

How NOT to Overheat

by John Hayford, M.S.

It's bad enough you have to get close to flames, exert yourselves for long periods on hot, humid days ... or wear heavy protective gear. Any one of these can challenge the internal system that's trying to keep your body temperature stable. Put them together, and it's a wonder more firefighters don't become dangerously overheated!

It's easier to prevent overheating if you understand how your thermoregulatory system works. The guiding principle is that your body must keep its internal temperature within a narrow range. To do so, it must continuously get rid of heat as it builds up. Heat is moved away from the core of your body by pumping warm blood out to the edges (your skin). From there, heat radiates out of the blood, leaving cooler blood to return to the center ... where it picks up more heat and heads back out again!

More importantly, as your skin warms, sweat glands are stimulated and when sweat evaporates, the body is cooled. Believe it or not, the evaporation of sweat is the primary way your body dissipates heat. For any liquid to evaporate, the surrounding air must have a low moisture content in order to accept it. That's why on more humid days, sweat beads up on the skin and drips off – it can't evaporate. And sweat that doesn't evaporate won't cool your body.

So how do people get into trouble and overheat? Whenever we sweat, fluid is lost from the body. Ultimately, this fluid is removed from your circulating blood. Without replenishing that fluid, blood volume falls, which means there's less fluid available to move heat away from the central areas of your body. In fact, if blood volume drops too far, your body tries to prevent further loss by automatically *shutting down* the sweating mechanism. This can lead to a life-threatening emergency known as heat stroke.



The key is to make sure there's plenty of fluid to move heat throughout your body. The solution is simple: **Drink plenty of plain, cold water** – before, during and after any kind of physical exertion.

Water is absorbed from the intestine into your bloodstream, replenishing the fluid you've lost through sweating. Because you sweat continuously, you need to drink water every day – *even when you're not thirsty!* If your environment is hot or humid, you need water even more frequently.

Water should be *cold* because this stimulates your stomach to empty more quickly into the intestines. And when fluid volume is low, rapid replenishment can be important.

What about fluids other than water? Sodas and sports drinks contain

substances (sugars, salts, electrolytes) that make them more concentrated than your body fluids. When a concentrated drink enters the intestine, your body tries to dilute it by releasing water from the bloodstream *into* the intestine. *This is exactly the opposite of what you want to happen!* So, if you really like sports drinks, dilute them with water *before* drinking. Drinks containing caffeine or alcohol aren't great choices either. Both stimulate the kidneys to produce more urine – so they can actually promote fluid loss.

What other precautions should you take? Because the evaporation of sweat requires skin exposure to the air, try to keep clothing to a minimum – especially around your arms, hands, legs and head.



Firefighters and rescue workers are prime candidates for heat exhaustion.

Keep fit. Exercise elevates your body temperature, and repeated exercise challenges your heat-reducing system on a regular basis. Over time, your body learns to start cooling itself *before* your internal temperature rises very much.

Finally, slow down. The harder you exercise, the more internal heat you'll generate. But keep in mind also that your heart rate automatically increases in response to the heat. This means that *exercising at a reduced pace on a hot day produces the same cardiovascular effect as your normal pace on a cooler day!* 🌀

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