

T.E.A.M. Security Heat Related Illness Awareness

HEAT RELATED ILLNESS

A healthy body temperature is maintained by the nervous system. As the body temperature increases, the body tries to maintain its normal temperature by transferring heat. Sweating and blood flow to the skin (thermoregulation) help us keep our bodies cool. A heat-related illness occurs when our bodies can no longer transfer enough heat to keep us cool.

A high body temperature (**hyperthermia**) can develop rapidly in extremely hot environments, such as when a child is left in a car in the summer heat. Hot temperatures can also build up in small spaces where the ventilation is poor, such as attics or boiler rooms. People working in these environments may quickly develop hyperthermia.

High temperature caused by a **fever** is different from a high body temperature caused by a heat-related illness. A fever is the body's normal reaction to infection and other conditions, both minor and serious. Heat-related illnesses produce a high body temperature because the body cannot transfer heat effectively or because external heat gain is excessive.

Heat-related illnesses include:

PRICKLY HEAT

Prickly heat presents as tiny red bumps on the skin in defined areas. It is also caused *miliaria*. Prickly heat is caused by the tiny sweat glands becoming blocked by profuse sweating. It is common in people exposed to long periods of heat and can develop as the result of high fevers.

Prickly heat is itchy and uncomfortable, but does not generally pose a health risk on its own. However, one form of prickly heat, *miliaria profunda*, so completely blocks the sweat glands that it can significantly increase heat related illnesses such as heat exhaustion or sunstroke. Additionally, the bumps or blisters may become infected if they are scratched. This can cause more serious illnesses like blood infections, which require antibiotics for treatment. At the very least, it is clearly established that scratching prickly heat bumps, thought it might seem like a fine idea at the time, will result in more itching.

HEAT CRAMPS

Signs of heat cramps include:

- Muscle twitching or spasms.
- Muscles that feel hard and lumpy.
- Tender muscles.
- Nausea and vomiting.
- Weakness and fatigue.

Heat cramps occur in muscles during or after exercise because sweating causes the body to lose water, salt, and other minerals (electrolytes). Leg muscles, such as the calf or thigh muscles, are usually affected most, but abdominal muscle cramps can also occur.

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Heat cramps may start during the activity or up to several hours after exercise that caused heavy sweating, and they may last for several minutes. The skin is moist and cool, and the muscles are tender. Muscle twitching may occur. Fatigue, nausea, and vomiting are also common with heat cramps.

To prevent heat cramps, drink plenty of water before, during, and after you are active. This is very important when it's hot out and when you do intense exercise. Sports drinks are absorbed as quickly as water but also replace sugar, sodium, and other nutrients. People who are hydrated and acclimate to hot environments are less likely to experience heat cramps.

Do not use salt tablets, which are absorbed slowly and can cause irritation of the stomach. Salt tablets do not replace water loss.

HEAT EDEMA (SWELLING)

It is not uncommon for your feet or hands to become swollen when you sit or stand for a long time in a hot environment (heat edema). Heat causes the blood vessels to expand (dilate), so body fluid moves into the hands or legs by gravity. The balance of salt in the body is also a risk factor for heat edema. If salt loss is less than normal, the increased salt level draws fluid into the hands and legs.

Older adults have an increased risk of heat edema, especially if they have other medical conditions that affect their circulation.

People visiting hot climates from colder climates may also have an increased risk of heat edema.

HEAT TETANY (HYPERVENTILATION AND HEAT STRESS)

Heat tetany (hyperventilation and heat stress) is usually related to short periods of stress in intense heat environments. Symptoms may include hyperventilation, respiratory problems, numbness or tingling, or muscle spasms.

Treatment includes removing the affected person from the heat and slowing the breathing pattern.

HEAT SYNCOPE (FAINTING)

Heat syncope occurs when you faint suddenly and lose consciousness because of low blood pressure. Heat causes the blood vessels to expand (dilate), so body fluid moves into the legs by gravity, which causes low blood pressure and may result in fainting.

Symptoms that could lead to heat syncope (fainting) include:

- Feeling faint or lightheaded.
- Pale, cool, and moist skin.
- Lightheadedness when you change position, such as moving from a lying position to a standing position (orthostatic hypotension).

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Heat syncope can be caused by blood pooling in the legs if you have been standing still for a long time in a hot environment. It can also be caused by vigorous physical activity for two or more hours before the fainting happens.

Your risk of developing heat syncope increases when you have not adjusted (acclimated) to a hot environment. Being dehydrated may also increase your risk for heat syncope. Recovery is rapid once you lie down in a cool environment.

Heat syncope is sometimes a symptom of a nervous system, metabolic, or cardiovascular problem that needs further medical evaluation.

HEAT EXHAUSTION

Heat exhaustion occurs when a person cannot sweat enough to cool the body. It generally develops when a person is working or exercising in hot weather, sweats a lot, and does not drink enough liquids to replace those lost fluids. Heat exhaustion can be caused by loss of fluid (dehydration) or loss of electrolytes.

Symptoms of heat exhaustion include fatigue, weakness, headache, dizziness, or nausea, and the skin is pale, cool, and moist. Mild heat exhaustion does not cause a decrease in a person's mental alertness, but it may occasionally cause fainting. Mild cases of heat exhaustion usually can be treated at home.

Moderate to severe heat exhaustion can sometimes lead to heatstroke, which requires emergency treatment.

HEATSTROKE (SUNSTROKE)

Heatstroke occurs when the body fails to regulate its own temperature, and body temperature continues to rise. Symptoms of heatstroke include:

- Unconsciousness for longer than a few seconds.
- Confusion, severe restlessness, or anxiety.
- Convulsion (seizure).
- Symptoms of moderate to severe difficulty breathing.
- Fast heart rate.
- Sweating that may be heavy or may have stopped.
- Skin that may be red, hot, and dry, even in the armpits.

Classic heatstroke can develop without exertion when a person is exposed to a hot environment and the body is unable to cool itself effectively. In this type of heatstroke, the body's ability to sweat and transfer the heat to the environment is reduced. A person with heatstroke may stop sweating. Classic heatstroke may develop over several days. Babies, older adults, and people with chronic health problems have the greatest risk of this type of heatstroke.

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Exertional heatstroke may develop when a person is working or exercising in a hot environment. A person with heatstroke from exertion may sweat profusely, but the body still produces more heat than it can lose. This causes the body's temperature to rise to high levels.

Both types of heatstroke cause severe dehydration and can cause body organs to stop functioning. **Heatstroke is a life-threatening medical emergency**, requiring emergency medical treatment.

Often, environmental and physical conditions can make it difficult to stay cool. Heat-related illness is often caused or made worse by dehydration and fatigue. Exercising during hot weather, working outdoors, and overdressing for the environment increase your risk. Caffeine or alcohol also increase your risk for dehydration.

Many medicines increase your risk of a heat-related illness. Some medicines decrease the amount of blood pumped by the heart (cardiac output) and limit blood flow to the skin, so your body is less able to cool itself by sweating. Other medicines can alter your sense of thirst or increase your body's production of heat. If you take medicines regularly, ask your doctor for advice about hot-weather activity and your risk of getting a heat-related illness.

Other things that may increase your risk of a heat-related illness include:

- **Age.** Babies do not lose heat quickly and they do not sweat effectively. Older adults do not sweat easily and usually have other health conditions that affect their ability to lose heat.
- **Obesity.** People who are overweight have decreased blood flow to the skin, hold heat in because of the insulating layer of fat tissue, and have a greater body mass to cool.
- **Summer heat waves.** People who live in cities are especially vulnerable to illness during a summer heat wave because heat is trapped by tall buildings and air pollutants, especially if there is a high level of humidity.
- **Chronic diseases**, such as diabetes, heart failure, and cancer. These conditions change the way the body gets rid of heat.
- **Travel** to wilderness areas or foreign countries with high outdoor temperatures and humidity. When you go to a different climate, your body must get used to the differences (acclimate) to keep your body temperature in a normal range.

Most heat-related illnesses can be prevented by keeping the body cool and by avoiding dehydration in hot environments. Home treatment is usually all that is needed to treat mild heat-related illnesses. Heat exhaustion and heatstroke need immediate medical treatment.

Review the Emergencies and Check Your Symptoms sections to determine if and when you need to see a doctor.

How Much Water to Drink?

Water is the most important thing your body needs to survive. Without water you would die in a few days. Every form of life depends on water for survival. It is a vital part of all kinds of metabolic processes within our bodies and the bodies of other forms of life. We use up a lot of our water during the digestion of food and about 72% of the fat free mass of the human body is water.

How Much Water to Drink for Proper Function and Hydration?

Because we rely so greatly on water, it is absolutely vital to consume somewhere between one and seven liters of water to stay hydrated and avoid dehydration. Physicians, dieticians and nutritionists have agreed that drinking eight 8 ounce glasses of water a day (64 ounces) is best for proper hydration, although this has not been scientifically proven. It is, however, the Recommended Daily Intake and is most likely sufficient for proper hydration. A recent report by the National Research Council has recommended humans consume 2.7 liters of water total for women and 3.7 liters of water for men in not only liquid form but also from food sources.

The Amount Of Water Needed Depends on Lifestyle

How much water to drink really depends on several factors and can change based on the individual person. The exact amount of water necessary for proper functioning depends on a person's level of physical activity, the climate and temperature, humidity, and proper kidney functioning, among other factors. Water is taken from the body through sweat, urine, feces, and by water vapor that leaves the body through breathing. Obviously, a person who sweats for an hour while jogging needs more water than a person who leads a very sedentary lifestyle, just as a person in a very humid climate may not need as much water as someone in the dry desert.

Is It Possible to Drink Too Much Water?

For the average person, it is highly unlikely that you will drink too much water. Your body will expel water quickly through urination, making it very difficult to drink too much. In fact, it is more likely that you will dangerously harm your body if you drink too little water. There are however, two cases where you may damage your body by consuming too much water.

When people are exercising, they may feel the need to drink a lot of water because they feel thirsty or are sweating a lot. This can be dangerous if exercisers or athletes drink more water than needed during exercise. A person who consumes too much water during exercise may run the risk of water intoxication, which can be fatal. According to the Annals of Internal Medicine, a research report on marathon runners found that some developed brain swelling due to water intoxication. They had taken in too much water while running which caused their sodium levels in the blood to drop drastically. When this happens the extra water is absorbed into the blood which causes fluid to build up in the brain. This fluid also accumulates in the lungs, causing runners and other athletes to become nauseous and out of breath. It is important to slowly hydrate yourself during exercise. It has been recommended that you drink a cup extra of water for each hour of exercise.

Another possible way to drink too much water is if your kidneys are not functioning properly. Improper functioning of the kidneys can allow an excess of water to build up. If this is the case, those with kidney problems should discuss how much water to drink with their physician.

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People need water for survival on proper body functioning but people need to make sure that their water does not contain too much sodium or other impurities such as chemicals or harmful bacteria. Although, many things have been added to drinking water to better the taste of water and provide essential electrolytes. If drinking water from an unknown source, make sure you put the water through a filtration device or boil the water to kill bacteria and chemicals.

Chances are, if you stick to the recommended eight glasses of water a day, you will be in pretty good shape and your body will stay hydrated. But, remember to take into account physical exercise, climate, and any medical conditions. Your best advice would be to discuss your water intake with a physician or dietician to find out the best amount of water to drink for your specific circumstance.

What to Drink When You Exercise

The options include sports drinks, energy drinks, and just regular water.

By Elaine Magee, MPH, RD

WebMD Weight Loss Clinic - Expert Column

We all know that when we work out, it's important to stay hydrated. Something we may not be so clear on is what exactly we should drink when we exercise.

Ordinary water, of course, is the classic choice. But with store shelves everywhere full of sports drinks, energy drinks, and various flavored and fortified waters, what's an exerciser to do?

Experts say it all depends on your taste -- as well as the length and intensity of your workouts. Here's a look at how the various drinks measure up.

Flavored or Unflavored?

When I'm really thirsty, the only thing that hits the spot is good old H₂O -- preferably cold. But that's just me.

Are you someone who will drink more if your drink is flavored (and there are plenty of you out there)? Then you're better off drinking whatever ends up helping you drink *more* when you exercise. The bottom line is hydration.

The American College of Sports Medicine recommends flavored drinks when fluid replacement is needed during and after exercise to enhance palatability and promote fluid replacement.

And how do you know when fluid replacement is really needed?

"Exercising 1.5 hours to three hours is long enough to warrant fluid replacement due to sweat losses," says Kristine Clark, Ph., FACSM, director of sports nutrition for Penn State University Park. "How much sweat is lost influences how much sodium and potassium are lost."

The longer you exercise and the more heavily you sweat, the greater the need for a sports drink to help replace these lost micronutrients, Clark says.

"A sports drink can do many great things to increase energy levels without the complications of digesting and absorbing a meal," says Clark.

Sports Drinks and Exercise

Basically, a sports drink offers your body three things it might need before, during, or after vigorous exercise:

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- **Hydration.** The American College of Sports Medicine recommends that people drink about 17 ounces of fluid about two hours before exercise, to promote adequate hydration and allow time for the body to excrete any excess water. During exercise, they recommend that athletes start drinking early and at regular intervals in order to take in fluids at the rate they're losing them through sweating.
- **Fuel.** The carbohydrates found in sweetened sports drinks provide energy to help delay fatigue, Clark says. The Gatorade Co. says lab tests have shown that 6% carbohydrate (14 grams of carbohydrate per 8 ounces of water) is the optimal percentage of carbs for speeding fluid and energy back into the body.
- **Electrolytes or Minerals.** These are things like sodium, potassium, and chloride that athletes lose through sweat. When water goes out of the body, so do electrolytes. And when the body is losing lots of water (as during exercise), it makes sense that you need to replace electrolytes.

What About the Average Exerciser?

So what if you're just a "weekend warrior" when it comes to tough workouts? Or an avid exerciser who's not quite of athlete standing? Do you really need a sports drink when you exercise?

The answer, it seems, lies in how much you're sweating.

The American College of Sports Medicine says that during exercise lasting less than one hour there's little evidence of any difference in performance between exercisers who drink beverages containing carbohydrates and electrolytes, and those who drink plain water.

And, according to Clark, someone exercising 1.5 hours in a cool environment (who is probably not sweating much) is more in need of fluids or water than electrolytes.

The ABCs of Vitamin Water

I totally get adding electrolytes to drinks to help your body recover from vigorous exercise, but vitamins? It's still best to get vitamins and minerals naturally from foods and beverages -- like vitamin C from citrus and dark leafy green vegetables, and calcium from dairy products.

"Athletes will not need vitamin and mineral supplements if adequate energy to maintain body weight is consumed from a variety of foods," the American Dietetic Association and American College of Sports Medicine say in a position paper on nutrition and athletic performance.

But if you really like the idea of vitamin water, here are some things to think about:

- Whether alternative sweeteners are added. Many experts believe that even alternative sweeteners should be consumed in moderation, especially in children.
- Whether you'll be taking in *too many* vitamins. Most of the vitamins added to vitamin water are water soluble (like vitamin C, B vitamins, etc.). This makes it seem like any excess consumed can just pass out through the kidneys. This is true -- but that doesn't mean large amounts of water-soluble vitamins are entirely harmless. High amounts can affect the absorption or utilization of other nutrients. It's also possible that passing large amounts through the kidneys could cause problems.

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- Whether you might be just as happy with dressed-up regular water. You can flavor it with lemon, lime, orange, or a strawberry or two. Green tea comes flavored naturally these days, too. This can be a different but healthful way to drink water once a day, too.

Energy Drinks for Exercisers

What about energy drinks for exercisers? Is there anything to them, besides plenty of caffeine?

The truth is that it depends on the energy drink. Red Bull, among the biggest names in energy drinks, pumps in 106 calories of carbohydrates (27 grams), and 193 milligrams of sodium along with its jolt of caffeine. Sugar-free energy drinks, meanwhile, give you the jolt without the carbs and calories.

Clark believes energy drinks do have their place. She says there is clear evidence caffeine is a nonharmful stimulant that provides performance-enhancing benefits, which can include improved endurance, stamina, and reaction time.

"In most cases caffeine stimulates alertness, motor skill, and concentration," says Clark.

She warns, however, that caffeine is banned by the National Collegiate Athletic Association at levels equivalent to five Starbucks coffees. But drinking one Red Bull, for example, provides about 70 milligrams of caffeine, which is less than what you'll find in one Starbucks coffee (260 milligrams per 12-ounce serving).

Overuse of caffeine can cause the jitters, so exercisers just need to know how much to consume for their personal comfort, warns Clark.

Assorted other ingredients are added to some of these energy drinks, such as:

- Taurine, which is similar to an amino acid but not considered a component of proteins. Glucuronolactone, a compound produced by the metabolism of glucose in the human liver. It's purported -- but not proven -- to fight fatigue.
- Ginkgo biloba, which is thought to help prevent mental decline but again, this theory is up for debate.
- Ginseng, which is promoted for energy and mental alertness, but the specifics of its effects aren't clear.
- Guarana, which is nicknamed "herbal caffeine." This is a stimulant similar to caffeine, and so should be used only in moderation.

What's in Your Exercise Drink?

Below is some nutritional information, as available on labels, about some of the common sports and energy drinks available. And here's one more tip for staying hydrated when you work out: Whatever you choose to drink when you exercise, drink it well-chilled for faster absorption by the body.

Sports drinks (8 ounces):

- **Gatorade:** 50 calories, 14 grams sugar (from sucrose syrup and high-fructose corn syrup), 110 mg sodium, caffeine-free. Other ingredients: potassium (30 mg). Vitamins (percentage of recommended Daily Value): None

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- **Propel Fitness Water:** 10 calories, 2 grams sugar (from sucrose syrup; also sweetened with sucralose or Splenda), 35 mg sodium, caffeine-free. Other ingredients: None. Vitamins (% Daily Value): 10% vitamin C; 10% vitamin E; 25% B3 and B6; 4% B12, 25% pantothenic acid.

Energy drinks (8 ounces):

- **Red Bull:** 110 calories, 27 grams sugar (from sucrose and glucose), 200 mg sodium, contains caffeine. Other ingredients: taurine, glucuronolactone. Vitamins (% Daily Value): 100% B3, 250% B6, 80% B12, 50% pantothenic acid. Note: Red Bull is also available in a sugar-free option with acesulfame K, aspartame, and inositol as sweeteners. This version contains 10 calories and 0 grams sugar.
- **Rock Star:** 140 calories, 31 grams sugar (from sucrose and glucose), 125 mg sodium, 80 mg caffeine. Other ingredients: taurine (1,000 mg), ginkgo biloba leaf extract (150 mg), guarana seed extract (25 mg), inositol (25 mg), L-carnitine (25 mg), Panax ginseng extract (25 mg), milk thistle extract (20 mg). Note: Rock Star is available in a sugar-free option sweetened with acesulfame potassium and sucralose or Splenda. This version has 10 calories and 0 grams sugar.
- **Sobe, Energy Citrus Flavor.** 120 calories, 31 grams sugar (mainly from high-fructose corn syrup and orange juice concentrate), 15 mg sodium, contains caffeine. Other ingredients: guarana (50 mg), panax ginseng (50 mg), taurine (16.5 mg). Vitamins (% Daily Value): 100% vitamin C.
- **Amp Energy Overdrive** (Mountain Dew). 110 calories, 29 grams sugar (from high-fructose corn syrup and orange juice concentrate), 65 mg sodium, contains caffeine. Other ingredients: guarana extract (150 mg), Panax ginseng extract (10 mg), taurine (10 mg). Vitamins (% Daily Value): 20% B2, 10% B3, 10% B6, 10% B12, 10% pantothenic acid.
- **Full Throttle Energy Drink** (from Coca-Cola). 110 calories, 29 grams sugar (from high fructose corn syrup), 85 mg sodium, contains caffeine. Other ingredients: guarana extract (.70 mg), ginseng extract (90 mg), taurine. Vitamins (% Daily Value): 20% B3, 20% B6, 10% B12.
- **Sugar-Free Tab Energy.** 5 calories, 0 grams sugar (contains sucralose or Splenda), 110 mg sodium, contains caffeine. Other ingredients: ginseng extract, guarana extract. Vitamins (% Daily Value): 25% B3, 25% B6, 15% B12.

Fortified waters (8 ounces):

- **Propel Fitness Water.** 10 calories, 2 grams sugar, 35 milligrams sodium. Vitamins (% Daily Value) 25% for niacin (B-3), B-6, and pantothenic acid; 10% for vitamins C and E.
- **Glaceau Vitamin Water -- Energy.** 50 calories, 13 grams sugar (from crystalline fructose), 0 mg sodium, 50 mg caffeine. Other ingredients: guarana (25 mg). Vitamins (% Daily Value): 40% vitamin C, 20% B3, 20% B6, 20% B12.