- Body temperature

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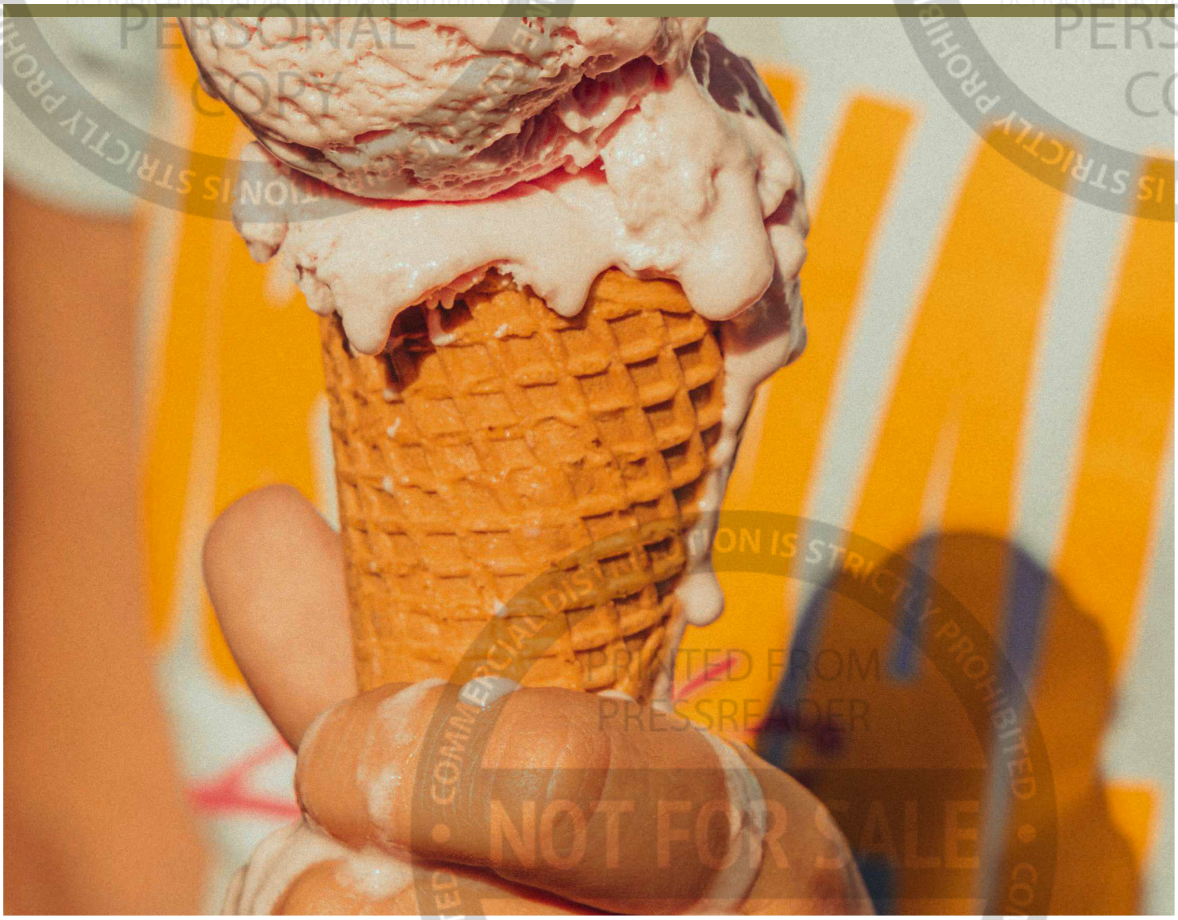

REVIEW

Heatstroke: how to spot it and what you can do about it

Extreme heat is behind a growing number of health issues, an increasing number of which are resulting in death

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This summer the news has been awash with alarming reports of deaths due to heat stroke in countries all over the globe. According to a recent report by the Intergovernmental Panel on Climate Change, extreme heat events are increasing in frequency and duration, and are affecting more people. So how can you tell the difference between someone who's just hot and someone who's health is in danger due to heat stress?



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WHAT IS HEAT STRESS AND WHY IS IT SO DANGEROUS?

Heat stress is caused by a build-up of heat in our bodies, either because of exertion (for example running a 5k race or doing heavy manual labour) or as a result of stressors from the external environment. But it's not just an effect of air temperature; relative humidity and wind speed also play a part. Heat stress is also influenced by how used, or 'acclimatised', to a climate a particular person is, as well as the clothes they're wearing.

Humans are homeotherms. This means that we must keep our internal core body temperature constant, at around 37°C (98°F). If our core body temperature reaches around 42°C (107°F), our vital organs begin to shut down. This can result in severe illness and even death.

"It's thought that there are 27 ways a person can die from extreme heat"

It's thought that there are 27 ways a person can die from extreme heat. This includes reduced blood flow and damage to the brain, heart and lungs.

Those who are most at risk of heat stress progressing into heat illnesses are those who have a limit in their body's ability to regulate their core body temperature, known as thermoregulation. Those who have less ability to seek and access cooling are also more vulnerable. This includes babies and infants, children, the over 65s, those with pre-existing medical conditions, pregnant women and outdoor workers.

WHAT ARE HEAT ILLNESSES?

Heat illnesses occur when the risk of heat stress is high and someone begins to feel unwell. There are several kinds of heat illnesses and they often occur at the same time as dehydration. These include: 'heat syncope', which presents as fainting, or just a feeling of dizziness, resulting from excess sweating; 'heat tetany', or hyperventilation; heat cramps; and heat exhaustion, which you can leave you feeling dizzy, nauseous, weak, clammy and very thirsty. It can also cause cramps in your limbs or stomach and give you a high temperature and an elevated heart rate.

Another common type of heat illness is heatstroke, which occurs when the body can no longer control its internal temperature. Heatstroke falls into two categories: exertional heatstroke, which occurs due to strenuous exercise; and classic heatstroke, which results from passive exposure to extreme environmental heat.

WHAT SHOULD I DO IF I THINK SOMEONE IS EXPERIENCING HEATSTROKE?

If someone passes out or is having difficulty concentrating or breathing, you should seek immediate medical advice. If someone is fully conscious, but feels unwell or overly hot, then they need to cool down and rehydrate as soon as possible.

The best way to cool someone down quickly is to submerge them in cool water, in a bathtub, shower or swimming pool. Be careful not to use water that's too cold, though, as this can lead to cold shock which can cause sudden changes in breathing, heart rate and blood pressure. There's no benefit in using ice water.

If fully submerging someone suffering from heatstroke in water isn't an option, cooling their feet, hands or face and the back of their neck, can also help to bring down their core body temperature.

They'll also need to replenish the minerals and water lost through sweat. This can be done by giving them a sports drink to replenish their body fluids, electrolytes and salt.

HOW CAN YOU PREVENT HEAT ILLNESSES?

In a lot of cases, heat illnesses are preventable. Many countries increasingly have heat health plans to issue warnings and prepare people for periods of extreme heat. The typical advice these plans offer →

ABOVE Cool water dousing is an effective way to cool yourself or someone else down quickly. Just be careful the water isn't too cold

"The only way to effectively prevent extreme heat from increasing even more is to transition to net zero"

→ includes staying out of the day's highest heat by being in a cooler place between 12pm and 5pm, and staying hydrated (hot drinks are just as effective as cold, as the drink's temperature has little influence on core body temperature).

You can also cool down by taking cold showers and cooling your hands, feet and face with cold water, and promote airflow through your house by opening windows and doors, when the air temperature outside is cooler. Drawing curtains, blinds or shutters to shield indoor spaces from the heat of the Sun can also help to keep the air inside your home cool, as can the use of electric fans to circulate the air.

Special care should be taken over the most vulnerable members of society, however. The elderly, for example, often underestimate their risk of developing heatstroke and are usually only more likely to drink more water, stay cooler or take it easy if family or friends advise them to.

Infants are also particularly vulnerable to extreme heat. A study carried out by researchers at the Heat and Health Research Incubator at the University of Sydney found that the most common strategy for keeping the Sun off babies is to place a light blanket over their prams. This can raise the temperature inside a pram by 4°C in 20 minutes, however. A more effective method is to cover the pram with a damp cloth and attach a small clip-on fan.

BELOW Fans are an effective way to circulate air and create a cooling breeze, provided the air being circulated isn't too hot to start with

by **DR CHLOE BRIMICOMBE**
Chloe is a climate scientist and extreme heat researcher based at the University of Graz's Wegener Center in Austria.

IS THE SITUATION GOING TO GET WORSE?

While extreme heat events are increasing thanks to climate change, heat policy has also made a lot of progress in recent years. In a lot of cases, governments have put detailed heat health plans in place. These are often more reactive than proactive, however. Other measures such as more thoughtful urban planning can also come into play. One example is to include green spaces in urban areas to help keep down temperatures where heat is highest thanks to the so-called 'heat island' effect.

Anticipatory action, such as providing funds for schemes like cooling centres (where residents can take shelter during a heatwave) and early warning systems that inform people of the impacts of heat and provide reminders on how to keep cool, can also make a significant contribution.

But the only way to effectively prevent extreme heat from increasing even more is to transition to net zero, where the carbon emitted into Earth's atmosphere is equal to the carbon removed from it. This will stop emissions that are causing the rise in the planet's baseline temperature and prevent extreme events such as heatwaves.

This is vitally important because as temperatures climb, we could reach a threshold where even the healthiest people would be unable to survive without access to cooling. That's a future none of us want to see.



GET HELP
Call the emergency medical services (999 in the UK; 911 in the US) *immediately* if you or anyone else develops signs of heatstroke.