



## Heat Illness

Heat illness happens in the UK as well as in warm climates. The weather doesn't have to be hot if personnel are: exercising hard, carrying heavy loads or wearing protective clothing. Heat illness can cause a lot of damage, and can lead to individuals being downgraded and medically discharged. In some cases heat illness can be fatal.

### Definition

Heat illness includes those individuals who become unwell as a result of a rise in core body temperature.

### How does it happen?

Heat illness happens when a body gains more heat than it loses.

Body temperature rises when exercising and from the air temperature, direct sunshine or heat reflecting off buildings and other surfaces.

Heat is lost mainly by sweating. Usually, this helps the body to cool down and continue to function efficiently. In humid conditions, sweating doesn't work as well, and if too many clothes (or the wrong sort of clothes) are worn the body may keep in more heat than it should.

If more heat is gained than lost body temperature rises too much, which may lead to heat illness.

$$\text{HEAT STORAGE} = \text{HEAT GAINED} - \text{HEAT LOST}$$

As a serving member of the Armed Forces, you are more at risk from heat illness because of the combination of:

- High intensity physical training
- High exposure to heat
- Having to wear protective clothing (e.g. Body armour, CBRN, fire retardant or impermeable clothing).

### Risk Factors

You are at greater risk of heat illness if you are:

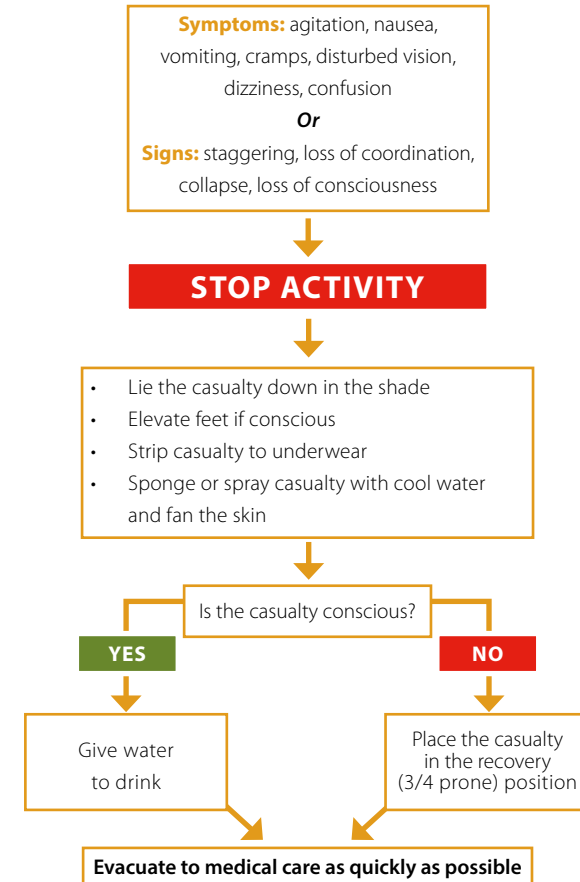
- Tired
- Hungry
- Thirsty (dehydrated)
- Unfit
- Overweight
- A smoker
- Hung-over

### Recognition and response

If in a hot environment; or wearing protective clothing (or both) an individual should be presumed to have heat illness if they experience or display any of the following:

- Agitation
- Nausea or vomiting
- Cramps
- Dizziness.

### Immediate Treatment Action



### Point of Contact:

SO1 Occ Med HQSG  
Coltman House  
DMS Whittington  
WS14 9PY

Tel: 94422 (01543 43) 4673.  
Dii: SG ACDS StratPol-OM SO1



Ministry  
of Defence

## An Individual's Guide to Climatic Injury





# Cold Injuries

Military personnel are at increased risk from cold-related problems because of the unavoidable need to expose them to adverse environmental conditions on operations and exercises both in the UK and abroad.

Cold injuries occur as a result of the effects of cold and wet and cold and dry conditions on the body and are classified as follows:

**Hypothermia** occurs where there is a low core body temperature. This may be mild, moderate or severe and can be due to:

- **Immersion.** Caused by severe cold stress; often rapid. e.g. a sailor washed overboard.
- **Exhaustion.** Caused by a combination of wind and wet conditions with moderately low temperature. e.g. usually found in mountaineers or hill walkers.
- **Urban.** Where the cold is relatively mild but prolonged. e.g. most common in the elderly and malnourished.

**Non-Freezing Cold Injury (NFCI)** is the most common injury in land operations and exercise. The main cause is allowing wet feet or hands to remain wet and / or cold for long periods.

**Freezing Cold Injury (FCI)** is a significant cause of disability. Parts of the body most prone to freezing are the extremities and exposed areas - face, fingers, toes, heels and soles of the feet. There are two types of FCI:

- **Frost nip.** Where people recover fully within 30 mins of re-warming of the injured part.
- **Frost bite.** Which goes deeper and causes longer lasting damage.

Control of human body temperature is dependent on the balance of heat production and the rate of heat loss. The rate of heat loss through convection and conduction depends on the temperature difference between skin and the environment. Air movement across the body increases both types of heat loss. This is commonly known as 'wind chill'.

**HEAT STORAGE = HEAT GAINED - HEAT LOST**

### Risk Factors.

You are at greater risk of cold injury if you are:

- Have a past history of cold-related problems
- Unwell
- Unfit
- Dehydrated - cold weather causes increase respiratory and urinary fluid loss
- Poorly fed - resting adult male energy requirements increase from 2500 kcl (at room temp) to 5000 kcal at -20°C
- Of an Afro-Caribbean ethnicity
- Current smoker

The easiest way to prevent NFCI is to stay warm and dry, but of course, this is not always possible. You can reduce your risk by:

- Make sure your kit is designed for the job
- Wear clean and dry socks
- Use foot powder
- Ensure boots fit - don't lace them too tight
- Try to keep your hands dry
- Use gloves where possible
- Eat and drink as often as possible - digesting food produces heat
- Don't become dehydrated
- Don't smoke

### Recognition and response

#### Hypothermia

You are particularly at risk in cold and wet conditions.

Initial signs :	Later signs : (core temp <32°C)
<ul style="list-style-type: none"> <li>• Feeling very cold</li> <li>• Stiffness, tiredness</li> <li>• Violent shivering</li> <li>• Increased heart rate</li> <li>• Irrational behaviour</li> </ul>	<ul style="list-style-type: none"> <li>• Probably not shivering</li> <li>• Stiff limbs - rigid joints</li> <li>• Confusion or loss of consciousness</li> </ul>

**Immediate actions.** The most important immediate action is to get the under cover, stop getting any colder and replace wet clothing with dry. Once under cover:

- Start to re-warm SLOWLY
- Add layers
- Give warming food and drink (but NOT alcohol)
- Place the casualty in a sleeping bag and treat as a stretcher case
- Urgently evacuate (*concurrent discussions with medical staff*)

#### Non-Freezing Cold Injury (NFCI).

NFCI usually affects the feet, causing numbness which does not go away. You may feel pain and pins and needles.

#### Report to your commander immediately if:

- Your hands or feet get pins and needles
- Your hands or feet become numb and stay numb

**Immediate actions.** If you get hands or feet wet. Make sure you:

- Dry them as soon as you can
- Change your socks
- Use foot powder
- Wiggle your toes and fingers to keep them warm

#### If you have to stand still for long periods:

- Do 10 mins of step ups or marching on the spot to get your circulation going

#### If exercise is not possible:

- Take off your wet boots and socks
- Gently re-warm your feet/hands
- Place your feet into a dry sleeping bag - then massage them gently
- Change into dry kit as soon as possible

**DO NOT use any artificial heat, hot water or stoves. This will make the injury worse.**

#### Freezing cold injury (FCI)

Early signs (frost nip):	Later signs (frost bite):
<ul style="list-style-type: none"> <li>• The affected part feels cold and painful</li> <li>• A tingling sensation followed by numbness</li> <li>• No feeling when the affected part is moved</li> <li>• Skin looks mottled - white and pink</li> </ul>	<ul style="list-style-type: none"> <li>• No feeling in the affected part</li> <li>• Skin white and waxy looking</li> <li>• A clear line between white and pink skin</li> <li>• Eventually (after re-warming) skin may appear bruised and blistered</li> </ul>

#### Immediate actions.

- Get into shelter
- Remain sheltered until evacuation can be arranged
- Protect the affected part
- Do NOT re-warm if there is any danger of re-freezing
- Do NOT apply direct heat, or rub the frozen part in an attempt to thaw
- Do NOT allow the casualty to smoke or take alcohol
- Do NOT use protective ointments (e.g. muscle warming rubs)
- Do NOT allow the casualty to use the limb when re-warmed

Once frostbite is suspected /evident, you must treat the casualty as a case for evacuation. If the casualty is going to be re-exposed to the cold, you must not rewarm until they are in the hands of medically trained personnel.