

Expert discusses heat-related illnesses, prevention, signs and symptoms

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With extreme heat upon us early this summer season, medical experts at

Virginia Commonwealth University Medical Center remind people not to ignore the dangers that accompany the high temperatures. Despite improved education over the years, heat-related illnesses and deaths still occur and can happen to anyone.

Heat-related illnesses are most common during the summer and they can be the result of many circumstances, including leaving someone, such as a child, in a car with no ventilation when there is a moderate to high heat index or participating in extended outdoor activities when there is a high heat index.

Robin Foster, M.D., chair of the Division of Pediatric Emergency Medicine at Children's Hospital of Richmond and associate professor of emergency medicine and pediatrics in the VCU School of Medicine, provides information and tips that can help prevent heat-related illnesses and shares the warning signs everyone should know.

What are heat-related illnesses?

Heat-related illnesses occur when the body is exposed to high external heat sources. Because of the excessive heat exposure, the body can no longer control its temperature, causing the core body temperature to become very high. This causes multiple organ system dysfunction and potentially death in its most serious form, heat stroke.

What causes heat-related illnesses?

People's bodies normally control their temperatures by thermoregulation. When the core temperature starts increasing, the body responds by trying to transfer heat away from itself. Common mechanisms include sweating to promote evaporative heat losses, vasodilation to carry more heat to the surface of the skin for increased convection, conduction, and radiation

of heat.

Evaporation is the most effective mechanism for dissipating heat. Evaporation depends on a water pressure gradient so in high humidity (greater than 75 percent) this mechanism loses its efficacy. This culminates in an inability to regulate the [core body temperature](#) and if it exceeds 40 degrees Celsius results in an inability to maintain adequate cardiac output (heat exhaustion) or multiorgan system dysfunction. This includes central nervous system and other organ or tissue damage, including kidney injury, liver injury and rhabdomyolysis (muscle breakdown that leads to renal failure).

How common are heat-related illnesses?

Heat-related illnesses are very common and account for significant morbidity and mortality in the young and elderly. Historically in the U.S. hundreds of deaths have occurred during heat waves in large cities. In Chicago in 1995, more than 700 people died from heat-related illness. In California in 2006, 655 deaths occurred, and 1,620 hospitalizations and 16,000 emergency department visits occurred secondary to heat-related illnesses.

Who can suffer from heat-related illnesses?

Anyone.

Are certain populations more prone to heat-related illnesses?

The very young and the very old are at the greatest risk.

Other risk factors include: low physical fitness; lack of acclimatization;

obesity; use of alcohol; medications/ supplements, especially stimulants; dehydration; viral or bacterial infections; previous heat stroke; and sweat gland dysfunction.

What are some prevention tips to avoid heat-related illness?

- Know the risk of activity each day; be mindful of the heat index, which is a combination of the temperature and humidity. Heat index less than 80 is in the green zone. Eighty-90 is the yellow zone and 90-105 is the red zone.
- Drink water early and often.
- Prehydrate prior to practice exercise or play.
- Practice exercise or play in the early morning and late evening when the heat index is lower.
- Practice exercise and play for short periods of time when the heat index is elevated.
- Abstain from vigorous physical activity when the heat index exceeds 90.
- Continue drinking throughout practice, exercise or play. Drink at least 8 ounces per hour. If the heat index is higher, the amount of fluid intake may need to be increased. Take frequent breaks in a cool area.
- Use fans or other forms of ventilation to increase evaporative heat loss from sweating.
- Urine should be light yellow in color and comparable to normal volumes produced when not exposed to [heat](#).

Can a heat-related illness only be caused from being outdoors during extreme temperatures?

Heat-related illnesses can occur in enclosed spaces if the temperature is

elevated and ventilation is poor. Some occupations are more susceptible, such as construction workers, painters, and air conditioning or electrical technicians.

What are signs and symptoms that someone might be experiencing a heat-related illness?

Early signs:

- Heavy sweating.
- Weakness.
- Cold, pale, clammy skin.
- Fast, weak pulse.
- Nausea, vomiting.

Late signs:

- High body temperature.
- Hot, red, dry skin.
- Rapid, strong pulse.
- Altered mental status or coma.

At what point should someone seek medical attention?

If someone demonstrates the early signs listed above, seek a cool environment and supervision for them to hydrate and rest. If these early symptoms persist despite cooling and oral hydration, then please seek medical care.

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