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## Understanding and preventing cold weather injuries

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During the past 10 years, Soldiers have experienced an average of 361 cold weather-related injuries every year. Cold weather injury prevention is a command and leadership as well as a personal responsibility and successful management of cold depends on proper knowledge and understanding of problems associated with working in cold environments.

Exposure to the cold can lead to a variety of cold weather-related injuries and while the cold makes military tasks more difficult, it does not make them impossible. The key to overcoming the cold and successfully completing the mission lies within an understanding of cold weather injuries and ways of preventing them. Officials at the Armed Forces Health Surveillance Center Office offer the following descriptions of the most common cold weather injuries and information about how to prevent them.

### Injuries

**Chilblains** is a nonfreezing cold injury resulting from repeated, prolonged skin exposure to cold and wet (high humidity) temperatures above freezing. Exposed skin becomes red, tender, hot to the touch, and is usually accompanied with itching. This can worsen to an aching, prickly (pins and needles) sensation and then numbness. Chilblains can develop in exposed skin in only a few hours. The most commonly affected areas are the ears, nose, fingers and toes

**Immersion Foot / Trench Foot** is a nonfreezing injury that results from prolonged exposure to wet conditions between 32°F – 60°F or inactivity with damp socks and boots. Immersing feet in cold water, not changing socks frequently, not maintaining proper hygiene, and allowing sweat to accumulate in boots or gloves will soften the skin, causing tissue loss, and, often, infection. These cold and wet conditions constrict blood vessels and the affected areas become cold, swollen, discolored, waxy and are often accompanied by sensations of pins and needles, numbness, and then pain. In extreme cases, flesh dies and amputation may be necessary.

**Frostnip** is the freezing of the top layers of skin tissue and is considered the first degree of frostbite. Frostnip usually results from short-duration exposure to cold air or contact with a cold object such as metal. Exposed skin, such as the cheeks, ears, fingers, and wrists are more likely to develop frostnip. The top layer of frozen skin becomes white, waxy, and feels hard and rubbery while the deeper tissue is still soft. The affected area feels numb and may become swollen, but does not blister. Frozen skin thaws quickly, becoming red and painful with eventual peeling of the skin with complete healing with 10 days and injury is normally reversible.

**Frostbite** is the actual freezing of skin tissue that can extend through all layers of the skin and actually freeze the muscle and/ bone. Frozen skin may turn red and then gray-blue with blisters and in worst cases, the skin dies and turns blue-black. At this stage, amputation often required. Deep frozen skin feels “wooden” to the touch with zero mobility of the affected body part. Instantaneous frostbite can occur when the skin comes in contact with super-cooled liquids, such as POL, fuel, antifreeze, and alcohol, all of which remain liquid at temperatures as low as -40°F.

**Hypothermia** is a potential life threatening conditions that is defined as the general cooling of the body core temperature below 95°F (normal body temperature is 98.6°F). Hypothermia sets in when the body-heat lost exceeds the body's heat production due to prolonged cold exposure. Although hypothermia is usually associated with cold climates, it can occur at temperatures well above freezing especially when a person is exposed to extended wet conditions.

Signs and symptoms of hypothermia change as body temperature falls. Mental functions typically decline first; marked with declined decision making ability, slurred speech, disorientation, incoherence, irrationality, and possible unconsciousness. Muscle functions deteriorate with shivering, lose of fine motor ability (i.e. unable to complete tasks with hands), progressing to stumbling, clumsiness, and falling. In severe cases, shivering ceases, and the soldier exhibits stiffness and inability to move. Pulse and respiration rates decrease progressing to unconsciousness, irregular heartbeat, and death. Unfortunately, early signs and symptoms of hypothermia can be difficult to recognize and may easily go undetected. A victim may deny he/she is in trouble; believe the symptoms, not the victim.

**Dehydration** is a lack of water in the body and most people associate dehydration with hot weather conditions. However, it is very easy to become dehydrated in cold weather and many individuals fail to drink enough liquid and underestimate fluid loss from sweating. Proper hydration is especially important in cold weather as dehydration adversely affects the body's resistance to cold injury, increasing the chance cold weather injuries. Remember that proper hydration is essential to supplying fuel and energy to body parts to facilitate heat production.

### **Risk Factors**

Understanding the contributing factors of cold weather injuries provides a better understanding of the best methods on how to combat the cold. Environmental factors including temperature, wind, rain, immersion, and altitude; work load; duration of cold/wet exposure; and individual risk factors such as physical fitness, fatigue, health, prior history of cold injury, use of medications, alcohol, nicotine, and poor nutrition can all contribute to cold weather injuries.

### **Prevention**

Individuals can work and play in cold environments if they are properly prepared and understand basic control measures to prevent cold weather injuries.

#### ***Keep body warm:***

- Keep moving by exercising big muscles (arms, legs) to keep warm.
- Avoid alcohol use as it impairs the body's ability to shiver and gives a false sense of warmth.
- Avoid all tobacco products as they decrease blood circulation to the skin.
- Eat all meals to maintain energy.
- Drink water or warm non-caffeinated/alcoholic fluids to prevent dehydration. Drinking warm liquids like tea and hot chocolate contain sugar provides energy to help the body generate additional heat.
- Limit the amount of time outside on extremely cold days. Periodically move into warm area such as a warming tent.

#### ***Wear proper clothing:***

- Several layers of loose clothing, rather than one or two "bulky" layers. Air is trapped between these layers and acts as insulation against the cold. The layers can also be removed if you become too hot to prevent sweating. Loose clothing allows the blood to circulate to the extremities.
- Ensure all clothing is good condition, clean, and dry; change wet, damp clothes immediately.

#### ***Protect feet:***

- Carry extra pair of socks and change damp socks immediately. Use food powder to help absorb moisture.
- Avoid tight socks and boots, ensuring not to over tighten boots or shoes.
- Wear overshoes to keep boots and socks clean and dry.

**Protect hands:**

- Wear gloves, mittens, or gloves/mittens with inserts to avoid frostbite injuries.
- Keep gloves/mittens clean and dry; change damp gloves immediately.
- Warm hands under clothes if they become numb.
- Avoid skin contact with snow, fuel or bare metal that has been exposed to the cold for extended periods.

**Protect head, face and ears:**

- Wear a hat. As much as 70 percent or more of the body's heat is lost through an uncovered head and a hat reduces the amount of body heat that escapes from your head.
- Cover face & ears with scarf to prevent frostbite injuries. In combination, a hat and scarf protect the skin and retain body heat.
- Warm face and ears by covering them with your hands, but do not rub face or ears.
- Wear sunscreen.
- Exercise facial muscles to help maintain circulation.

**Protect friends and family:**

- Watch for signs of frostbite and other cold weather injuries in your buddy.
- Ask about and assist with re-warming of feet, hands, ears, or face.
- Immediately treat persons showing any sign/symptom of cold injury.
- Remove sick, injured, and wounded individuals from the cold as they are very susceptible to cold injuries.

For more information about cold weather-related injury prevention, visit the Army's Center for Health Promotion and Preventative Medicine Web site at <http://chppm-www.apgea.army.mil/HIOCWI/>. For more information about the Army's Fall/Winter Safety Campaign, visit <https://safety.army.mil> and click on the Fall/Winter icon on the bottom right corner.



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