CONDITION

Heat illness

Heat illness happens when the body cannot release heat quickly enough to keep its temperature and organs working normally.

WHAT IT IS
A spectrum of illness caused by excess body heat

BODY SYSTEM
Whole body, especially brain, muscles, kidneys, and circulation

MAIN SYMPTOMS
Heavy sweating, weakness, headache, confusion

WHAT CAUSES IT
Heat exposure or exertion overwhelming normal cooling

HOW IT IS DIAGNOSED
Clinical assessment, core temperature, blood and urine tests

MAIN TREATMENT
Rapid cooling, fluids, and organ support when severe

CAN IT BE CURED?
Yes - prompt cooling often allows full recovery

IS IT AN EMERGENCY?
Sometimes - confusion, seizure, or collapse suggests heat stroke

LONG-TERM OUTLOOK
Usually good; heat stroke may cause lasting organ injury

Overview

Heat illness happens when your body gains more heat than it can release. It can occur in hot weather, during strenuous exercise, in a hot workplace, or inside a poorly ventilated building or vehicle.

Your body normally cools itself by sweating and sending more blood toward the skin. High humidity slows the evaporation of sweat. Heavy clothing, physical effort, dehydration, illness, and some medicines can also make cooling less effective.

Heat illness is a spectrum. Milder problems include heat rash, heat cramps, heat-related fainting, and heat exhaustion. Heat stroke is the most severe form. It affects brain function and can quickly injure the muscles, kidneys, liver, heart, and blood-clotting system.

Heat exhaustion does not always progress to heat stroke, but it is a warning that the body is struggling. Confusion, unusual behaviour, seizure, severe loss of coordination, or unconsciousness suggests heat stroke and requires emergency care.

Symptoms

Symptoms can develop gradually or come on quickly. They may appear during heat exposure or soon afterward.

Heat exhaustion commonly causes:

Heat-related fainting often happens after standing for a long time or stopping suddenly after exercise. A person usually recovers quickly after lying flat in a cool place, but other causes of fainting may need to be considered.

Heat stroke causes a change in brain function. Warning signs include confusion, agitation, slurred speech, poor coordination, seizure, or loss of consciousness. The skin may be hot and flushed. A person with heat stroke may sweat heavily, especially when the illness is caused by exercise. Dry skin is not required for the diagnosis.

Heat stroke is often linked with a core body temperature around 40°C or 104°F or higher. However, a lower reading does not rule it out, particularly if cooling has already started or the temperature was measured at the skin, mouth, ear, or armpit.

- Heavy sweating and cool, damp, or pale skin
- Weakness, tiredness, dizziness, or faintness
- Headache, nausea, vomiting, or muscle cramps
- Thirst, a fast pulse, or reduced urine output

Causes and risk factors

Heat illness develops when heat from the environment and the body's own activity exceeds its ability to cool down. Exercise and physical work create extra heat inside the muscles. Humidity, still air, direct sun, and protective clothing can limit heat loss.

Anyone can develop heat illness. Risk is higher when you are not used to the heat or when temperatures rise suddenly.

Other factors that can increase risk include:

Some medicines can affect sweating, thirst, alertness, circulation, or fluid balance. Examples

include certain water tablets like furosemide or hydrochlorothiazide , antihistamines like cetirizine or loratadine , anticholinergic medicines, stimulants like methylphenidate or lisdexamfetamine , and medicines for blood pressure or mental health conditions. Do not stop a prescribed medicine because of hot weather without medical advice. A pharmacist or clinician can explain whether it changes your heat risk.

Children, older adults, and people with disabilities may rely on someone else to help them reach a cool place or drink enough. A parked vehicle can become dangerously hot even when the outside temperature does not seem extreme.

- Infancy or older age
- Heart, lung, kidney, or nervous system conditions
- Diabetes, obesity, fever, vomiting, or diarrhoea
- Pregnancy
- Limited access to shade, cooling, water, or rest
- Alcohol or recreational stimulant use
- Previous heat illness
- Working or exercising alone in hot conditions

Diagnosis

Mild heat illness is usually diagnosed from symptoms, recent heat exposure, activity, and a physical examination. The clinician may ask about fluid intake, medicines, alcohol or drug use, and other medical conditions.

If heat stroke is suspected, treatment begins immediately rather than waiting for test results. Measuring core temperature helps assess severity. In an emergency setting, a rectal temperature is generally the most reliable measurement. Forehead, skin, ear, and mouth readings can be misleading during intense exercise or rapid cooling.

Blood and urine tests do not provide a single yes-or-no answer. They are used to look for dehydration and complications such as muscle breakdown, kidney or liver injury, electrolyte changes, and abnormal blood clotting. An electrocardiogram may be used to check heart rhythm.

Other conditions can resemble heat illness, including infection, low blood sugar, stroke, poisoning, drug effects, and heart problems. This is particularly important when there is confusion, collapse, chest pain, or persistent vomiting.

Treatment and management

For suspected heat exhaustion, stop activity and move to shade or an air-conditioned space. Remove unnecessary clothing and equipment. Cool the skin with cool water, wet cloths, fans, or a cool shower.

If you are fully awake and can swallow safely, take small, frequent drinks of cool water or an oral rehydration drink. A drink containing electrolytes may be useful after prolonged heavy sweating. Avoid alcohol. Do not use salt tablets unless a healthcare professional has specifically advised them.

Symptoms should begin to improve with rest and cooling. Medical assessment is needed if symptoms worsen, vomiting prevents drinking, or recovery is not clear within about an hour.

Heat stroke requires emergency treatment. Call emergency services and begin cooling while waiting. Move the person out of the heat, remove excess clothing, and cool them with cold water and fans. Cold-water immersion is highly effective for exertional heat stroke when it can be done safely and the airway can be monitored. If immersion is not practical, repeatedly wet the skin, fan it, and place cold packs near the neck, armpits, and groin.

Do not give drinks to someone who is confused, having a seizure, unconscious, or unable to swallow normally. Do not leave them alone. If they are unconscious but breathing, place them on their side if this can be done safely. Begin cardiopulmonary resuscitation if they are not breathing normally.

Fever-reducing medicines such as paracetamol or acetaminophen do not treat heat stroke. Heat stroke is caused by failed heat control, not by the body resetting its temperature during an infection. These medicines may also add strain to injured organs.

Hospital treatment may include continued cooling, fluids given through a vein, close monitoring, and support for affected organs.

Complications

Most mild heat illnesses improve without lasting harm when exposure stops and cooling begins early. Heat stroke can cause serious complications because high temperature and poor circulation injure cells throughout the body.

Possible complications include:

Complications may not be obvious at first. Blood tests can continue to change after the body temperature has fallen, which is why people treated for heat stroke usually need hospital observation and repeat testing.

- Rhabdomyolysis, meaning rapid breakdown of muscle tissue
- Acute kidney or liver injury
- Abnormal heart rhythms or low blood pressure
- Bleeding caused by disruption of normal blood clotting
- Lung injury
- Seizures or damage affecting memory, balance, or coordination

Prevention

Many episodes of heat illness can be prevented, although risk cannot always be removed during extreme heat.

Increase demanding activity gradually when you are newly exposed to hot conditions. This process, called heat acclimatisation, helps the body become more efficient at sweating and controlling circulation over several days.

Plan strenuous activity for cooler parts of the day when possible. Take regular breaks in shade or air conditioning. Light, loose clothing can help sweat evaporate, while some work or sports equipment may require more frequent rest and cooling.

Drink regularly and respond to thirst. More fluid may be needed during prolonged sweating, but forcing very large amounts of plain water can also be harmful because it may lower blood sodium. Urine that becomes much darker or much less frequent can be a sign that you need more fluid, though urine colour is not a perfect measure.

Check weather alerts and the heat index, which combines temperature and humidity. Use a buddy system during demanding activity. Check on people who may have trouble recognising heat symptoms or reaching a cool place.

Never leave a child, dependent adult, or animal in a parked vehicle, even briefly.

Living with it and what to expect

Heat cramps, fainting, and heat exhaustion often settle after cooling, rest, and replacement of lost fluid. Tiredness, headache, or reduced exercise tolerance may continue for a short time. Returning immediately to strenuous activity can bring symptoms back.

A previous episode can help you recognise early warning signs, but it may also increase the chance of another episode. Consider what contributed, such as sudden intense exercise,

protective clothing, illness, limited breaks, or a medicine that affects heat tolerance.

Recovery after heat stroke is less predictable. Some people recover fully, while others have weakness, poor coordination, memory problems, or kidney or liver abnormalities that continue for weeks or months. Follow-up may include blood tests and a gradual return to work, sport, or other demanding activity.

Do not resume intense exercise after heat stroke until a clinician familiar with your illness has reviewed your recovery. The timing is based on symptoms, physical function, organ test results, and the type of activity involved.

When to get medical help

Call emergency services for confusion, unusual behaviour, severe loss of coordination, seizure, collapse, or unconsciousness during or after heat exposure. These are signs of possible heat stroke. Start cooling immediately rather than waiting for help to arrive.

Emergency help is also appropriate for breathing difficulty, chest pain, signs of shock, or a person who is too drowsy to drink safely.

Seek prompt medical advice for suspected heat exhaustion when:

Routine follow-up is reasonable after recovery if episodes keep happening, symptoms linger, or you want to review medicines and plans for future heat exposure. Anyone discharged after heat stroke should attend the follow-up arranged by the hospital.

- Symptoms are getting worse despite rest and cooling
- Vomiting prevents fluid intake
- Fainting is prolonged or happens repeatedly
- Symptoms do not clearly improve within about an hour
- Urine becomes very dark, or there is severe muscle pain or weakness
- The affected person has significant heart, kidney, or other medical problems

Common questions

What is the difference between heat exhaustion and heat stroke?

Heat exhaustion causes symptoms such as heavy sweating, weakness, dizziness, headache, and nausea without major changes in brain function. Heat stroke causes confusion, abnormal behaviour, loss of coordination, seizure, or unconsciousness. Heat stroke is an emergency.

Can you have heat stroke while still sweating?

Yes. Sweating may continue, especially in heat stroke caused by exercise. Hot, dry skin can occur, but it is not required. Changes in thinking or consciousness are more important warning signs.

Does heat illness only happen outside?

No. It can happen in hot homes, workplaces, kitchens, vehicles, sports facilities, or other poorly ventilated spaces. Indoor risk rises when there is no effective cooling or air movement.

How long does heat exhaustion last?

Symptoms should start improving after moving to a cool place, resting, cooling the skin, and drinking if it is safe to do so. Ongoing or worsening symptoms after about an hour need medical assessment. Tiredness may last longer.

Should I take a fever reducer for heat illness?

No. Fever medicines do not correct the failed temperature control that causes heat stroke. Cooling is the priority. A person with possible heat stroke needs emergency care.

Can heat illness happen when the temperature is not extremely high?

Yes. Humidity, direct sun, heavy clothing, poor airflow, intense exercise, dehydration, and lack of heat acclimatisation can produce heat illness at temperatures that may not seem extreme.

Sources

- Centers for Disease Control and Prevention. Heat and Health: About Heat and Your Health . Updated 2024
- National Institute for Occupational Safety and Health. Criteria for a Recommended Standard: Occupational Exposure to Heat and Hot Environments . Revised Criteria 2016
- Wilderness Medical Society. Clinical Practice Guidelines for the Prevention and Treatment of Heat Illness: 2019 Update . Wilderness & Environmental Medicine. 2019;30(4S):S33-S46
- American College of Sports Medicine. Expert Consensus Statement on Exertional Heat Illness: Recognition, Management, and Return to Activity . Medicine & Science in Sports & Exercise. 2021;53(8):1758-1788
- Bouchama A, Knochel JP. Heat Stroke . New England Journal of Medicine. 2002;346:1978-1988
- NHS. Heat exhaustion and heatstroke . Reviewed June 2023