CONDITION

# Hypothermia

Hypothermia is a dangerous drop in core body temperature below 35°C.

**WHAT IT IS**
Dangerous fall in core body temperature below 35°C

**BODY SYSTEM**
Whole body, especially brain, heart, and circulation

**MAIN SYMPTOMS**
Shivering, confusion, slurred speech, poor coordination

**WHAT CAUSES IT**
Cold exposure overwhelming the body's heat production

**HOW IT IS DIAGNOSED**
Core temperature measurement and clinical assessment

**MAIN TREATMENT**
Safe rewarming and supportive medical care

**CAN IT BE CURED?**
Yes - with prompt safe rewarming

**IS IT AN EMERGENCY?**
Yes - especially with confusion, drowsiness, or unconsciousness

**LONG-TERM OUTLOOK**
Full recovery often possible; severe cases can be fatal

## Overview

Hypothermia happens when your body loses heat faster than it can produce it. Your core temperature-the temperature of deep tissues and organs-falls below 35°C, or 95°F.

This is different from simply feeling cold. As body temperature falls, the brain, heart, breathing, muscles, and other organs stop working normally. Thinking and coordination may become impaired, so someone with hypothermia may not understand what is happening or be able to help themselves.

Hypothermia can develop outdoors in freezing weather, but it can also happen at temperatures above freezing. Wind, rain, wet clothing, cold-water immersion, exhaustion, and long periods without shelter all increase heat loss. It can also occur indoors, especially in a poorly heated home or in someone who cannot move easily.

Suspected hypothermia should be treated as a medical emergency, particularly if the person is confused, unusually sleepy, clumsy, or unconscious. Recovery is often possible with prompt, careful rewarming.

## Symptoms

Early symptoms may be easy to miss. A person may shiver, feel tired, become quiet, or have trouble using their hands. Their skin may look pale and feel cold.

As cooling continues, common signs include:

In more severe hypothermia, shivering may decrease or stop. This does not mean the person is improving. It can mean that the body no longer has enough energy to shiver effectively.

A severely affected person may become unconscious. Their breathing and pulse can be extremely slow and difficult to detect. Dangerous abnormal heart rhythms and cardiac arrest can occur.

Babies may not show typical symptoms. Warning signs can include cold, red skin, low energy, poor feeding, or an unusually weak cry. Older adults may mainly seem confused, tired, or less mobile than usual.

- Persistent shivering
- Slurred or slow speech
- Confusion, poor judgment, or unusual behaviour
- Stumbling, clumsiness, or difficulty walking
- Drowsiness and slow responses
- Slow, shallow breathing
- A weak or slow pulse

## Causes and risk factors

Hypothermia is caused by losing too much body heat. Heat can be lost through direct contact with cold surfaces or water, through moving air, and through evaporation from wet skin or clothing.

Cold-water immersion is especially dangerous because water carries heat away from the body much faster than air. Falling into cold water can also cause a sudden gasp and breathing difficulty before hypothermia develops.

Situations that raise the risk include:

Alcohol may make the skin feel warm, but it increases heat loss and can impair judgment. Sedatives and some other medicines may reduce alertness, movement, or the body's response to cold.

Babies and older adults regulate temperature less effectively. Risk is also higher in people with poor nutrition, low body weight, reduced mobility, or conditions that affect the brain, nerves, hormones, or circulation. Examples include stroke, dementia, Parkinson's disease, diabetes, and an underactive thyroid.

Serious infection, low blood sugar, trauma, and certain drug overdoses can contribute to a low body temperature. Sometimes several factors are involved.

- Wearing wet or inadequate clothing
- Staying outside in cold, windy, or rainy conditions
- Becoming lost, injured, or exhausted outdoors
- Living in a home without enough heating
- Being unable to move or change position
- Drinking alcohol or using sedating drugs

## Diagnosis

Hypothermia is diagnosed from the circumstances, symptoms, physical examination, and an accurate core temperature measurement. A core temperature below 35°C confirms hypothermia.

Ordinary household thermometers may not measure temperatures low enough to detect it. Mouth, forehead, or ear readings can also be inaccurate when the skin and surrounding air are very cold. Medical teams use low-reading thermometers and may measure temperature in the ear canal, rectum, bladder, or oesophagus, depending on the situation and the person's condition.

Treatment should not be delayed while trying repeatedly to obtain a temperature if someone has concerning symptoms after cold exposure.

In hospital, an electrocardiogram, or ECG, checks the heart's rhythm. Blood tests may look for low blood sugar, changes in salts and acid levels, organ injury, infection, alcohol or drugs, and medical problems that contributed to the cooling. Imaging may be needed if there was a fall, injury, stroke, or another suspected cause.

## Treatment and management

The immediate aim is to stop further heat loss and rewarm the body safely. Contact emergency services if hypothermia is suspected, especially when there is confusion, marked drowsiness, poor coordination, abnormal breathing, or loss of consciousness.

While waiting for help:

A fully awake person who can swallow safely may have a warm, sweet, non-alcoholic drink. Do not give food or drink to someone who is drowsy, confused, vomiting, or unconscious.

Do not rub or massage cold arms and legs. Avoid direct intense heat, including very hot baths, heating lamps, or hot-water bottles placed directly on the skin. Numb skin can burn, and sudden heating of the limbs may worsen strain on the heart. Do not give alcohol.

If the person is not breathing normally, start cardiopulmonary resuscitation, or CPR, and use an automated external defibrillator if one is available. Follow the emergency call handler's instructions. A very cold person's pulse and breathing may be unusually slow, so medical assessment remains important.

In hospital, treatment is matched to severity. Mild cases may respond to dry insulation, a warm environment, and warm drinks when safe. Moderate or severe cases may need heated blankets or forced warm air, warmed oxygen, warmed intravenous fluids, and close heart monitoring.

For life-threatening hypothermia, doctors may use internal rewarming methods. In some specialist centres, blood can be warmed outside the body using heart-lung bypass or extracorporeal membrane oxygenation, known as ECMO. These methods can also support the circulation during cardiac arrest.

- Move the person to shelter if this can be done safely
- Handle them gently and keep them lying as still as practical
- Remove wet clothing, cutting it away if necessary
- Dry the person and wrap them in blankets or dry layers
- Cover the head and neck while keeping the face clear
- Insulate them from the cold ground
- Warm the centre of the body, such as the chest and upper back

## Complications

Hypothermia can cause abnormal heart rhythms, very low blood pressure, breathing failure, loss of consciousness, and cardiac arrest. The risk increases as the core temperature falls.

Cold exposure may also cause frostbite, in which skin and deeper tissues freeze. Frostbite is a separate cold injury but can occur at the same time. Falls, drowning, or other injuries may have happened before or during the exposure.

Other possible complications include muscle breakdown, kidney injury, blood-clotting problems, lung infection, and damage caused by a long period without enough oxygen. Severe cases may be fatal.

After rescue, the core temperature can continue to fall for a time as cold blood returns from the arms and legs. This is one reason gentle handling, central warming, and medical monitoring are important.

## Prevention

Many cases of accidental hypothermia can be prevented, although sudden weather changes, accidents, or medical emergencies cannot always be avoided.

Before spending time in cold or wet conditions, check the weather and plan for shelter. Wear several loose layers, including a wind-resistant and water-resistant outer layer. Keep the head, hands, and feet covered, and replace wet clothing promptly.

Carry dry clothing, food, water, and emergency supplies when hiking, boating, skiing, or travelling in remote areas. Tell someone your route and expected return time. Wear an appropriate life jacket around cold water.

Avoid alcohol when you may be exposed to cold. It can impair decision-making and increase heat loss.

Indoors, maintain adequate heating and check on people who may have difficulty noticing or responding to cold. Babies, older adults, and people with reduced mobility may need extra help keeping rooms warm and changing wet clothing.

## Living with it and what to expect

Hypothermia is usually an acute event rather than a long-term condition. Rewarming may take several hours, followed by observation while temperature, heart rhythm, breathing, and organ function return toward normal.

People treated early for mild hypothermia may recover without lasting effects. Tiredness,

soreness, and emotional distress can continue for a short time after a frightening exposure.

Recovery from severe hypothermia is less predictable. It depends on how low the temperature became, how long the exposure lasted, whether cardiac arrest occurred, and whether there were injuries, infection, or other medical problems. Rehabilitation may be needed after prolonged intensive care or damage to the brain, nerves, muscles, or limbs.

A follow-up appointment may be recommended after an unexplained episode, an indoor episode, or severe hypothermia. This can help identify contributing problems such as an underactive thyroid, low blood sugar, infection, medication effects, poor nutrition, unsafe housing, or reduced mobility.

Hypothermia does not usually keep returning once the cold exposure and contributing factors have been addressed. However, someone with ongoing mobility, memory, housing, or health problems may remain at risk and may need practical support.

## When to get medical help

Call emergency services for suspected hypothermia when someone has been exposed to cold and has confusion, slurred speech, poor coordination, marked drowsiness, slow or abnormal breathing, or loss of consciousness. A measured temperature below 35°C also requires urgent medical assessment.

Start CPR if the person is unresponsive and not breathing normally. Do not assume that someone who is very cold cannot be resuscitated.

Seek urgent help after cold-water immersion if the person remains cold, confused, breathless, weak, or unable to stop shivering. Also get urgent care for suspected frostbite, injury, chest pain, or symptoms that worsen during rewarming.

Routine follow-up is appropriate after recovery if the cause was unclear, the episode happened indoors, symptoms return, or an underlying medical or social problem may have contributed.

## Common questions

Can you have hypothermia when it is not freezing outside?

Yes. Hypothermia can develop above freezing, especially in wind or rain, in wet clothing, or after immersion in cold water. A cool indoor environment can also be enough when someone is frail, unwell, or unable to move.

What temperature counts as hypothermia?

A core body temperature below 35°C, or 95°F, is hypothermia. Symptoms and the circumstances are also important because household thermometers may not measure low temperatures accurately.

Does shivering mean hypothermia is mild?

Not always. Shivering is a common early response, but it can be strong in significant hypothermia. If shivering stops while the person remains cold, confused, or drowsy, the condition may be worsening.

Should I put someone with hypothermia in a hot bath?

No. Sudden, intense heating can burn numb skin and place stress on the circulation. Remove wet clothing, insulate the person, warm the centre of the body, and obtain emergency help.

How long does recovery take?

Mild cases may improve during several hours of careful rewarming. Severe hypothermia can require intensive care and a longer recovery. The course is influenced by cardiac arrest, injuries, illness, and the duration of exposure.

Can hypothermia cause permanent damage?

It can, particularly after severe or prolonged cooling, cardiac arrest, or a long period with too little oxygen. However, full recovery is possible, and very cold people may sometimes survive prolonged resuscitation.

## Sources

- NHS. Hypothermia
- Centers for Disease Control and Prevention. Preventing Hypothermia
- Wilderness Medical Society. Clinical Practice Guidelines for the Out-of-Hospital Evaluation and Treatment of Accidental Hypothermia: 2019 Update
- European Resuscitation Council Guidelines 2021: Cardiac arrest in special circumstances
- Resuscitation Council UK. Special circumstances guidelines