



Understanding and preventing cold weather injuries

U.S. Army Combat Readiness/Safety Center

Each year, hundreds of Soldiers experience cold weather-related injuries. The responsibility for preventing these injuries is a command and leadership function, as well as a personal responsibility for each Soldier.

Exposure to the cold can lead to a variety of problems 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 how to prevent them.

Officials at the Armed Forces Health Surveillance Center offer the following descriptions of the most common cold weather injuries and information on how to prevent them.

Chilblains are a nonfreezing cold injury resulting from repeated, prolonged skin exposure to cold and wet (high humidity) temperatures above freezing. Exposed skin becomes red, tender and hot to the touch and is usually itchy. These symptoms 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. Symptoms in affected areas include cold, swollen, discolored and waxy flesh accompanied by tingling sensations, numbness and pain. In extreme cases, the 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 and waxy and feels hard and rubbery while the deeper tissue is still soft. Affected areas feel numb and may become swollen but do not blister. Frozen skin thaws quickly, becoming red and painful with eventual peeling. Complete healing usually occurs within 10 days, and frostnip is normally reversible.

Frostbite is the actual freezing of skin tissue that can extend through all layers of the skin and freeze muscle and bone. Frozen skin may turn red and then gray-blue with blisters. In the worst

cases, the skin dies and turns blue-black; at this stage, amputation is often required. Deep frozen skin feels “wooden” to the touch with zero mobility of the affected body part. Instantaneous frostbite can occur when skin comes in contact with super-cooled liquids including petroleum, oils and lubricants; fuel; antifreeze; and alcohol, all of which remain liquid at temperatures as low as -40 F.

Hypothermia is a potential life-threatening condition. It is defined as a general cooling of the body’s core temperature below 95 F (normal body temperature is 98.6 F). Hypothermia sets in when body heat loss 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 impaired decision-making ability, slurred speech, disorientation, incoherence, irrationality and possible unconsciousness. Muscle functions deteriorate with shivering and loss 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 victim exhibits stiffness and an 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 go undetected. Victims may deny they are 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. 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 because dehydration adversely affects the body’s resistance to cold injury, increasing the chance of cold weather injuries. Remember that proper hydration is essential to supplying the fuel and energy necessary for heat production.

Understanding the factors contributing to cold weather injuries provides a better understanding of the best methods 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.

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

Keep the body warm

- Keep moving by exercising big muscles (arms and legs) to keep warm.
- Avoid alcohol use. Alcohol impairs the body’s ability to shiver and gives a false sense of warmth.
- Avoid all tobacco products; they decrease blood circulation to the skin.
- Eat all meals to maintain energy.
- Drink water or warm non-caffeinated fluids to prevent dehydration. Drinking warm liquids like tea and hot chocolate that contain sugar provides energy to help the body generate additional heat.

- Limit the amount of time spent outside on extremely cold days and periodically move into warm areas such as warming tents.

Wear proper clothing

- Wear several layers of loose clothing rather than one or two bulky layers. Air trapped between layers acts as insulation against the cold. Layers may also be removed if you become too hot. Additionally, loose clothing allows blood to circulate to the extremities.
- Ensure all clothing is in good condition, clean and dry; change wet, damp clothes immediately.

Protect feet

- Carry extra pairs of socks and change damp socks immediately. Use foot powder to help absorb moisture.
- Avoid tight socks and boots, and never over-tighten boots or shoes.
- Wear overshoes to keep boots and socks clean and dry.

Protect hands

- Wear gloves, mittens or gloves and mittens with inserts to avoid frostbite injuries.
- Keep gloves and 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.
- Cover face and ears with a scarf to prevent frostbite injuries. In combination, a hat and scarf protect the skin and retain body heat.
- Warm face and ears by covering, but not rubbing, with your hands.
- 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 buddies.
- Ask about and assist with rewarming of feet, hands, ears and face.
- Immediately treat persons showing any signs or symptoms of cold injury.
- Remove sick and injured individuals from the cold; they are very susceptible to cold injuries.

More information on cold weather safety and many other fall and winter safety topics is available online at <https://safety.army.mil> under the Fall/Winter Safety Campaign tab.