a layer or use blankets to keep warm during breaks or pauses.
- Apply antiperspirant on feet before exercising to lessen sweating of the feet (which is usually followed by cooling of the feet). Doing the same on the palm of the hands may reduce the feeling of cold for people who tend to sweat a lot in their gloves or mitts.
- Ensure participants hydrate when they exercise in the cold.
- Bring children inside when they say they are cold; it is not worth the risk to prolong exercise and have them suffer from frostbite. Once a person suffers serious frostbite, the risk of subsequent frostbites to the same area may be increased.
- Never send participants out into the cold alone or without means of communicating with you and/or an emergency centre; avoid prolonged activities in which participants are in isolated areas and run the risk of becoming exhausted.

- When the weather is very cold and participants must train outdoors, hold your practices between 11 a.m. and 2 p.m. as these tend to be the warmest hours of the day. Be aware that temperature drops quickly when the sun sets.
- Inform participants and their parents to consider the combined effect of cold and wind (i.e. the wind chill factor) when making decisions about how to dress rather than simply looking at the thermometer. Do the same when you make coaching decisions about the choice and the scheduling of activities.
- If possible, choose areas that are protected from the wind; avoid activities in open areas.
- Ensure protective eyewear is worn to prevent snow reflection from damaging eyes, and protect from the cold and the wind.
- Have participants or their parents bring a change of clothing,
- Have participants or their parents bring a change of clothing, especially socks and underwear. Try to find a warm and protected spot to change.
- Inform participants and parents that a hat should be worn at all times; over 30% of body heat may be lost through the head. Ensure ears are covered to avoid frostbite.
- Allow additional time for warming up for training and competition; it takes longer to get the body warmed up and ready for sport in cold weather than it does in warm weather.