Cold-Weather Casualties and Injuries

Soldiers are responsible for preventing individual cold injuries such as:
- Chilblain
- Immersion foot (trench foot)
- Frostbite
- Dehydration
- Snow Blindness
- Carbon Monoxide Poisoning

Commanders and Unit NCOs are responsible for the health and safety of their troops by:

Training soldiers on the proper use of cold weather clothing. Remembering the acronym C-O-L-D when wearing clothing in cold weather (C: Keep it Clean; O: avoid Overheating; L: wear clothing Loose and in Layers; D: keep clothing Dry).

Maintaining adequate hydration and ensuring nutritional requirements are met.

General Guidance for all Cold-Weather Training

Skin: Cover exposed skin because it is more likely to develop frostbite. Avoid wet skin (common around the nose and mouth).Inspect hands, feet, face and ears frequently for signs of frostbite.

Clothing: Change into dry clothing at least daily and whenever clothing becomes wet. Wash and dry feet and put on dry socks at least twice daily.

Nutrition: Consume 4500 calories/day/soldier. This is equivalent to three meal packets in Meal-Cold Weather (MCW) or three to four MREs.

Hydration: Consume 3 to 6 Liters of liquid (canteens)/day/soldier. Warm, sweet drinks are useful for re-warming.

Camouflage: Consider not using camouflage below 32° F (not recommended below 10° F), because camouflage obscures detection of cold injuries.

These guidelines are generalized for worldwide use. Commanders of units with extensive extreme cold-weather training and specialized equipment may opt to use less conservative guidelines. Cold injury prevention is a command responsibility.

Wind Chill Temperature Table

Temperature it “feels like” when wind is blowing

<table>
<thead>
<tr>
<th>Wind (mph)</th>
<th>Temperature (°F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calm</td>
<td>40</td>
</tr>
<tr>
<td>5</td>
<td>36</td>
</tr>
<tr>
<td>10</td>
<td>34</td>
</tr>
<tr>
<td>15</td>
<td>32</td>
</tr>
<tr>
<td>20</td>
<td>30</td>
</tr>
<tr>
<td>25</td>
<td>29</td>
</tr>
<tr>
<td>30</td>
<td>28</td>
</tr>
<tr>
<td>35</td>
<td>28</td>
</tr>
<tr>
<td>40</td>
<td>27</td>
</tr>
<tr>
<td>45</td>
<td>27</td>
</tr>
<tr>
<td>50</td>
<td>26</td>
</tr>
<tr>
<td>55</td>
<td>25</td>
</tr>
<tr>
<td>60</td>
<td>25</td>
</tr>
</tbody>
</table>

Frostbite Risk (see Wind Chill Temperature Table above)

<table>
<thead>
<tr>
<th>Low</th>
<th>High</th>
<th>Severe</th>
<th>Extreme</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freezing is possible below 32°, but unlikely</td>
<td>Freezing could occur in 30 minutes</td>
<td>Freezing could occur in 10 minutes</td>
<td>Freezing could occur in 5 minutes</td>
</tr>
<tr>
<td>Preventive Measures</td>
<td>Preventive Measures</td>
<td>Preventive Measures</td>
<td>Preventive Measures</td>
</tr>
<tr>
<td>Avoid sweating</td>
<td>Wear ECWCS* or equivalent and wind protection including head, hands, feet and face</td>
<td>Wear Vapor Barrier boots below 0° F</td>
<td>Provide warming facilities</td>
</tr>
<tr>
<td>Cover exposed skin if possible</td>
<td>Mandatory buddy checks every 20-30 minutes</td>
<td>Work groups of no less than 2 personnel</td>
<td>Be ready to modify activities due to extreme risk</td>
</tr>
<tr>
<td>Wear appropriate layers and wind protection for the work intensity</td>
<td>Mandatory buddy checks every 10 minutes</td>
<td>Stay active</td>
<td>Keep task duration as short as possible</td>
</tr>
</tbody>
</table>

* Extended cold weather clothing system

Note: Wet skin could significantly decrease the time for frostbite to occur.

Trench Foot can occur at any temperature - Always keep feet warm and dry.
## Cold-Weather Casualties and Injuries

### Hypothermia

**Cause**
- Prolonged cold exposure and body-heat loss. May occur at temperatures above freezing, especially when a person’s skin or clothing is wet

**Symptoms**
- Shivering may or may not be present
- Drowsiness, mental slowness, lack of coordination that could progress to unconsciousness, irregular heartbeat, and death

**First-Aid**
- Get the soldier to a medical facility as soon as possible, because hypothermia is the most serious cold exposure medical emergency and can lead to death
- Never assume someone is dead until determined by medical authorities, even if a victim is cold and not breathing
- Remove wet clothing and wrap victim in blankets or a sleeping bag
- Place another person in sleeping bag as an additional heat source
- Minimize handling of the unconscious victim with a very low heartbeat so as to not induce a heart attack
- Never wear cotton clothing in cold weather environments
- Anticipate the need for warming areas for soldiers exposed to cold, wet conditions

**Prevention**
- Consume 3-6 quarts of water per day at a minimum
- Minimize exposure to wind, rain, and snow
- Keep face and ears covered and dry
- Keep socks clean and dry
- Avoid tight socks and boots

### Frostbite

**Cause**
- Freezing of exposed skin, such as fingers, toes, ears, and other facial parts
- Exposure of skin to metal, extremely cool fuel and POL*, wind chill, and tight clothing, particularly boots

**Symptoms**
- Tingling, blistered, swollen, or tender areas
- Pale, yellowish, waxy-looking skin (grayish in dark-skinned soldiers)
- Frozen tissue that feels wooden to the touch
- Swelling, red skin (or darkening of the skin in dark-skinned soldiers)

**First-Aid**
- Evacuate immediately, because frostbite can lead to amputation
- Start first-aid immediately. Warm affected area with direct body heat
- Do not massage or rub affected areas
- Do not thaw frozen areas if treatment will be delayed
- Do not massage or rub affected areas
- Do not wet the area or rub it with snow or ice
- Do not expose affected area to open fire, stove, or any other intense heat source
- Do not expose affected area to open fire, stove, or any other intense heat source

**Prevention**
- Use contact gloves to handle all equipment; never use bare hands
- Use approved gloves to handle all fuel and POL products
- In extreme cold environments, do not remove clothing immediately after heavy exertion (PT); wait until you are in a warmer location
- Never wear cotton clothing in cold-weather environments
- Always post a fire guard when operating a heater in sleeping areas

### Chilblain

**Cause**
- Repeated exposure of exposed skin for prolonged periods from 20° - 60°F with high humidity (for those not acclimated to cold weather)

**Symptoms**
- Swollen, red skin (or darkening of the skin in dark-skinned soldiers)
- Tender, hot skin, usually accompanied by itching
- Warm affected area with direct body heat
- Do not massage or rub affected areas
- Do not wet the area or rub it with snow or ice
- Do not expose affected area to open fire, stove, or any other intense heat source
- Use contact gloves to handle all fuel and POL products
- Use approved gloves to handle all equipment; never use bare hands
- In extreme cold environments, do not remove clothing immediately after heavy exertion (PT); wait until you are in a warmer location
- Never wear cotton clothing in cold-weather environments

**First-Aid**
- Use contact gloves to handle all fuel and POL products
- Keep face and ears covered and dry
- Keep socks clean and dry
- Avoid tight socks and boots

**Prevention**
- Use contact gloves to handle all fuel and POL products
- Use approved gloves to handle all equipment; never use bare hands
- In extreme cold environments, do not remove clothing immediately after heavy exertion (PT); wait until you are in a warmer location
- Never wear cotton clothing in cold-weather environments
- Always post a fire guard when operating a heater in sleeping areas

### Dehydration

**Cause**
- Depletion of body fluids

**Symptoms**
- Dizziness
- Weakness
- Blurred vision

**First-Aid**
- Replace lost water. Water should be sipped, not gulped
- Get medical treatment

**Prevention**
- Consume 3-6 quarts of water per day at a minimum
- Minimize exposure to wind, rain, and snow
- Keep face and ears covered and dry
- Keep socks clean and dry
- Avoid tight socks and boots

### Snow Blindness

**Cause**
- Burns of the cornea of the eye by exposure to intense UV rays of the sun in a snow-covered environment

**Symptoms**
- Pain, red, watery or gritty feeling in the eyes
- Rest in total darkness; bandage eyes with gauze
- Use sunglasses with side protection in a snow-covered environment
- Use improvised slit glasses if sunglasses are not available

**First-Aid**
- Move to fresh air
- Administer oxygen if available
- CPR if needed

**Prevention**
- Evacuate if no improvement within 24 hours
- Rest in total darkness; bandage eyes with gauze
- Use sunglasses with side protection in a snow-covered environment
- Use improvised slit glasses if sunglasses are not available

### Carbon Monoxide Poisoning

**Cause**
- Replacement of oxygen with carbon monoxide in the blood stream from burning fuels without proper ventilation

**Symptoms**
- Headache, confusion, dizziness, excessive yawning
- Cherry red lips and mouth (in light skinned individuals); grayish tint to lips and mouth (in dark skinned individuals)
- Unconsciousness
- Unconsciousness

**First-Aid**
- Move to fresh air
- Administer oxygen if available
- CPR if needed

**Prevention**
- Use only Army-approved heaters in sleeping areas and ensure that personnel are properly licensed to operate the heaters
- Never sleep in running vehicles
- Always post a fire guard when operating a heater in sleeping areas

* POL - petroleum, oil, lubricants