



# Hypothermia

## What is it?

Losing too much heat from the body, especially the outer layer, leading to the temperature to the most important points of the body falling below 35°C. Heat loss, and tiredness, cold, anxiety, and mental stress can be very dangerous. The causes and effects will vary from case to case, as will every individual's reaction to them.

Temperatures:    37°C - normal body core temperature  
                          35°C - symptoms of hypothermia begin  
                          33°C - normal skin temp  
                          31°C - unconscious, but responds to stimulation  
                          30°C - coma  
                          26°C - DEATH - but people have recovered from temperatures of 15°C.  
**Never stop treatment**

## Causes:

A combination of one or more of the following:

- **Wet and Cold:**  
When clothes are wet, the water replaces trapped heat, and the body temperature can drop by more than 10% very quickly. As the clothes are drying, the person also loses heat because of the energy needed to dry them. Obviously, the lower the temperature, the greater the problems.
- **Wind:**  
When the wind is blowing, especially on to a wet person, the rate of heat loss is considerably speeded up. Wind-chill can easily make the temperature many degrees colder than the still air temperature. By preventing wind blowing through wet clothes, and so keeping the trapped layers of heat, the person will stay much warmer. Bare hands are a real problem, as is a wet head, so hat and gloves are essential. Walking in a strong wind also tires people out more quickly, and can lead to exhaustion.
- **Exhaustion:**  
Combined with the natural problems such as weather, some of the main factors in causing hypothermia are lack of fitness, over stretching the group, too heavy loads, too fast a pace, and lack of sleep and food.
- **Equipment:**  
If an individual does not have the correct clothing, the speed of the onset of hypothermia can be greatly increased. Everyone must have warm and windproof clothes, to trap layers of heat, and prevent wind-chill.





### What to Look For:

- Victim begins to act in a generally unnatural manner
- Complains of tiredness, cold, cramp, shivering, and overall discomfort. At the same time, sudden bursts of energy and violent language
- Body feels cold and dry; pulse slows down - often a lot
- Mental and physical lethargy, lack of understanding, looking pissed off, etc.
- Slurring of speech, irrational or violent behaviour
- Poor vision, and finally collapse and coma. If a person reaches this stage, they are in very serious trouble

These signs may not all be present, or in this order. Mild cases should be treated immediately, as they soon become serious. If one person is suffering, maybe others will be too. Take steps to prevent more cases, and also stay warm yourself.

### Prevention:

- BE AWARE. Watch the group, look for early signs of problems, and be prepared to take action at once, i.e. stop, turn back etc...
- Keep a very close eye on the weather while you are walking, and do not be afraid to turn back.
- Make sure everyone has warm clothing, best in several layers, and a windproof, waterproof outer layer. All should have a hat and gloves; 30 - 50% of body heat is lost via the head.
- Make sure that you carry a survival bag, emergency food, and spare clothes.
- Make sure that the route is suitable for the group, that they have the correct equipment, that they do not carry too much, and that they have plenty of sleep.

### Treatment:

- Stop!!
- Shelter: Provide some shelter, even if it is just a survival bag.
- Warmth: Insulate the patient to prevent further heat loss, put dry clothes next to the skin, and put something between them and the ground. Put them in a sleeping bag, with some one else to keep them warm. Stop any more heat loss & re-warm.
- Food: Give warm sweet drinks, and high energy food, warm if you can.
- Keep Checking: Keep a close watch on the patient, to make sure they get no worse. If they do, take action.
- Others: Make sure that the rest of the group is OK; tell them to put on extra clothes, and to find shelter. Put another guide or leader in charge of them, and above all stay warm yourself; if you die, you are no good to the group!!!
- Send for Help: If it is a severe case. Often, with warmth and rest, people recover quickly, but go slowly and keep watching!





### Never give up:

If somebody becomes very cold. Keep treating them, even if you cannot detect a heartbeat. Sometimes the pulse can slow down to one heartbeat a minute.

### Do not:

Rub the patient, or give them alcohol - this draws heat away from the core of the body to the surface. Do not give Mouth to Mouth Resuscitation

Send at least two people to the nearest place where they can get help. Do not be afraid to get help from huts, other walkers etc...

Very serious cases of hypothermia will need a great deal of first aid and help. Do the best you can on the mountain, but you must get them down and into professional help as soon as possible.

### Conclusion:

- Have adequate equipment and clothing for all.
- Ensure you have enough food and water, and emergency gear for the group.
- Do not try and do too much.
- Always watch the weather and the group.
- Never be afraid to turn back.
- Enjoy yourselves - SAFELY.

## Effects of Heat

It is often said that man is a tropical animal, and it is true that it is easier to lose heat than to keep it. But, in a cold climate, the best way to stay warm is to put on warmer clothes. In a hot climate, heat loss is more controlled by climate than anything you can do. It is easier to wear a coat than a block of ice. Exposure to the heat is rare Switzerland. But, bad sunburn and mild heat exhaustion can happen, and in the mountains the leader should know the main heat disorders and how to stop the chance of being ill because of them.

### Water Requirements:

Since most of these disorders are because of too little water, more than the direct effects of heat, knowing what the body needs water for and why is useful. As a rough guide, 2 1/2 litres may be taken as the average daily requirement, broken down as follows:

	mls per 24 hours
Urine	1400
Breathing	400
Sweating	600
Solid waste	100
Total	2500





This need is higher if you are doing hard physical work, especially in hot weather, when another 750 ml may be needed for every 1,000 kcal of energy used. Most of this water is evaporated as sweat, and in this way, cools the bodies surface. The evaporation of 1 litre of sweat leads to a heat loss of about 600 kcal. In really hot climates, water needs may be as much as 8 litres per 24 hours.

### **Salt Requirements:**

Normally the salt we eat is a lot more than what we really need, but sweating for longer can lead to dangerous salt losses, mainly to people who are un-acclimatised. For every litre of fluid lost, 2 grams of salt is lost. Luckily, getting used to less salt in a hot environment is quite quick and the immediate effects can be cured by taking salt either as solid or liquid and drinking less.

### **Acclimatisation:**

Very little is known about getting used to heat over a long time and you can be left thinking that, as with the Eskimo in the cold environment, avoiding getting to hot is the best protection against the harmful effects of a hot climate. Short term changes to heat happen in a few days of exposure. Differences include: less change in heart rate when working, a lower skin and body temperature, sweating starts sooner so cools the body down better and quicker, less salt is lost in sweat and urine. The person also will feel more comfortable in the conditions.

### **Sunburn:**

This can be very dangerous to people with sensitive skin. Also, sunburn can get in the way of sweat being made and lead to more heat problems. Sunburn is usually caused from being in the sun for too long without protecting the body. The length of time in the sun should be carefully regulated to build up protective tan. To start with, a good barrier cream should be used which does not interfere with sweating and which cuts out most of the harmful ultra-violet radiation. When applying the cream it is important to remember the lips and also those areas of the face which get a lot of reflected light from the ground or snow: under the nose and ears, chin, etc. Sunburn can be treated well with calamine lotion.

### **Effects of Glare:**

Snow blindness is linked to uncomfortable eyes and strain, because the eyes have not been protected well enough. The cure is simple: wear sunglasses. These must be good quality and reduce the amount of ultra-violet radiation. They must not cut down to much of the total amount of light let into the eye. In snow conditions, especially at high altitudes, eyes must be protected from light getting in around the sides of the lenses as well as the lenses.





### **Heat disorders:**

#### Prickly Heat

This is an itchy rash of tiny blisters, usually caused by sweating for a long in a hot climate. The only real cure is to get out of the sun and rest, although other things can be done to relieve the symptoms.

#### Heat Syncope

People not used to the heat often suffer from being very tired, linked with fainting or a feeling of giddiness. This is common condition, and can be cured by rest.

#### Heat Exhaustion

Heat exhaustion linked with too little water can be very serious, leading in the end to death. The symptoms of heat exhaustion include: thirst, fatigue, giddiness, a quick pulse, higher body temperature, going to the toilet less than normal and later on, delirium and coma. The only cure is to put more water back in the system.

Heat exhaustion because of too little salt has similar symptoms. But may not show any noticeable rise in body temperature, but it is almost always associated with severe muscle cramp. It can be dangerous if more salt is not added to the diet. Victims may not realise they suffer from this as the body can not tell them.

#### Heat Stroke

Mistakenly referred to as sunstroke. This is by far the most serious of the heat disorders and is caused the body not being able to control its temperature. It is associated with a very high body temperature and too little sweating. The skin is hot and dry to touch. Early symptoms are very similar, like aggressive behaviour, lack of co-ordination and so on. Later on the victim goes into a coma or convulsions and death will follow unless good treatment is given.

Heat stroke can be cured by sponging down of the patient, or covering them with wet towels and fanning well. It is important to start treatment as soon as possible, unless the shortage of water is so big that others lives will be put in danger. When you can, dunking in a cold bath (10 C) is the best way to cure.

### **Precautions:**

It is important to remember that it is not possible to get used to the low intake of water. A certain minimum amount is needed for survival. Most of the recommendations, therefore, concern the conservation of water.

- Keep fit. Fitness is very important, especially when travel is involved.
- Do the minimum of work you can to meet the expedition's aims.
- Keep out of the sun as much as possible especially during the hottest part of the day.
- Drink more water when the water is easily available, little and often being the best maxim to follow. Thirst is a bad indicator of your real need and extra water will be useful on a long journey.
- Don't hoard water until collapse is imminent.
- A high calorie diet, short on protein, is good.





- Wear loose, lightweight clothing, which lets you sweat and light in colour; also a sun hat and sunglasses. On no account try to climb uphill in hot conditions wearing fully waterproof clothing.
- If salt tablets are taken they must be dissolved in a lot of water.

## Altitude Sickness

### Background:

The higher you go into the atmosphere, the lower the amount of oxygen in the air. At the summit of Mont Blanc (4,807m), the highest mountain in Western Europe, there is half of the oxygen that is available at sea level. For climbers and hikers at such altitudes, the lack of oxygen may cause illness that is potentially life threatening. This means that your lungs must work harder to keep the right amount of oxygen in the blood.

The first effects can be felt at around 1500m. At this level the amount of oxygen in the air changes and the body tries to adapt to its new and unfamiliar environment. The body starts to create more red blood cells in order to push around the available oxygen. This process by which individuals gradually adjust is known as acclimatisation and can take 1 to 2 weeks. The initial and most important adjustments are an increase in the frequency and depth of breathing.

At medium altitude (1,500m – 2,500m) the amount of oxygen in the blood remains above 90% but altitude illness is possible. At high altitude (2,500 – 5,300m) the amount of oxygen in the blood falls below 90%, altitude illness is common and acclimatisation is necessary

### What to Look For:

People who do not adjust well to high altitudes will often feel and behave differently than normal. Someone with altitude sickness will be out of breath, complain of a headache, feel dizzy, feel sick, feel tired, vomit, maybe lose their appetite and have disturbed sleep.

### Cause:

Rapid ascent to high altitudes often results in the syndrome known as acute mountain sickness (AMS). At elevations between 2,500m and 5,000m, about 20% to 90% of those who are not adapted to high altitude will experience mild symptoms of AMS. The frequency of AMS in the Swiss Alps ranges from 9% at 2,850m to 53% at 4,559m.

Most problems are caused by gaining too much altitude too quickly. Fatigue, dehydration, cold, and fear also add to the possibility of developing altitude sickness.





### **Prevention:**

The effects of altitude on the body are very different from person to person. Some people never have trouble with high altitudes because they ascend slowly enough. Others are not able to acclimatise even if the altitude that they are at is not very high.

Currently it is recommended that above 3,000m each night should average not more than 300m above the last, with a rest day every two or three days (or every 1,000m). It is very important not to ascend any further if experiencing symptoms of AMS and that descent should be considered until symptoms are relieved.

The best way to prevent altitude sickness is to acclimatise slowly and drink lots of water.

### **Treatment:**

Mild cases of altitude sickness may be cured with rest, but in more serious cases descending to a lower altitude is the only option. Mild and severe AMS sufferers can use drugs such as aspirin, ibuprofen and naproxen to alleviate high altitude headache.

## **Lightning**

It is every Alpinist's worst nightmare to be caught in an electric storm. They can come in so quickly and with such ferocity that you may have nowhere to go.

Avoid them at all costs. Learn about the weather systems to watch for. Change your plans to a lower and shorter route which you can complete comfortably in time.

The cloud is the cumulonimbus and as it grows, so the water droplets inside it are hurled up and down. If they freeze they shatter; and as they shatter there is a separation of electrical charges – the positive charges attach to the ice crystals and the negative charges attach to the hail. A discharge (lightening) takes place, coupled with an explosive expansion of air (thunder). The lightening hits the ground when the discharge takes place between the negatively charged hail and positively charged ground.

### **Warning Signs:**

The two systems which cause thunderstorms are (a) cold fronts and (b) hot weather. The best warning of (a) is the weather chart showing a cold front, with an immediate warning of a noticeable drop in pressure. The best warning of (b) is the weather chart showing a weak pressure gradient, with immediate warnings of the weather feeling heavy and the build up of altocumulus castellanus or altocumulus flocus.

If you are on a summit or exposed ridge you may hear crackling sounds and your ice axe or trekking poles may hum or spark. Your hair may stand on end and may even glow with a bluish light.

### **Getting Off the Mountain:**





But unfortunately the time will come when you do get caught, because everybody gets caught sooner or later. Make every effort to get off the mountain. If you haven't been running for some time, now is the time to take it up again.

If you are on an exposed ridge, try to get along it and down the easy slopes back to the valley. A group bivvy shelter is good because it will not only help you stay dry, but you can share the horror of the moment with your group.

**Places to Avoid:**

Ridges, as you are particularly exposed to bolt lighting coming in at you horizontally.  
Under boulders and in the entrance to caves as the lightening is looking for the shortest way to earth and you might provide the link.  
In the line of cracks in the rock because the lightening may follow the crack down.

**Metal Objects:**

Put your ice axe, crampons, trekking poles or other metal objects at least 20 metres away from you, as the lightening will be attracted to them.

**Trees:**

If you are down below the tree-line avoid the temptation of sheltering underneath a big tree, because it is the most likely object around to be hit.

**If Struck:**

Not all lightening strikes are fatal. But if someone is struck and they stop breathing, start resuscitation straight away.

