

National Weather Service

Office of Climate, Water, and Weather Services



Home

News

Organization

Search

NWS

All NOAA

Weather Services

Aviation, Climate,
Hydro, Public...

Weather Awareness

Floods, Wind Chill,
Tornadoes, Heat...

Education

Weather Terms,
Teachers, Statistics

Publications

Assessments,
Aware, Brochures...

Get Weather Info

Forecasts,
Past Weather,
Weather Radio...

Other Contacts

NWS Partners
Locate NOAA Staff
Map of NWS Offices
Key NWS Contacts
Coop Reps List
Hydro Reps Map

Questions/Comments?

**Heat: A Major Killer****Beat The Heat Weather Ready Nation Campaign**

Espanol

- [NOAA's Watch, Warning, and Advisory Products for Extreme Heat](#)
- [Heat Index Information](#)
- [Heat Hazards](#)
- [Heat-Related Illness Symptoms and First Aid](#)
- [How Fast Can the Sun Heat A Car?](#)
- [Vehicle Related Heat Deaths](#)
- [Preparing for and Responding to Excessive Heat Events](#)
- [Resources](#)

Heat is one of the leading weather-related killer in the United States, resulting in hundreds of fatalities each year. In the disastrous [heat wave of 1980](#), more than 1,250 people died. In the [heat wave of 1995](#) more than 700 deaths in the Chicago area were attributed to heat, making this the deadliest weather event in Chicago history. In August 2003, a record heat wave in Europe claimed an estimated 50,000 lives.

North American summers are hot; most summers see heat waves in one or more parts of the United States. East of the Rockies, they tend to combine both high temperatures and high humidity, although some of the worst heat waves have been catastrophically dry.



NOAA's Watch, Warning, and Advisory Products for Extreme Heat

Each [National Weather Service Forecast Office](#) issues the following heat-related products as conditions warrant:

- **Excessive Heat Outlooks**: are issued when the potential exists for an excessive heat event in the next 3-7 days. An Outlook provides information to those who need considerable lead time to prepare for the event, such as public utility staff, emergency managers and public health officials. See the [mean heat index and probability forecasts](#) maps.
- **Excessive Heat Watches**: are issued when conditions are favorable for an excessive heat event in the next 24 to 72 hours. A Watch is used when the risk of a heat wave has increased but its occurrence and timing is still uncertain. A Watch provides enough lead time so that those who need to prepare can do so, such as cities officials who have excessive heat event mitigation plans.
- **Excessive Heat Warning/Advisories** are issued when an excessive heat event is expected in the next 36 hours. These products are issued when an excessive heat event is occurring, is imminent, or has a very high probability of occurring. The warning is used for conditions posing a threat to life. An advisory is for less

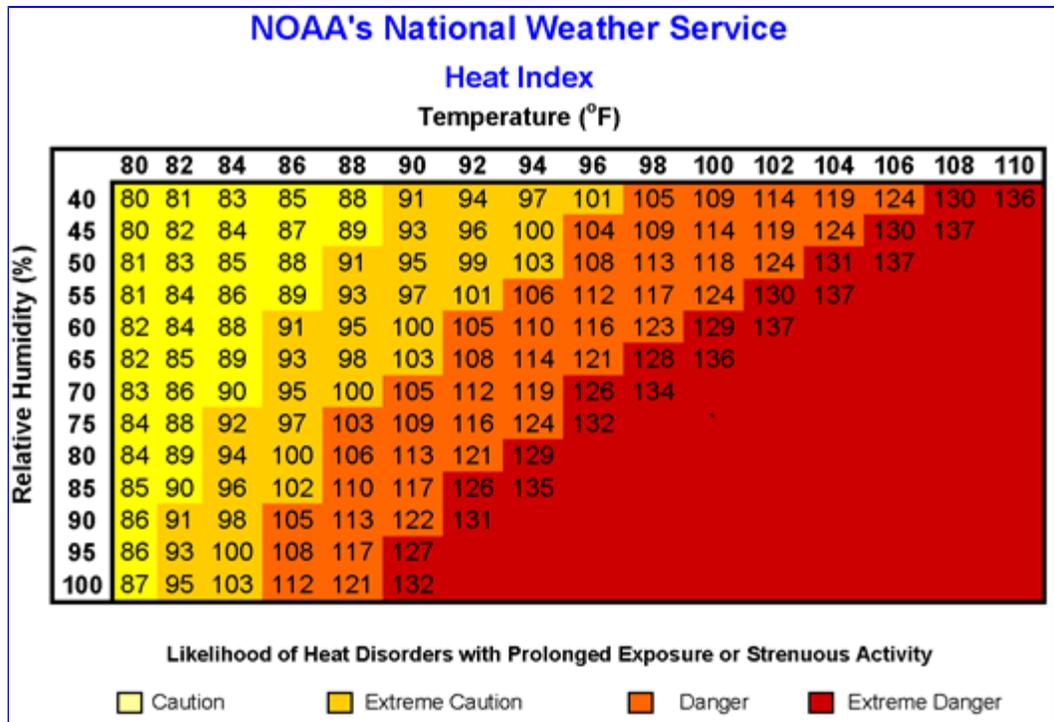
serious conditions that cause significant discomfort or inconvenience and, if caution is not taken, could lead to a threat to life.

How Forecasters Decide Whether to Issue Excessive Heat Products

How Forecasters Decide Whether to Issue Excessive Heat Products

NOAA's heat alert procedures are based mainly on Heat Index Values. The [Heat Index](#), sometimes referred to as the apparent temperature is given in [degrees Fahrenheit](#). The Heat Index is a measure of how hot it really feels when [relative humidity](#) is factored in with the actual air temperature.

To find the Heat Index temperature, look at the [Heat Index chart](#) below. As an example, if the air temperature is 96°F and the relative humidity is 65%, the heat index--how hot it feels--is 121°F. The National Weather Service will initiate alert procedures when the Heat Index is expected to exceed 105°-110°F (depending on local climate) for at least 2 consecutive days. NWS also offers a [Heat Index chart](#) for area with high heat but low relative humidity.



IMPORTANT: Since heat index values were devised for shady, light wind conditions, **exposure to full sunshine can increase heat index values by up to 15°F**. Also, **strong winds**, particularly with very hot, dry air, can be extremely hazardous.

The [Heat Index Chart](#) shaded zone above 105°F (orange or red) shows a level that may cause increasingly severe heat disorders with continued exposure or physical activity.

The Hazards of Excessive Heat

During extremely hot and humid weather the body's ability to cool itself is affected. When the body heats too rapidly to cool itself properly, or when too much fluid or salt is lost through dehydration or sweating, body temperature rises and heat-related illnesses may develop.

Heat-related illnesses can range from heat cramps to heat exhaustion to more serious heat stroke. Heat stroke can result in death and requires **immediate medical attention**.

Factors or conditions that can make some people more susceptible to heat-related illnesses include age (older adults and young children), obesity, fever, heart disease, mental illness, poor circulation, prescription drug and alcohol use, and sunburn. Sunburn, caused by [ultraviolet radiation](#) from the sun, can significantly retard the skin's ability to shed excess heat.



Heat-Related Illness Symptoms and First Aid

HEAT CRAMPS

- **Symptoms:**
 - Painful muscle cramps and spasms usually in legs and abdomen
 - Heavy sweating
- **First Aid:**
 - Apply firm pressure on cramping muscles or gentle massage to relieve spasm.
 - Give sips of water, if nausea occurs, discontinue water

HEAT EXHAUSTION

- **Symptoms:**
 - Heavy sweating
 - Weakness
 - Cool, pale, clammy skin
 - Weak pulse
 - Possible muscle cramps
 - Dizziness
 - Nausea and vomiting
 - Fainting
 - Normal temperature possible
- **First Aid:**
 - Move person to a cooler environment
 - Remove or loosen clothing
 - Apply cool, wet cloths
 - Fan or move victim to air conditioned room
 - Offer sips of water. If nausea occurs, discontinue water. If vomiting continues, seek immediate medical attention.

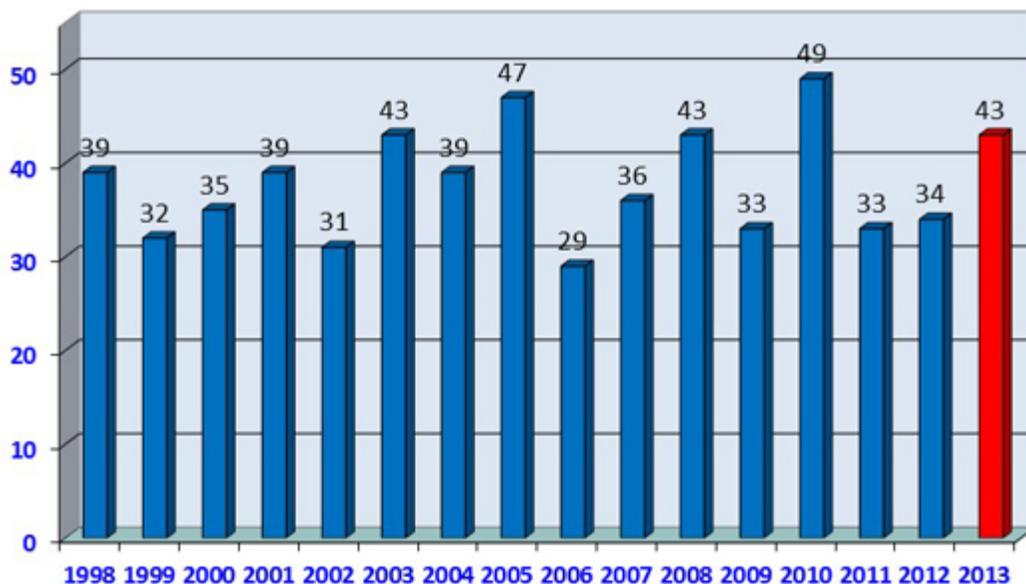
HEAT STROKE (or sunstroke)

- **Symptoms:**
 - Altered mental state
 - Possible throbbing headache, confusion, nausea, dizziness, shallow breathing
 - High body temperature (106°F or higher)
 - Skin may be hot and dry, or patient may be sweating
 - Rapid pulse
 - Possible unconsciousness
- **First Aid:**
 - **Heat stroke is a severe medical emergency. Summon emergency medical assistance or get the victim to a hospital immediately. Delay can be fatal.**
 - Move the victim to a cooler, preferably air-conditioned, environment
 - Reduce body temperature with a water mister and fan or sponging
 - Use fan if heat index temperatures are below the high 90s
 - Use extreme caution
 - If temperature rises again, repeat process
 - Do NOT give fluids

Never Leave Children, Disabled Adults or Pets in Parked Vehicles

Each year, dozens of children and untold numbers of pets left in parked vehicles die from hyperthermia. Hyperthermia is an acute condition that occurs when the body absorbs more heat than it can handle. Hyperthermia can occur even on a mild day. Studies have shown that the temperature inside a parked vehicle can rapidly rise to a dangerous level for children, pets and even adults. Leaving the windows slightly open does not significantly decrease the heating rate. The effects can be more severe on children because their bodies warm at a faster rate than adults.

U.S. Heatstroke Deaths (Children in Vehicles)



Courtesy of San Francisco State University. Use of this graph does not imply NWS endorsement of services provided by San Francisco State University.

How Fast Can the Sun Heat a Car?

The sun's shortwave radiation (yellow in figure below) heats objects that it strikes. For example, a dark dashboard or seat can easily reach temperatures in the range of 180 to over 200°F. These objects (e.g., dashboard, steering wheel, child seat) heat the adjacent air by conduction and convection and also give off longwave radiation (red in figure below) which is very efficient at warming the air trapped inside a vehicle.

Shown below are time lapse photos of thermometer readings in a car over a period of less than an hour. As the animation shows, in just over 2 minutes the car went from a safe temperature to an unsafe temperature of 94.3°F. This demonstration shows just how quickly a vehicle can become a death trap for a child.

Objects Heated by the Sun Warm Vehicle's Air



[CLICK HERE FOR ANIMATION](#) (700K)

(Hi-Res ~ 2.5 mb.WMV file)

Individual Frames:

[0 min](#), [10 min](#), [20 min](#), [30 min](#), [40 min](#), [50 min](#), [60 min](#)

Animation Courtesy of General Motors and San Francisco State University. Use of this animation does not imply NWS endorsement of services provided by General Motors and San Francisco State University.

Hyperthermia deaths aren't confined to summer months. They also happen during the spring and fall. Below are some examples.

The atmosphere and the windows of a car are relatively transparent to the sun's shortwave radiation (yellow in figure below) and are warmed little. This shortwave energy, however, does heat objects it strikes. For example, a dark dashboard or seat can easily reach temperatures in the range of 180°F to more than 200°F. These objects, e.g., dashboard, steering wheel, childseat, heat the adjacent air by conduction and convection and give off longwave radiation (infrared), which efficiently warms the air trapped inside a vehicle. [Learn more about excessive heat and cars.](#)

Vehicle Related Heat Deaths

- **Honolulu, HI, March 07, 2007:** A 3-year-old girl died when the father left her in a child seat for 1.5 hours while he visited friends in a Waikiki apartment building. The outside temperature was only **81 degrees**.
- **North Augusta, SC, April 2006:** A mother left her a 15-month-old son in a car. He was in a car for 9 hours while his mom went to work. She is now serving a 20-year prison sentence.
- **Greenville, TX, December 01, 2012:** A 6-month-old boy died after being left in a car for more than 2 hours by his mother. She was charged with murder. The temperature rose to an **unseasonably warm 81 degrees** on that day.
- **Adults are in danger too.** On July 12, 2001, a man died of heat stroke after falling asleep in his car with the windows rolled up in the parking lot of a supermarket in Hinds County, MS.

Safety Tips for Concerning Children

- **Make sure your child's safety seat and safety belt buckles aren't too hot** before securing your child in a safety restraint system, especially when your car has been parked in the heat.
- **Never leave your child** unattended in a vehicle, even with the windows down.
- **Teach children not to play** in, on, or around cars.
- **Always lock car** doors and trunks--even at home--and keep keys out of children's reach.
- **Always make sure all children have left the car** when you reach your destination. Don't leave sleeping infants in the car ever

Downloadable Child Vehicular Heat Stroke Prevention Logos



Safety Tips for Adults

- **Slow down.** Reduce, eliminate or reschedule strenuous activities until the coolest time of the day. Children, seniors and anyone with health problems should stay in the coolest available place, not necessarily indoors.
- **Dress for summer.** Wear lightweight, light-colored clothing to reflect heat and sunlight.
- **Put less fuel on your inner fires.** Foods, like meat and other proteins that increase metabolic



- heat production also increase water loss.
- **Drink plenty of water, non-alcoholic and decaffeinated fluids.** Your body needs water to keep cool. Drink plenty of fluids even if you don't feel thirsty. Persons who have epilepsy or heart, kidney or liver disease, are on fluid restrictive diets or have a problem with fluid retention should consult a physician before increasing their consumption of fluids. **Do not drink alcoholic beverages and limit caffeinated beverages.**
 - **During excessive heat periods, spend more time in air-conditioned places.** Air conditioning in homes and other buildings markedly reduces danger from the heat. If you cannot afford an air conditioner, go to a library, store or other location with air conditioning for part of the day.
 - **Don't get too much sun.** Sunburn reduces your body's ability to dissipate heat.
 - **Do not take salt tablets unless specified by a physician.**

Worker Safety

Outdoor workers can be at a higher risk to the effects of excessive heat. See [Occupational Safety and Health Administration \(OSHA\)](#) resources and recommended practices when working under hot conditions.

Drinking water often; resting and cooling down in the shade; gradually increasing workloads and allowing more frequent breaks for new workers or workers who have been away for a week or more (acclimatization); and knowing symptoms, prevention, and emergency response can help prevent heat-related illness and death. Check weather forecasts ahead of time to be better prepared.

Preparing for and Responding to Excessive Heat Events

The [Excessive Heat Events Guidebook](#) was developed by the [Environmental Protection Agency \(EPA\)](#) in 2006, in collaboration with the [National Weather Service](#), the [Centers for Disease Control and Prevention](#), and the [Department of Homeland Security](#). This guidebook provides best practices for saving lives during heat waves in urban areas, and provides a menu of options that communities can use in developing their own mitigation plans.

Resources:

- [Social Media Posts](#)
- [Five Social Media Graphics zipped](#) or click on your choice below



- [Beat the Heat Weather Ready Nation Campaign](#)
- [Safety and Health Topics from the Occupational Safety & Health Administration \(OSHA\)](#)
- [Centers for Disease Control and Prevention \(CDC\)](#)
- [American Red Cross](#)
- [Federal Emergency Management Agency \(FEMA\)](#)



1325 East West Highway
Silver Spring, MD 20910
[Questions?](#) [Comments?](#)

[Glossary](#)

[Career Opportunities](#)



<http://www.nws.noaa.gov/om/heat/index.shtml>
Last Updated: July 28, 2014