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Extreme Heat and Electrolytes — Tips to Staying Hydrated

Analysis by Dr. Joseph Mercola | August 30, 2024

STORY AT-A-GLANCE

- Extreme heat is a leading cause of weather-related fatalities in the U.S., killing approximately 1,200 Americans annually. Understanding how your body manages heat and learning how to maintain proper hydration and electrolyte balance is crucial for safety
- Sweating is your body's primary cooling mechanism. When you sweat, your body loses not just water but also electrolytes, which can lead to an imbalance and contribute to heat-related illnesses
- Heat-related illnesses range from heat exhaustion to potentially fatal heat stroke. Recognizing early dehydration signs is key to preventing severe conditions, especially in high-risk groups
- Rather than following rigid hydration rules, rely on your body's thirst signals and urine characteristics to gauge your hydration needs. Be aware that overhydration can also pose risks by diluting your blood sodium levels
- Tips to optimize hydration and electrolyte balance are included below, along with additional strategies to stay safe during hot weather

Hot weather affects millions of people across the United States every summer, with the temperatures in some areas soaring to 100°F (37.8°C) and above.[1] This extreme heat is not just uncomfortable — it can also be deadly.

In fact, heat has been the leading cause of weather-related fatalities in the U.S., surpassing hurricanes, tornadoes and floods combined.[2] The U.S. Centers for Disease Control and Prevention (CDC) estimates that extreme heat kills approximately 1,200 Americans every year.[3]

Fortunately, there are effective strategies you can adopt to stay safe during intense heat waves. A key first step is understanding how your body manages heat, with proper hydration being a crucial factor in supporting this process.

How Your Body Responds to Heat

When temperatures soar, your body activates its built-in cooling mechanism — sweating. Perspiration or sweating is one of the primary ways your body responds to heat, alongside vasodilation, a process that redirects blood flow to your skin to help improve the transfer of heat from your body to the environment.[4]

As sweat evaporates from your skin, it efficiently removes the heat from the surface of your skin. The University of Mississippi Medical Center considers this process "the most effective means of thermoregulation in humans."[5] Aside from cooling you off, sweating also clears out excess micronutrients, metabolic waste products and toxins from your body, as well as supports cardiovascular, respiratory and joint health.[6]

Sweat is 99% water and 1% salt and fat.[7] Hence, proper hydration is important to maintain your body's ability to sweat and cool itself. Dehydration occurs when your body loses more fluid than it takes in. However, when you sweat heavily, you're not just losing water — you're also losing electrolytes, which are minerals in your blood and other bodily fluids that carry an electric charge and are crucial for various bodily functions.

The Role of Electrolytes in Your Body's Heat Regulation Process

Your body is composed of complex electrical circuits that rely on the balance of electrolytes to function properly. The main electrolytes include sodium, potassium, calcium, magnesium and chloride, all of which play an important role in:[8]

Maintaining fluid balance inside and outside your cells	Facilitating nerve impulses and muscle contractions
Balancing your body's pH levels	Transporting nutrients into cells
Moving waste products out of cells	Regulating your heart rate and rhythm
Controlling blood pressure	Supporting bone and tooth health
Blood clotting	

The primary intracellular electrolyte is potassium, while the main extracellular electrolyte is sodium. Keep in mind that water and salt go together. Salt helps attract and retain water in the blood. Maintaining adequate salt (sodium) levels ensures proper blood volume, which in turn supports optimal circulation and heat dissipation.

Being dehydrated disrupts the balance of electrolytes and water in your body. This can rapidly result in abnormally low sodium levels (hyponatremia),[9] which subsequently decreases blood volume. In response, your heart and kidneys experience additional strain, as your body attempts to compensate by reducing the excretion of sodium by the kidneys.

Retaining sodium brings your blood volume and pressure back up by narrowing the blood vessels (vasoconstriction). However, without adequate fluid intake to support blood volume, your body will struggle to maintain proper circulation and temperature regulation, leading to heat-related illnesses.

Health Risks Associated with Extreme Heat

The disruption of fluid and electrolyte balance after prolonged exposure to high temperatures underlies many heat-related health risks, including heat exhaustion, which manifests through heavy sweating, weakness, dizziness, nausea, muscle cramps, headaches and cold, clammy skin.

If not addressed promptly, this condition can escalate into heatstroke, a life-threatening situation where the body's core temperature soars above 104 degrees Fahrenheit (40 degrees Celsius).[10]

Heatstroke symptoms include hot, red skin that's dry or damp, rapid heartbeat, confusion, dizziness, loss of consciousness and hallucinations, which require immediate medical attention. The CDC advises taking these necessary actions if heat stroke symptoms arise:[11]

- Move the affected person to a cooler place
- Lower the person's temperature with a cool cloth or a cool bath
- Refrain from giving them anything to drink
- Contact 911 immediately if the patient is among the high-risk groups

Moreover, the loss of electrolytes can lead to painful heat cramps, especially during or after intense physical activity.[12] High temperatures also place significant strain on the cardiovascular system.[13]

As the heart works harder to pump blood to the skin for cooling, individuals with pre-existing heart conditions face an increased risk of heart attacks.[14] Extreme heat can also exacerbate existing health conditions such as respiratory diseases, diabetes and kidney disorders.[15]

Heat rash, also known as prickly heat, is a heat-related condition that occurs when sweat ducts become blocked, resulting in red, itchy rashes. Although it is not directly caused by dehydration or electrolyte imbalance, it is often associated with excessive sweating. Heat rash can be uncomfortable, but it is generally less severe compared to other heat-related illnesses.[16]

How to Tell if You're Dehydrated

Recognizing the signs of dehydration early can help protect you from more severe conditions like heat exhaustion or heat stroke. Here are some key indicators of mild to

moderate dehydration:[17,18]

Dry, sticky mouth	Bad breath	Chills
Sleepiness or tiredness	Decreased alertness and fatigue	Dizziness or lightheadedness
Headache	Confusion	Constipation
A decline in athletic performance	Few or no tears when crying	Minimal amount of dark-colored urine
Dry, cool skin	Sugar craving	Muscle cramps

Signs of severe dehydration can manifest as a range of increasingly serious physical symptoms, from lack of urination to an alarmingly rapid heartbeat and breathing rate. As the condition worsens, cognitive functions may deteriorate, leading to confusion and disorientation. In extreme cases, severe dehydration can cause delirium or unconsciousness.

While dehydration can affect anyone, certain groups are at higher risk, including infants and toddlers, with their less developed regulatory systems, as well as older adults, whose bodies may be less efficient at conserving water and sensing thirst. Those with pre-existing medical conditions, such as diabetes, kidney disease or cardiovascular issues, are also at higher risk of dehydration, as these conditions can interfere with the body's normal fluid balance mechanisms.[19]

Hydration Tips — Finding the Right Balance

The conventional recommendation is to drink eight 8-ounce glasses of water a day, also known as the 8x8 rule. However, this one-size-fits-all approach may not accurately address individual hydration needs. Factors such as age, overall health, activity levels and climate can significantly influence your body's water requirements.

Instead of adhering to a rigid rule, it's more effective to rely on two key indicators to ensure adequate hydration:

1. **Thirst —** Your body's built-in hydration alarm, thirst is a powerful and individualized signal prompting you to replenish lost fluids. By listening to this natural cue, you can maintain optimal hydration levels tailored to your specific needs.

2. **Urine characteristics —** The color and frequency of your urine provide valuable insights into your hydration status. A pale straw or light-yellow color indicates proper hydration, whereas dark yellow or amber-colored urine suggests dehydration.

   Most well-hydrated individuals also urinate seven to eight times daily. If you're visiting the bathroom less frequently or producing scant amounts of urine, it may be a sign that you need to boost your fluid consumption.

It's important to remember that overhydration, also known as water intoxication or water poisoning, can be just as dangerous as dehydration. Although rare in healthy individuals, consuming excessive amounts of water can lead to serious electrolyte imbalances by diluting the blood and causing sodium levels to drop.

When sodium levels fall below 135 mEq/L, fluid shifts into the cells, including those in the brain, leading to a condition known as cerebral edema. This swelling increases pressure within the skull, resulting in symptoms such as headaches, nausea and vomiting. Other signs of water intoxication include elevated blood pressure, double vision, confusion and drowsiness.

Strategies to Optimize Hydration and Electrolyte Balance

There's more to staying hydrated than simply drinking water. While hydration allows the cells to maintain their proper structure, the ratios of electrolytes inside and outside the cell also play a role. To optimize your hydration and maintain a healthy electrolyte balance, consider adopting these strategies:

1. **Incorporate more electrolyte-rich food into your diet —** For optimal hydration, you also need natural salt in your diet. Steer clear of iodized highly processed table salt, as it contains anticaking agents and can contain undesirable contaminants, including plastic. Instead, make sure you're using a natural unprocessed salt, such as Mediterranean sea salt, Celtic sea salt and Himalayan pink salt.

   In cases where you need to consume large amounts of water because you're sweating profusely, consider adding electrolytes to it. A simple and cost-effective way to do that is to dissolve a small pinch of Himalayan salt into your water. A small amount of organic orange juice or lemon can help improve the taste.

   I also recommend drinking tea with honey, fruit juice, coconut water and raw milk, as well as eating cooked vegetables, watermelon and other ripe fruits. These contain minerals, vitamins and sugars that aid hydration better than plain water. When you do drink plain water, make sure it's well-filtered to avoid contaminants like fluoride, chlorine and disinfection byproducts (DBPs).

2. **Consider using electrolyte concentrates —** High-quality electrolyte concentrates can be useful, especially during hot weather or intense physical activities. I personally alternate between using an electrolyte concentrate and drinking pure, filtered water, and my phase angle has improved as a result.

   The phase angle is a measurement of the bioimpedance of your body and reflects cellular membrane integrity. It's a great measure of overall health. The device itself is a powerful tool to help you determine your objective hydration status. When you improve intracellular hydration, you improve your body's ability to conduct and generate electricity.

3. **Increase your body's structured water —** A key component of proper hydration is getting the water into the cell. We've always known water exists as liquid, ice and vapor, but there's also a gel phase known as structured water. A more technical term is exclusion zone (EZ) water. This is the kind of water found inside your body's cells.

By getting more of this gel-like water into your body, you're able to hydrate better overall. One of the simplest ways of getting this type of water into your body is to eat more well-cooked leafy greens. You can also structure the water already inside your body by exposing your bare skin to near-infrared and ultraviolet (UV) radiation, i.e., sunlight, on a regular basis.

4. **Maintain sodium-to-potassium ratio —** Maintaining an ideal sodium-to-potassium ratio is crucial to normalizing blood pressure levels, protecting your heart health and reducing your risk of heat stroke.

   The easiest way to do this is to avoid eating processed foods and junk foods, which are notoriously low in potassium and high in sodium while focusing on eating healthy whole foods. I delved more into this topic in my article, "**Surprise! Everything You've Been Told About Salt Is Wrong**."

Additional Ways to Stay Safe During Extreme Heat

During the hottest months of the year, it's crucial to take proactive steps to protect yourself from the dangers of extreme heat. In addition to the tips mentioned above for hydration and electrolyte balance, here are additional practical tips to help you stay safe and minimize the impact of extreme heat on your well-being:[20,21]

1. **Avoid soda or sports drinks —** While it might be tempting to reach for a cold soda or sports drink on a hot day, these beverages can actually worsen dehydration. Sodas, often loaded with high fructose corn syrup and caffeine, have been shown to cause deleterious effects on the kidneys when consumed during hot weather.[22]

   Many sports drinks, despite their marketing claims, contain excessive amounts of sugar and artificial additives that can be harmful to your body. Instead, opt for the beverages I mentioned above.

2. **Dress for the weather —** Wear loose-fitting, light-colored clothes made from breathable fabrics like organic cotton or linen. These materials allow air to circulate

and sweat to evaporate, whereas dark and tight clothing can trap heat and increase your risk of overheating.

3. **Minimize strenuous activities —** Limit strenuous physical activities during the hottest parts of the day, and take breaks as often as you need. If you want to exercise, I recommend doing a low-impact and moderate-intensity activity like walking.

4. **Keep cool —** Use fans, air conditioning or a cool cloth to lower your body temperature. Taking cool showers or baths can also help reduce body heat.

5. **Monitor the weather —** Stay informed about heat advisories and weather conditions through local news or weather apps. Knowing the forecast can help you plan your activities and take necessary precautions when extreme heat is expected.

   The Heat and Health Initiative, created by the National Weather Service (NWS) and CDC, may be particularly helpful, as it uses both the HeatRisk Dashboard and HeatRisk Forecast to provide usable information on the potential impact the heat index will have on health. Learn more about it here.

For more tips to stay cool during extreme heat, I recommend reading my article, "**How to Cool Your Body Down During a Hot Summer Day**."

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