

What cold weather does to the body and how to protect yourself this winter

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As temperatures drop, zip up that coat, pull on a hat and gloves and be mindful of how much time you're exposed to the elements, especially if you're an older adult or have an underlying cardiovascular condition.

Health experts warn extreme cold—or even prolonged exposure to normal winter temperatures—can affect the heart, the brain and other vital organs.

"Each and every system of the body can be affected," said Dr. Haitham Khraishah, a preventive cardiologist at University Hospitals Harrington Heart & Vascular Institute and an assistant professor of medicine at Case Western Reserve University in Cleveland.

How the body loses heat

When exposed to the cold, the body can lose heat faster than it's produced. Over time, the body uses up its stored energy and body temperature begins to drop. Long-term exposure to the cold—especially if the body's core temperature falls below 95 degrees Fahrenheit—can lead to hypothermia, frostbite and other problems.

There are multiple ways the body can lose heat, Khraishah said.

About 60% of heat loss occurs through radiation—heat simply radiates away from the body into the surrounding air. The body can also lose heat through conduction and convection, which happens when a person touches a cold object, such as the steering wheel of a car, or cold wind touches the body. Heat can also leave the body through evaporation, such as when someone sweats while running, shoveling snow or otherwise exerting themselves in cold weather.

People can also lose heat by breathing in cold air and breathing out warm, moist air, said Dr. E. John Wipfler III, a clinical professor at the University of Illinois College of Medicine and an attending emergency physician at OSF Healthcare St Francis Medical Center in Peoria.

Just breathing takes away a fair amount of thermal energy to warm the

cold air taken into the lungs, he said.

Cold and the cardiovascular system

When air temperatures drop, blood vessels constrict to prevent heat loss and to keep more blood around the body's core.

"Our body's mission is to preserve vital organs," Khraishah said. "Blood is moving away from the periphery to this area, which is why fingers and toes get cold."

But this increases blood pressure, and [high blood pressure](#) can lead to a [heart attack](#) or stroke, especially in people who already face higher cardiovascular risks. Extreme cold also may cause blood to thicken and become more prone to clotting, which likewise raises the risk of heart attack and stroke.

Khraishah published a [paper](#) in the journal *Stroke* last year that found [extreme temperatures](#)—both hot and cold—increased the risk of dying from a stroke. Other studies have shown a greater risk of death from multiple cardiovascular conditions—especially heart failure—during periods of extreme cold. Hospitalizations for heart attacks have also been shown to rise following cold temperature spells.

Cold and the respiratory system

People with asthma, chronic lung disease, or other respiratory conditions or illnesses are at higher risk when temperatures drop because cold, dry air irritates the airways, Khraishah said. This leads to greater inflammation and causes muscles around the airways to constrict, which can lead to wheezing, coughing, shortness of breath or a burning feeling in the chest, especially during exertion.

Susceptibility to illness

In general, cold weather can make people more susceptible to illness, Wipfler said.

"When cold weather occurs, people tend to congregate indoors, in more crowded environments, making it easier for germs to spread," he said. What's more, some viruses can survive better in the cold, and the human immune system may lose some of its effectiveness.

The cold and dry air "may dry out mucous membranes that cover the nose, mouth and throat," Khraishah said. "If you get exposed to viruses or bacteria, they can get trapped in those membranes, so you lose your baseline of defense."

Hypothermia and the brain

Blood vessel constriction because of the cold can impair cognitive function, Wipfler said.

This is especially a problem if hypothermia takes hold, which happens when core body temperature drops below 95 degrees Fahrenheit. Hypothermia can be caused by exposure to extreme cold or may occur during less cold temperatures if the body gets chilled from rain, sweat or being in cold water.

Warning signs of hypothermia include shivering, confusion, slurred speech, slow breathing, memory loss, drowsiness, exhaustion, a puffy or swollen face and pale skin. Babies experiencing hypothermia may have bright, red skin and very low energy.

Hypothermia is a medical emergency, and early warning signs such as

shivering should never be ignored, Wipfler said.

"Once you stop shivering, your chances of fixing yourself are gone," he said. By that time, the brain stops working properly and people are unable to make logical decisions. "Some of the last things people do in severe hypothermia is they may start thinking they are getting too hot and remove their clothes."

The Centers for Disease Control and Prevention recommends seeking immediate medical help for hypothermia. If that isn't available, restore body heat by getting the person into a warm room or shelter, removing wet clothing, warming their chest, neck, head and groin area with blankets, towels or sheets, and giving them warm drinks but no alcohol.

Frostbite

Prolonged exposure to the cold, when less blood flows to the extremities, can also cause frostbite. People with poor blood circulation are at higher risk. Warning signs include numbness, pale or waxy skin, redness or pain.

The CDC recommends immediately getting out of the cold and into a warmer environment if this occurs. Avoid rubbing the frostbitten area or walking on frostbitten feet or toes, as this can cause more damage. Instead, put the frostbitten areas in warm—not hot—water.

If this is not available, use body heat from other parts of the body to warm the area, such as by placing frostbitten hands or fingers in an armpit. Do not use heating pads or heat from a stove, as the affected areas may easily burn.

Who is most vulnerable

Both the very old and the very young are more vulnerable to the cold than people in other age groups, Wipfler said.

Older adults may have chronic illnesses such as diabetes, which prevents proper blood flow, or take medications that make it harder for them to stay warm. Memory problems can prevent people from remembering to dress appropriately for cold weather, and thyroid problems can make it tougher for the body to properly regulate its temperature.

"People who are very old may have the disadvantage of being less able to shiver and generate heat because of their lower muscle mass," Wipfler said.

"And the very young do not have the mental capacity to communicate well or the ability to change their environment. Also, children have larger body surface area relative to body mass, so a higher chance of hypothermia and other cold injuries."

How to keep warm

Wipfler said the first step to preventing harm from the cold is to wear the right clothing, especially when going outdoors for a long period of time. "Dress for success and avoid being unprepared and exposed to the elements. Make sure no skin is left exposed. Don't forget to wear a neck wrap, a hat and gloves, not just a jacket."

Staying active while out in the cold helps generate body heat, but too much exertion can have the opposite effect, Khraishah said. "Avoid excessive physical activity because you will sweat and lose heat."

He suggested using extra blankets to keep warm but not electric blankets, which are a fire hazard.

Wipfler said warm drinks may help people stay warm outdoors, but alcohol should be avoided. "It can make you feel warmer, but it dilates blood vessels and you pee more, so you dehydrate. And alcohol interferes with the ability to think straight."

Smoking should also be avoided, he said.

If caught out in the cold or wind, Wipfler suggested seeking shelter behind something that might block the wind or staying active to warm up. "If you don't have the right clothing and can't get to a warmer environment, work on generating heat," he said. "Jump up and down to create thermal energy."

Shivering is another way to generate heat, Wipfler said. "The main reason you shiver is that the brain detects you are getting cold and sends a signal to the body to increase adrenaline. You can make yourself shiver by tightening your muscles repeatedly, which will increase body temperature as energy is used in this muscle activity."

And don't rely on the thermometer to signal when [cold weather](#) is too cold, Khraishah said. People who are used to living in colder regions may fare better than those who live in warmer climates and are suddenly exposed to the cold, for example.

"What your body is used to compared to what it's facing is more important than a magic number," he said. "What's cold in Arizona is mild in Cleveland."

Provided by American Heart Association

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