

# Surviving Cold Temperatures

by Amy Murphy

Sub-zero temperatures, strong winds, blizzards and wind chill warnings are phrases Alaskans become accustomed to hearing during our long, cold winter months. Sometimes the National Weather Service issues weather advisories on a regular basis, warning residents of temperatures dropping to 45 below to 55 below zero. Blizzard warnings frequently advise of strong winds producing limited visibility and wind chills down to 80 below.

These exceedingly severe, frigid weather conditions disrupt normal lifestyles, resulting in inconveniences like vehicles that won't start; canceled plane flights; broken water pipes; and the ever-dreaded power outages. Cold temperatures can also cause human injury.

Prolonged exposure to low temperatures, wind and/or moisture can result in cold-related injury from frostbite and hypothermia. Frostbite is an injury to the skin and/or tissues underneath the skin that is caused by freezing and occurs when the body's mechanisms for maintaining warmth fail. Hypothermia occurs when the body's temperature drops below 95° Fahrenheit (F).

Unfortunately both conditions can lead to permanent injury or even death, making prevention very important.

## Who is at Risk?

Everyone who spends time outdoors is susceptible to developing symptoms related to exposure to cold temperatures. Some of the individuals who are at a greater risk include the elderly; people with circulatory disorders; people from tropical climates; smokers; homeless people and alcoholics. Children are also at a greater risk than adults because their loss of heat is faster. Children will often play long and hard, ignoring how uncomfortable or cold they have become.

AVEC's field employees have a high degree of risk because their job requires them to work outside in extreme winter conditions, especially during power outages. Our employees have to do things like climb power poles, work on transformers or shovel snow away from the power plant exhaust vents and radiator fans even when temperatures drop to -40° F or -50° F. Strong winter winds occasionally create severe wind chills down to -80° F.

Temperatures this cold limit the amount of time employees can spend working outdoors without

developing frostbite or becoming hypothermic. Safety is extremely important, which means our employees continually monitor the amount of time they spend outdoors and take frequent breaks to go inside and warm up.

## Tips for Prevention

The brain is a person's best defense against the cold and exposure to injury can be reduced by making good decisions. Usually people can either stay indoors or take precautions and bundle up warmly to go outside for a limited amount of time. Here are some suggestions on how to keep warm and avoid frostbite and hypothermia.

- Nutrition and hydration play a large part in the body's ability to deal with cold temperatures. Drink large amounts of liquid and eat plenty of good food to keep your body's internal fires stoked.
- Be sure to have plenty of dry, loose-fitting clothing to insulate your body by trapping warm, dry air inside. Clothing that is too loose results in air leaks that create excess space to be heated. Clothing that is too tight restricts blood flow.
- Blood flow can also be restricted by mechanical pressure such as gripping a pole or tool too tightly. Do NOT ever touch bare metal!
- The head and neck lose heat faster than any other part of the body. Your cheeks, ears and nose are the most prone to frostbite. Wear a hat, scarf and turtleneck sweater to protect these areas. Avoid becoming wet as wet clothing loses 90% of its insulating value.
- Use of alcohol, drugs and nicotine should be avoided. Alcohol dilates your blood vessels, increasing the rate at which you lose heat. Nicotine constricts your blood vessels and causes premature cooling of your extremities. Furthermore, alcohol, drug use and low blood sugar can affect decisions a person makes to protect themselves from the cold.
- Be aware of anticipated weather conditions before you set out on a trip and look at long-range forecasts.

## Recognizing Frostbite Symptoms

Skin freezes at about 28° F and the first symptoms are a "pins and needles" sensation followed by numbness. As frostbite develops the skin will become numb and turn to a grey or waxy-white color and the area will be cold to the touch and may feel stiff or woody. With frostbite, ice crystal formation and lack of blood flow to the frozen

area damages the tissues. After thawing, large blisters may develop and swelling may occur, worsening the injury. Frostbite is classified in the following degrees:

- **First Degree:** Often called frostnip, first-degree frostbite appears as numbed, white skin that feels stiff to the touch. With frostnip, the underlying tissue is warm and soft. If properly treated, the blistering, scarring and infection risk are minimal.
- **Second Degree:** Second degree or superficial frostbite appears as white to blue skin that feels hard and frozen. Underlying tissue is still unharmed; however the risk of blistering and permanent damage is greatly increased. It is this increased risk that mandates proper medical attention by trained professionals.
- **Third Degree:** Third degree or deep frostbite appears as white, blotchy and/or blue skin. The tissue underneath is damaged and feels hard and cold. Immediate medical attention is a must for this is a life-threatening situation.
- **Fourth Degree:** This is the most severe state and is usually full-thickness, involving muscle, tendons and bones. There is minimal swelling but gangrene can set in, resulting in dead skin and tissues and amputation.

## Treating Frostbite

- Get the victim out of the cold and to a warm place immediately. Look for signs of hypothermia and treat accordingly. Remove any wet or constrictive clothing items that could impair circulation. If you notice signs of frostbite, seek medical attention immediately.
- Place dry, sterile gauze between toes and fingers to absorb moisture and to keep them from sticking together. Check the dressings periodically to make sure they don't become too tight after swelling occurs. Slightly elevate the affected part to reduce pain and swelling.
- If you are more than one hour from a medical facility and you have warm water, place the frostbitten part in the water (104° to 108° F) or apply warm cloths to the affected areas. If you do not have a thermometer, test the water first to see if it is warm, not hot. Rewarming usually takes 20 to 40 minutes or until tissues soften. Keep adding warm water to ensure the temperature remains consistent. Severe burning pain, swelling and color changes may occur during warming. Be supportive, and if appropriate, medicate the patient.
- If you cannot rewarm the body part in a water bath, a second choice is to place it against your body, preferably an armpit or groin. This technique is much less effective at reducing the extent of the injury, but can be used in an emergency.

- Move thawed areas as little as possible. If the frostbite is extensive, give warm drinks to the victim in order to replace lost fluids.
- Re-freezing of thawed extremities can cause more severe damage. Prevent re-freezing by wrapping the thawed areas and keeping the victim warm. If re-freezing cannot be guaranteed, it is best to delay the initial re-warming process until a warm, safe location is reached.

Treatment for frostbite goes far beyond the initial emergency room visit in severe cases. It usually occurs over a few weeks to months. Tissue damage and repair may not be apparent immediately, resulting in surgery some 6 months later. Lasting effects include chronic pain, sensitivity to cold and sensory loss.

## What Not To Do

Do not use water hotter than 108° F or colder than 100° F since it will not thaw frostbite quickly enough. Do not rub or massage the frostbite area and DO NOT rub with ice or snow.

## Recognizing and Treating Hypothermia

Hypothermia occurs when the body loses more heat than it produces and the body temperature drops below 95° F. Symptoms include change in mental status, uncontrollable shivering, cool abdomen and a low core body temperature. Severe hypothermia may cause rigid muscles, dark and puffy skin, irregular heartbeat and respiration and unconsciousness.

Treat hypothermia by protecting the victim from further heat loss and seeking immediate medical attention. Get the victim out of the cold. Add insulation such as blankets, pillows, towels or newspapers beneath and around the victim. Be sure to cover the victim's head. Replace wet clothing with dry clothing. Handle the victim gently because rough handling can cause cardiac arrest. Keep the victim in a horizontal position. Give artificial respiration or CPR (if you are trained) as necessary.

## Enjoy Winter!

Even though exposure to extremely frigid temperatures can lead to injury, it doesn't mean you have to always play it safe and stay inside where it's warm and cozy. By exercising caution and using good sense you can bundle up warmly enough to get out and safely enjoy the many wonderful activities we can only do in the winter months!