

What is Hypothermia?

Hypothermia is defined as “a decrease in the core body temperature to a level at which normal muscular and cerebral functions are impaired,” and can be categorized as **mild**, **moderate**, or **severe**.

In **Mild Hypothermia** (core temperature of 96-98.6°F) the patient will be shivering and unable to do complex motor functions (like ice/rock climbing or skiing), but can walk and talk. As they progress to **Moderate Hypothermia** (91-95°F), shivering becomes more violent, and they lose fine motor skills (can't zip up jacket). The patient may exhibit mental status changes, as seen by slurred speech and irrational behavior (paradoxical undressing, apathy to the situation). In **Severe Hypothermia** (below 90°F), the shivering comes in waves, then stops. The patient often can't walk, and may curl in the fetal position to conserve heat. Heart rate and breathing slow as the body tries to hibernate.

Who gets Hypothermia?

Hypothermia can happen any time the ambient air temperature is below 98.6°F, so **should be considered in all patients**. Hypothermia is more likely on colder, windier days, especially with a patient who is **wet** (from submersion, sweating, etc). Other risk factors include being unprepared for conditions, dehydration, lack of food, fatigue, and extremes of age (the very young and very old, who can't regulate their body temperature as well). In up to 40% of hypothermia cases, **Alcohol** is a contributing factor (alcohol dilates peripheral blood vessels, so the patient can feel warmer, but is actually losing heat more quickly).

Treating a Hypothermic Patient in the Wilderness:

Like any other patient encounter, start your medical assessment with a primary survey: **Airway, Breathing, and Circulation**. The heart rate may be as low as 2-3 beats per minute, and there may only be 2 breaths per minute, so **check for a pulse for a full minute**. Feel for a pulse at the carotid (hypothermic patients do not have good perfusion of the extremities; there is no detectable radial pulse below a body temperature of 86-90°F). A patient with serious hypothermia is in a very delicate cardiovascular balance, and inappropriate chest compressions could result in a fatal heart rhythm. Only start CPR if you are sure there is **no pulse** after checking for a full minute.

After the ABC's, check the patient's **mental status**, specifically looking for slurred speech, a staggered walk, or unresponsiveness. For example, does the patient know their name and day of the week? Can they walk 30 feet in a straight line, or count backward from 100 by 7?

Following the Primary Survey (ABC's and mental status), it is appropriate to perform a **Secondary Survey** (look head-to-toe for any other missed injuries). It is especially important to perform this exam thoroughly in a hypothermic patient, as they may not be able to tell you about potential injuries due to numbness or their altered mental status.

There are 3 basic steps to treating hypothermia: Reduce Heat Loss, Add Fuel and Fluids, and Add Heat. These steps can be done either following the primary and secondary surveys or concurrently, depending on patient needs and number and training of rescuers.

Reduce Heat Loss:

In a mildly hypothermic patient, this could entail **removing wet clothing** and replacing with warm, **dry clothes**, increasing physical **activity**, or finding **shelter**.

In more severe cases, make a **hypothermia wrap**: use multiple sleeping bags, wool blankets, extra clothing, or foam pads to create at least 4" of insulation around the patient (especially between the patient and the ground). Wrap the whole thing in a tarp and/or space blanket to reduce radiant heat loss and protect from getting wet. This is the most important step; no matter how hypothermic the patient is, their internal warming will be more effective than any external warming.

Add Fuel and Fluids:

In a mildly hypothermic patient, use sugar- and carbohydrate-rich **food** to keep the patient's internal furnace fueled for the short term, and fats and proteins for long-term heating.

In a more severely hypothermic patient, the stomach has likely shut down and will be unable to digest solid food. It will still be able to absorb **water** and **sugar**, so something like warm **dilute jello** is recommended. Warm liquids will have a **negligible effect** on warming the patient, other than a morale boost. Don't give anything by mouth to a patient with altered mental status, as the risk of choking outweighs any benefit.

Add Heat:

In a moderate or severely hypothermic patient, **external heating** is recommended. The patient can be heated with heating pads, hot water bottles, or anything else warm. **Do not apply heat directly to the skin** (since hypothermic skin is delicate and can easily be burned), but use a cloth or similar item to protect the skin. Place the heat on major blood vessels: in the **groin** (femoral vein and artery), the **armpits** (brachial vein and artery), and the front of the **neck** (carotid artery and jugular veins). Giving heated, humidified air is the most useful intervention, but is not usually possible in the SAR setting.

Throughout the whole encounter, it's important to be gentle while handling the patient and to keep the patient level. That keeps blood flowing to the brain and avoids the patient going into shock. This is extremely important in hypothermia due to a principle called **Core Temperature Afterdrop**. As a patient's temperature drops, the body will try to preserve the vital organs by keeping all the warmth in the body's core. This results in warm blood in the core, with cooler blood in the extremities. If the patient is incorrectly treated (moved too abruptly, or the extremities heated rather than the core) this cooler blood may quickly enter body's core, which could result in cardiac arrest.

Another special consideration is **Hydrostatic Squeeze**. If a patient is submerged in water, the water pressure is squeezing the lower body, pushing the blood upward (to the most vital organs). That pressure is suddenly gone when the patient is removed from the water, and blood will pool to the lower extremities, which could result in shock. Therefore, keeping the patient level is extremely important.

Conclusion:

Based on the above discussion, some basic items for hypothermia treatment should be carried by SAR Teams, either by members individually or the team collectively. These include materials to make a hypothermia wrap (wool blankets, sleeping bags, pads, and a tarp), heating pads for external heating, extra food and clothing for a hypothermic patient, and a way to quickly heat up a warm drink (like diluted Jello). As with any other disease or injury, **prevention** is key to hypothermia. Know the weather forecast, bring appropriate clothing and equipment, and watch out for everyone around you.

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Please let me know of any corrections or suggestions

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Sources:

Auerbach, Paul. Wilderness Medicine (2012). Ch 5: "Accidental Hypothermia"

US Search and Rescue Task Force: Hypothermia and Cold Weather Injuries (ussartf.org)

hypothermia.org