

Hypothermia

A plain-English guide for you and your family

WHAT IS HAPPENING

Your body works hard to stay at 37°C (98.6°F) all the time — that is the only temperature where your cells, enzymes, and organs work right. To keep that temperature, your hypothalamus (a tiny control tower deep in your brain) reads the blood temperature and fires two main tools: shivering (your muscles shake fast to burn fuel and make heat) and vasoconstriction (your blood vessels squeeze tight so warm blood stays close to your heart, lungs, and brain instead of leaking heat out through your skin). When cold air, icy water, wet clothes, or something broken inside your body (sepsis, low thyroid, low blood sugar, malnutrition, alcohol, or trauma) pulls heat out faster than you can make it, your core temperature drops below 35°C — that is hypothermia. At first your body fights hard: you shiver like crazy and your heart races to pump warm blood. But if the cold keeps winning, shivering stops around 32°C because your muscles run out of fuel and oxygen, and now the body cannot save itself. Your heart slows, your brain gets foggy, and every organ starts to fail. Below 28°C, your brain shuts down into a coma, breathing stops, and your heart becomes so irritable that any bump — rolling the patient, rough handling, or even a dose of the wrong drug — can throw it into a deadly rhythm called ventricular fibrillation, or it can stop altogether. Every strange thing you see — the shivering, the slow heart, the confusion, the weird hump on the ECG called a J wave — is the body trying to keep blood flow and oxygen going while cold pulls the plug. None of it is random. Trace it backwards: your body tries to keep 37°C, then cold exposure or broken heat control causes hypothermia, and every finding is the body buying time.

What you might feel

- Core body temperature below 95°F (35°C)
- Shivering at first, then shivering stops
- Confusion, slurred speech, or acting drunk
- Heart rate slows down (bradycardia)
- Breathing slows and gets shallow
- J waves (Osborn waves) on the ECG
- Skin feels ice-cold and may look pale, blue, or waxy

- Muscles feel stiff and movements are clumsy

Call the doctor right away if...

- Core temperature below 90°F (32°C) — severe hypothermia with high risk of deadly heart rhythms
- Confusion, can't stay awake, or doesn't respond when you shake them — brain is shutting down
- Shivering has stopped but the person is still very cold — body can't fight back anymore
- Heart rhythm is chaotic or very slow (ventricular fibrillation or severe a slow heart rate (bradycardia)) — can stop any second
- Breathing is barely noticeable or has stopped — needs rescue breaths and advanced warming right away

What the care team will do

- Handle the patient extremely gently and keep them flat; no rough movement, vigorous rubbing, or aggressive position changes
- Remove all wet clothing immediately and replace with dry warm blankets; cover the head completely
- Place a continuous heart monitor and watch for J waves (extra bumps after the QRS complex) and dangerous rhythms like atrial fibrillation (an irregular, quivering heartbeat) or ventricular fibrillation
- Insert an esophageal or rectal temperature probe to get accurate core temperature; do not rely on oral or ear thermometers
- Start warm intravenous normal saline or lactated Ringer's solution heated to 40–42°C through a fluid warmer
- Apply a forced-air warming blanket set to 40–42°C if core temperature is between 28–32°C; use only regular blankets if temperature is 32–35°C
- Give warm humidified oxygen through a mask or breathing tube at 40–42°C
- Check blood sugar immediately and repeat every 30 minutes during rewarming

Medicines you may be given — and why

Passive external rewarming (dry clothing, blankets, warm room)

For mild hypothermia (core temp 32–35°C / 90–95°F), the body can warm itself if you stop the heat loss. Remove wet clothes, wrap the person in dry blankets, and move them to a warm room. The body's own metabolism (the energy-burning process in every cell) will slowly raise

the core temperature. This works because the heart and brain are still functioning normally and can control blood flow to keep vital organs warm.

Active external rewarming (forced-air warming blanket, heating pads)

For moderate hypothermia (core temp 28–32°C / 82–90°F), the body needs outside heat to warm up safely. A forced-air warming blanket blows warm air (around 43°C / 109°F) through a special blanket that covers the chest and torso. The warm air heats the skin, and blood flowing under the skin picks up that heat and carries it to the core organs (heart, lungs, brain). Heating pads or warm-water bottles can be placed on the chest, neck, and groin (not the arms or legs) to target the large blood vessels near the surface.

Warm intravenous (IV) fluids

For moderate to severe hypothermia (core temp below 32°C / 90°F), the body often has low blood volume (hypovolemia) because cold causes the kidneys to make more urine (cold diuresis) and blood vessels to squeeze tight. Warmed IV fluids—normal saline or lactated Ringer's heated to 40–42°C (104–108°F)—are infused through a vein. The warm fluid travels through the bloodstream directly to the heart and other core organs, adding both heat and volume. This raises core temperature and improves blood pressure and circulation.

Warm humidified oxygen

For moderate to severe hypothermia, cold air in the lungs can pull heat away from the body with every breath. Giving oxygen that has been warmed (to 40–45°C / 104–113°F) and humidified (moistened with water vapor) through a mask or breathing tube delivers heat directly to the lungs. The warm, moist air warms the blood flowing through the millions of tiny capillaries in the alveoli (the air sacs in the lungs where oxygen enters the blood). This warmed blood then flows to the heart and the rest of the body.

Extracorporeal membrane oxygenation (ECMO) or cardiopulmonary bypass

For severe hypothermia with cardiac arrest (core temp below 28°C / 82°F, or heart stopped), ECMO or cardiopulmonary bypass is the fastest and most effective rewarming method. Blood is removed from the body through a large catheter, pumped through a machine that warms it and adds oxygen, and then returned to the body. This directly warms the blood and can raise core temperature by 2–4°C per hour. It also takes over the job of the heart and lungs, keeping the brain and organs alive while the body rewarms.

Modified ACLS (advanced cardiac life support) medications

When a person with severe hypothermia (core temp below 30°C / 86°F) has cardiac arrest, standard ACLS drugs—epinephrine (adrenaline), amiodarone, and others—may not work because the cold heart muscle is less responsive to electrical and chemical signals. Current guidelines (AHA 2020) recommend WITHHOLDING or SPACING OUT these drugs until core

temperature is above 30°C (86°F). Once the person is warmer, epinephrine can help squeeze blood vessels and raise blood pressure, and amiodarone can help stabilize dangerous heart rhythms like ventricular fibrillation.

Where this information comes from

- Wilderness Medical Society Practice Guidelines for the Prevention and Treatment of Frostbite and Hypothermia (2019)
- American Heart Association Advanced Cardiovascular Life Support (ACLS)
- CDC Hypothermia Prevention and Treatment
- New England Journal of Medicine (NEJM) Clinical Practice review on Accidental Hypothermia

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