



Heat Waves

Why talk about excessive heat?

In recent years, excessive heat has caused more deaths than all other weather events, including floods. The American Meteorological Society reports that on average heat kills more than 1,000 people each year. During the July 1995 heat wave in Chicago, more than 700 people died as a result of excessive heat.

What is a heat wave?

A heat wave is a prolonged period of excessive heat, often combined with excessive humidity. Generally, excessive heat is defined as temperatures that hover 10 degrees or more above the average high temperature for the region during summer months, last for a prolonged period of time, and often are accompanied by high humidity.

What is the heat index?

The heat index is the temperature the body feels when the effects of heat and humidity are combined. Exposure to direct sunlight can increase the heat index by up to 15°F.

What are heat cramps, heat exhaustion, heatstroke, and sunstroke?

Heat cramps are muscular pains and spasms caused by heavy exertion in high heat. Heat cramps are often the first sign that the body is having trouble with the heat.

Heat exhaustion typically involves the loss of body fluids through heavy sweating when someone strenuously exercises or works in high heat and humidity. In someone suffering from heat exhaustion, blood flow to the skin increases while blood flow to vital organs decreases, resulting in a mild form of shock. If not treated, body temperature will continue to rise and the person may suffer heatstroke.

Heatstroke (also known as sunstroke) is a life-threatening condition in which a person's temperature control system, which produces sweating to cool the body, stops working. The body temperature of someone suffering from heatstroke can rise so high that brain damage and death may result if the body is not cooled quickly.

How can I protect myself in a heat wave?

The best ways to be protected from the ill effects of excessive heat are to dress appropriately, stay indoors, refrain from strenuous work or exercise during the hottest part of the day, and stay hydrated. Spending at least two hours a day in air conditioning significantly decreases a person's risk of heat-related illnesses.

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Heat can kill by pushing the human body beyond its limits. Under normal conditions, the body's internal thermostat produces perspiration that evaporates and cools the body. However, in excessive heat and high humidity, evaporation is slowed and the body must work extra hard to maintain a normal temperature.

Elderly people, young children, and those who are sick or overweight are more likely to become victims of excessive heat. Because men sweat more than women do, they become more quickly dehydrated and are more susceptible to heat illness.

The duration of excessive heat plays an important role in how people are affected by a heat wave. Studies have shown a significant rise in heat-related illnesses when excessive heat lasts more than two days.

People living in urban areas may be at greater risk from the effects of a prolonged heat wave than are people living in rural regions. An increased health problem, especially for those with respiratory difficulties, can occur when stagnant atmospheric conditions trap pollutants in urban areas, thus adding unhealthy air to excessively hot temperatures. In addition, asphalt and concrete store heat longer and gradually release heat, resulting in significantly higher temperatures, especially at night—an occurrence known as the "urban heat island effect."

Pets, horses, and livestock are also susceptible to difficulties from excessive heat. Animals do not perspire and rely on panting, wetting down, shade, cool earth, and drinking water for cooling. Animals cannot explain their needs, so it is up to people to take extra care that during heat waves, their needs are met.

What is the best source of information in a heat wave?

Local radio, television stations, and NOAA Weather Radio are the best sources of information in a heat wave.

NOAA Weather Radio is the prime alerting and critical information delivery system of the National Weather Service (NWS). NOAA Weather Radio broadcasts warnings, watches, forecasts, and other hazard information 24 hours a day over more than 650 stations in the 50 states, adjacent coastal waters, Puerto Rico, the U.S. Virgin Islands, and the U.S. Pacific territories. The NWS encourages people to buy a weather radio equipped with the Specific Area Message Encoder (SAME) feature. This feature automatically alerts you when important excessive heat information is issued for your area. Information on NOAA Weather Radio is available from your local NWS office or at www.nws.noaa.gov/nwr.

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Watch, Warning, Advisory

The National Weather Service issues alerts for excessive heat on a county-by-county basis. The alerts are broadcast on NOAA Weather Radio and on local radio and television stations. The parameters of an excessive heat watch, warning, and advisory vary by location.

Generally:

- Excessive Heat WATCH means conditions are favorable for an event to meet or exceed local excessive heat warning criteria in the next 12 to 48 hours.
- Excessive Heat WARNING means that heat values are forecast to meet or exceed locally defined warning criteria for at least two days.
- Excessive Heat ADVISORY means hazardous heat conditions have begun or will begin within 36 hours and, if caution is not exercised, they could become life threatening.

Be Prepared for a Heat Wave Protect Yourself

For general preparedness, every household should create and practice a Family Disaster Plan and assemble and maintain a Disaster Supplies Kit. In addition, households at risk from heat waves should take precautions to stay safe in case one occurs. Review your Family Disaster Plan before summer heat is expected and be sure to stock additional water.

If you are at risk from excessive heat, you should:

- Discuss with members of your household the precautions they should take to stay safe in excessive heat. Everyone should know what to do in the places where they spend time. Some places may not be air conditioned or safe during a heat wave, so plan alternatives.
- If your home does not have air conditioning, choose other places you could go to get relief from the heat during the warmest part of the day. Schools, libraries, theaters, and other community facilities often provide air-conditioned refuge on the hottest days. See if your area designates cooling centers. Air conditioning provides the safest escape from excessive heat. During the 1995 Midwest heat wave, most deaths happened to people who were not in air conditioned places.
- Plan how you can change daily activities to avoid strenuous work during the warmest part of the day. Ill effects of heat can quickly overcome the healthiest people, if they perform strenuous work during the warmest parts of the day. Symptoms of dehydration are not easily recognized and are often confused with symptoms of other conditions. Dehydration occurs fast and makes you ill very quickly.

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- Discuss with a physician any concerns about members of the household who are taking medications or have medical conditions that may cause poor blood circulation or reduced ability to tolerate heat. A physician can advise you about temporary changes to medication or other activities that can relieve the effects of heat.
- Plan to check on family, friends, and neighbors who do not have air conditioning or who spend much of their time alone. Elderly persons who live alone or with a working relative might need assistance on hot days. The majority of people who died because of the 1995 Midwest heat wave were persons who were alone.
- Plan to wear lightweight, light-colored clothing. Light colors will reflect away the sun's rays more than dark colors, which absorb the sun's rays.
- Get training. Take an American Red Cross first aid course to learn how to treat heat emergencies and other emergencies. Everyone should know how to respond, because the effects of heat can happen very quickly.
- Ensure that your animals' needs for water and shade are met. Bring companion animals into cooler areas.

What to Do During a Heat Wave

During a heat wave, you should:

- Listen to NOAA Weather Radio or local radio or television stations for up-to-date information.
- Never leave children or pets alone in closed vehicles. Temperatures inside a closed vehicle can reach more than 140°F (60° C) within minutes. Exposure to such high temperatures can kill in minutes. Even on days that feel pleasantly warm outside, temperatures in a closed vehicle can raise high enough to kill children and pets.
- Slow down. Avoid strenuous activity. Reduce, eliminate, or reschedule strenuous activities. High-risk individuals should stay in cool places. Get plenty of rest to allow your natural "cooling system" to work. If you must do strenuous activity, do it during the coolest part of the day, which is usually in the early morning. Many heat emergencies are experienced by people exercising or working during the hottest part of the day.
- Take frequent breaks if you must work outdoors. Frequent breaks, especially in a cool area, can help people tolerate heat better.
- Use a buddy system when working in excessive heat. Partners can keep an eye on each other and can assist each other when needed. Sometimes exposure to heat can cloud judgment, and, if you work alone, you may not notice this.
- Watch for signs of heat exhaustion and heatstroke.
- Avoid too much sunshine. Sunburn slows the skin's ability to cool itself. The sun will also heat the inner core of your body, resulting in dehydration. Use a sunscreen lotion with a high sun-protection factor (SPF) rating.

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- Postpone outdoor games and activities. Excessive heat can threaten the health of athletes, staff, and spectators of outdoor games and activities.
- Avoid extreme temperature changes. A cold or even a cool shower taken immediately after coming indoors from hot temperatures can result in hypothermia, particularly for elderly and very young people.
- Stay indoors as much as possible. If air conditioning is not available, stay on the lowest floor, out of the sunshine. Even in the warmest weather, staying indoors, out of sunshine, is safer than long periods of exposure to the sun.
- Keep heat outside and cool air inside. Close any registers that may allow heat inside. Install temporary reflectors, such as aluminum foil-covered cardboard, in windows and skylights to reflect heat back outside.
- Conserve electricity not needed to keep you cool. During periods of excessive heat, people tend to use a lot more power for air conditioning. Conserve electricity not used to keep you cool so power can remain available and reduce the chance of a community-wide outage.
- Vacuum air conditioner filters weekly during periods of high use. Air conditioner filters can become clogged or filled with dirt, making them less efficient. Keeping them clean will allow your air conditioner to provide more cool air.
- If your home does not have air conditioning, go to a public building with air conditioning each day for several hours. Air conditioned locations are the safest places during excessive heat because electric fans do not cool the air. Fans do help sweat evaporate, which gives a cooling effect. However, when temperatures exceed 90° F (32° C), fans become ineffective in reducing heat-related illness.
- Dress appropriately:
 - Wear loose-fitting, lightweight, light-colored clothing that will cover as much skin as possible. Lightweight, light-colored clothing reflects heat and sunlight and helps maintain normal body temperature. Cover as much skin as possible to avoid sunburn and the over-warming effects of sunlight on your body.
 - Protect your face and head by wearing a wide-brimmed hat. A hat will keep direct sunlight off your head and face. Sunlight can burn and warm the inner core of your body.
- Drink plenty of fluids even if you do not feel thirsty. Drink regularly and often. Your body needs water to keep cool. Water is the safest liquid to drink during heat emergencies. Injury and death can occur from dehydration, which can happen quickly and be unnoticed until too late. Symptoms of dehydration are often confused with symptoms of other conditions.
- People who have epilepsy or heart, kidney, or liver disease; who are on fluid restricted diets; or who have a problem with fluid retention should consult a doctor before increasing liquid intake.
- Avoid drinks with alcohol or caffeine. They can make you feel good for a little while,

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but they make the heat's effects on your body worse. This is especially true about beer, which actually dehydrates the body.

- Eat small meals and eat more often. Large, heavy meals are more difficult to digest and cause your body to increase internal heat to aid digestion, worsening overall conditions. Avoid foods that are high in protein, such as meats and nuts, which increase metabolic heat.
- Avoid using salt tablets unless directed to do so by a physician. Salt causes the body to retain fluids, resulting in swelling. Salt impedes sweating, which helps keep you cool.
- Check on your animals frequently to ensure that they are not suffering stress from the heat. Make sure they are indoors or in the shade. Use fans to cool areas that are not air conditioned or open to breezes. Provide plenty of water for drinking as well as for cooling the animals. If you see signs of heat stress, call your veterinarian. Very young and older animals, as well as animals with short snouts, are more susceptible to problems with heat.

How to Make Your Home Safer for Occupants in a Heat Wave

To make your home safer during a heat wave, you should:

- Install window air conditioners snugly. Insulate spaces around air conditioners for a tighter fit. An air conditioner with a tight fit around the windows or wall openings will make less noise and allow less hot air in from the outside.
- Make sure your home is properly insulated. This will help you to conserve electricity and reduce your home's power demands for air conditioning. Put weather stripping around doors and windows to keep cool air inside.
- Consider keeping storm windows installed throughout the year. Storm windows can keep the heat out of a house in the summer the same way they keep the cold out in the winter.
- Check air-conditioning ducts for proper insulation. Insulation around ducts prevents cool air from leaking and keeps it directed through the vents.
- Protect windows from the sun. Hang shades, draperies, awnings, or louvers on windows receiving morning or afternoon sun. Outdoor awnings or louvers can reduce the heat entering the house by as much as 80 percent.
- Use an attic fan. If you have a fan installed to vent warm air out of your attic, use it to help keep your home cool.
- Check buildings that house animals.

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How to Recognize and Treat Heat Exhaustion and Heatstroke

Heatstroke

The signs of heatstroke in a person are hot, red skin; changes in consciousness; rapid, weak pulse; and rapid, shallow breathing. A person experiencing heatstroke can have a very high body temperature—sometimes as high as 105°F (41° C). If the person was sweating from heavy work or exercise, the skin may be wet; otherwise, it will feel dry.

Heatstroke is a life-threatening situation. If you suspect someone is suffering from heatstroke, call 9-1-1 or your local emergency number immediately. Move the person to a cooler place. Quickly cool the person's body—immerse it in a cool bath or wrap it in wet sheets and fan it. Watch for signs of breathing problems. Keep the person lying down and continue to cool the body any way you can. If the person refuses water, is vomiting, or exhibits changes in the level of consciousness, do not give him or her anything to eat or drink.

Do not give liquids that contain alcohol or caffeine because they can cause further dehydration, making conditions worse.

Heat Exhaustion

The signs of heat exhaustion in a person are cool, moist, pale, or flushed skin; heavy sweating; headache; nausea or vomiting; dizziness; and exhaustion. A person experiencing heat exhaustion may have a normal body temperature, or it is likely to be rising.

If you suspect someone is suffering from heat exhaustion, move the person to a cooler place. Remove or loosen tight clothing and apply cool, wet cloths, such as towels or sheets dipped in water. If the person is conscious, give him or her cool water to drink. Make sure the person drinks slowly. Give a half glass of cool water every 15 minutes. Let the person rest in a comfortable position, and watch carefully for changes in his or her condition.

Do not give liquids that contain alcohol or caffeine because they can cause further dehydration, making conditions worse.

Heat Cramps

Heat cramps are muscle spasms that are caused by excessive sweating that results in a deficiency of salt. Although not as serious as heat exhaustion or heatstroke, heat cramps sometimes precede them. If someone is suffering from heat cramps, move the person to a cooler

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place and have him or her rest in a comfortable position. Lightly stretch the affected muscle and replenish fluids. Give a half glass of cool water every 15 minutes.

Do not give liquids that contain alcohol or caffeine because they can cause further dehydration, making conditions worse.

Heat Stroke in Animals

Animals are also susceptible to heat stroke, or hyperthermia, which is considered an emergency as it is with people. Signs in animals include excessive panting; increased body temperature, heart rate, or respiratory rate; unusual salivation; collapse, stupor, seizures, or coma; redder than normal mucous membrane (gums, for example); or capillary refill that is too fast. Be aware also of signs of dehydration, which is also an emergency.

For more information about first aid for cats and dogs, refer to *Pet First Aid*, by Barbara Mammato, DVM, MPH, a handbook sponsored by the American Red Cross and The Humane Society of the United States. For information about other animals, talk with your veterinarian.

If you suspect heat stroke, get the animal out of direct heat and spray it with cool water or place water-soaked towels on its head, neck, feet, chest, and abdomen. The consequences of heat stroke may be life-threatening, but might not be visible to you for several hours, so take the animal to your nearest veterinary hospital right away.

Facts and Fiction

Fiction: Beer and other alcoholic beverages satisfy thirst in excessive heat.

Facts: Although beer and alcoholic beverages appear to satisfy thirst, they actually cause further body dehydration. You should limit your intake of alcoholic beverages in excessive heat. Drink plenty of water. Your body needs water to keep cool. Drink plenty of fluids even if you do not feel thirsty. (People who have epilepsy or heart, kidney, or liver disease; are on fluid restricted diets; or have a problem with fluid retention should consult a physician before increasing their consumption of fluids.)

Fiction: It's always good to exercise, no matter how hot it is.

Facts: Many heat emergencies are experienced by people exercising or working during the hottest parts of the day. Reduce, eliminate, or reschedule strenuous activities. If you must do strenuous activity, do it during the coolest part of the day which is usually in the morning between 4:00 a.m. and 7:00 a.m.

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Fiction: A heatstroke (sunstroke) is not life-threatening.

Facts: A heatstroke or sunstroke is life threatening. If someone has heatstroke, his or her temperature control system, which produces sweat to cool the body, stops working. The body temperature can rise so high that brain damage and death may result if the body is not cooled quickly.

Fiction: You will get sunburned only on really hot days.

Facts: Sunburn (and tanning) results from exposure to ultraviolet (UV) radiation, which is distinct from the light and heat emitted by the sun. You cannot see or feel UV rays. They can, however, be quite damaging. UV exposure has been linked to skin cancer and other skin disorders, cataracts and other eye damage, and immune-system suppression. The ozone layer absorbs most of the sun's harmful UV rays, but this layer has thinned in recent years as a result of the emission of ozone-depleting chemicals. This thinning can lead to a greater chance of overexposure to UV radiation. To protect yourself:

- Limit time in the midday sun.
- Stay in shade.
- Use a broad-spectrum sunscreen of at least SPF15+ and reapply it every two hours.
- Wear a hat, protective clothing, and sunglasses.
- Watch for the UV Index (reported in local news and newspapers).

UV exposure is a year-round issue—you can sustain damage on the ski slopes just as easily as on the beach, and clouds provide only partial protection. For more information, visit <http://www.epa.gov/sunwise>.

