

## Protecting Workers from the Effects of Heat

At times, workers may be required to work in hot environments for long periods. When the human body is unable to maintain a normal temperature, heat illnesses can occur and may result in death. It is also important to consider that hot work environments may exist indoors. This fact sheet provides information to employers on measures they should take to prevent worker illnesses and death caused by heat stress.

### What is Heat Illness?

The following are illnesses that may result from exposure to heat in the workplace.

**Heat Stroke** is the most serious heat-related health problem. Heat stroke occurs when the body's temperature regulating system fails and body temperature rises to critical levels (greater than 104°F). ***This is a medical emergency that may result in death!*** The signs of heat stroke are confusion, loss of consciousness, and seizures. Workers experiencing heat stroke have a very high body temperature and may stop sweating. If a worker shows

#### Occupational Factors that May Contribute to Heat Illness

- High temperature and humidity
- Low fluid consumption
- Direct sun exposure (with no shade) or extreme heat
- Limited air movement (no breeze or wind)
- Physical exertion
- Use of bulky protective clothing and equipment

signs of possible heat stroke, **get medical help immediately**, and call 911. Until medical help arrives, move the worker to a shady, cool area and remove as much clothing as possible. Wet the worker with cool water and circulate the air to speed cooling. Place cold wet cloths, wet towels or ice all over the body or soak the worker's clothing with cold water.

**Heat Exhaustion** is the next most serious heat-related health problem. The signs and symptoms of heat exhaustion are headache, nausea, dizziness, weakness, irritability, confusion, thirst, heavy sweating and a body temperature greater than 100.4°F. Workers with heat exhaustion should be removed from the hot area and given liquids to drink.

Cool the worker with cold compresses to the head, neck, and face or have the worker wash his or her head, face and neck with cold water. Encourage frequent sips of cool water. Workers with signs or symptoms of heat exhaustion should be taken to a clinic or emergency room for medical evaluation and treatment. Make sure that someone stays with the worker until help arrives. If symptoms worsen, call 911 and get help immediately.

**Heat Cramps** are muscle pains usually caused by the loss of body salts and fluid during sweating. Workers with heat cramps should replace fluid loss by drinking water and/or carbohydrate-electrolyte replacement liquids (e.g., sports drinks) every 15 to 20 minutes.

**Heat Rash** is the most common problem in hot work environments. Heat rash is caused by sweating and looks like a red cluster of pimples or small blisters. Heat rash may appear on the neck, upper chest, groin, under the breasts and elbow creases. The best treatment for heat rash is to provide a cooler, less humid work environment. The rash area should be kept dry. Powder may be applied to increase comfort. Ointments and creams should **not** be used on a heat rash. Anything that makes the skin warm or moist may make the rash worse.

### Prevention Made Simple: Program Elements

Heat Illness Prevention Program key elements include:

- A Person Designated to Oversee the Heat Illness Prevention Program
- Hazard Identification
- Water. Rest. Shade Message
- Acclimatization
- Modified Work Schedules
- Training
- Monitoring for Signs and Symptoms
- Emergency Planning and Response

## ***Designate a Person to Oversee the Heat Stress Program***

Identify someone trained in the hazards, physiological responses to heat, and controls. This person can develop, implement and manage the program.

## ***Hazard Identification***

Hazard identification involves recognizing heat hazards and the risk of heat illness due to high temperature, humidity, sun and other thermal exposures, work demands, clothing or PPE and personal risk factors.

Identification tools include: OSHA's Heat [Smartphone App](#); a Wet Bulb Globe Thermometer (WBGT) which is a measure of heat stress in direct sunlight that takes into account temperature, humidity, wind speed, sun and cloud cover; and the National Weather Service [Heat Index](#). Exposure to full sun can increase heat index values up to 15°F.

## ***Water.Rest.Shade***

Ensure that cool drinking water is available and easily accessible. (Note: Certain beverages, such as caffeine and alcohol can lead to dehydration.)

Encourage workers to drink a liter of water over one hour, which is about one cup every fifteen minutes.

Provide or ensure that fully shaded or air-conditioned areas are available for resting and cooling down.

## ***Acclimatization***

Acclimatization is a physical change that allows the body to build tolerance to working in the heat. It occurs by gradually increasing workloads and exposure and taking frequent breaks for water and rest in the shade. Full acclimatization may take up to 14 days or longer depending on factors relating to the individual, such as increased risk of heat illness due to certain medications or medical conditions, or the environment.

New workers and those returning from a prolonged absence should begin with 20% of the workload on the first day, increasing incrementally by no more than 20% each subsequent day.

During a rapid change leading to excessively hot weather or conditions such as a heat wave, even experienced workers should begin on the first day of work in excessive heat with 50% of the normal workload and time spent in the hot environment, 60% on the second day, 80% on day three, and 100% on the fourth day.

## ***Modified Work Schedules***

Altering work schedules may reduce workers' exposure to heat. For instance:

- Reschedule all non-essential outdoor work for days with a reduced heat index.
- Schedule the more physically demanding work during the cooler times of day;
- Schedule less physically demanding work during warmer times of the day;
- Rotate workers and split shifts, and/or add extra workers.
- Work/Rest cycles, using established industry guidelines.
- Stop work if essential control methods are inadequate or unavailable when the risk of heat illness is very high.

Keep in mind that very early starting times may result in increased fatigue. Also, early morning hours tend to have higher humidity levels.

## ***Training***

Provide training in a language and manner workers understand, including information on health effects of heat, the symptoms of heat illness, how and when to respond to symptoms, and how to prevent heat illness.

## ***Monitoring for Heat Illness Symptoms***

Establish a system to monitor and report the signs and symptoms listed on the previous page to improve early detection and action. Using a buddy system will assist supervisors when watching for signs of heat illness.

## ***Emergency Planning and Response***

Have an emergency plan in place and communicate it to supervisors and workers. Emergency plan considerations include:

- What to do when someone is showing signs of heat illness. This can make the difference between life and death.
- How to contact emergency help.
- How long it will take for emergency help to arrive and training workers on appropriate first-aid measures until help arrives.
- Consider seeking advice from a healthcare professional in preparing a plan.

## ***Engineering Controls Specific to Indoor Workplaces***

Indoor workplaces may be cooled by using air conditioning or increased ventilation, assuming that cooler air is available from the outside. Other methods to reduce indoor temperature include: providing reflective shields to redirect radiant heat, insulating hot surfaces, and decreasing water vapor pressure, e.g., by sealing steam leaks and keeping floors dry. The use of fans to increase the air speed over the worker will improve heat exchange between the skin surface and the air, unless the air temperature is higher than the skin temperature. However, increasing air speeds above 300 ft. per min. may actually have a warming effect. Industrial hygiene personnel can assess the degree of heat stress caused by the work environment and make recommendations for reducing heat exposure.

## **Additional information**

For more information on this and other issues affecting workers or heat stress, visit: [www.osha.gov/heat](http://www.osha.gov/heat); [www.cdc.gov/niosh/topics/heatstress](http://www.cdc.gov/niosh/topics/heatstress); and [www.noaa.gov/features/earthhobs\\_0508/heat.html](http://www.noaa.gov/features/earthhobs_0508/heat.html).

Workers have the right to working conditions that do not pose a risk of serious harm, to receive information and training about workplace hazards and how to prevent them, and to file a complaint with OSHA to inspect their workplace without fear of retaliation.

For more information about workers' rights, see OSHA's workers page at [www.osha.gov/workers.html](http://www.osha.gov/workers.html).

**This is one in a series of informational fact sheets highlighting OSHA programs, policies or standards. It does not impose any new compliance requirements. For a comprehensive list of compliance requirements of OSHA standards or regulations, refer to Title 29 of the Code of Federal Regulations. This information will be made available to sensory-impaired individuals upon request. The voice phone is (202) 693-1999; teletypewriter (TTY) number: (877) 889-5627.**

**For assistance, contact us. We can help. It's confidential.**



**[www.osha.gov](http://www.osha.gov) (800) 321-OSHA (6742)**



U.S. Department of Labor

# OSHA FactSheet

## Working Outdoors in Warm Climates

Hot summer months pose special hazards for outdoor workers who must protect themselves against heat, sun exposure, and other hazards. Employers and employees should know the potential hazards in their workplaces and how to manage them.

### Sun

Sunlight contains ultraviolet (UV) radiation, which causes premature aging of the skin, wrinkles, cataracts, and skin cancer. There are no safe UV rays or safe suntans. Be especially careful in the sun if you burn easily, spend a lot of time outdoors, or have any of the following physical features: numerous, irregular, or large moles; freckles; fair skin; or blond, red, or light brown hair. Here's how to block those harmful rays:

- Cover up. Wear loose-fitting, long-sleeved shirts and long pants.
- Use sunscreen with a sun protection factor (SPF) of at least 30. Be sure to follow application directions on the bottle or tube.
- Wear a hat. A wide brim hat, not a baseball cap, works best because it protects the neck, ears, eyes, forehead, nose, and scalp.
- Wear UV-absorbent sunglasses (eye protection). Sunglasses don't have to be expensive, but they should block 99 to 100 percent of UVA and UVB radiation. Before you buy sunglasses, read the product tag or label.
- Limit exposure. UV rays are most intense between 10 a.m. and 4 p.m.

OSHA Card—Protecting Yourself in the Sun  
[www.osha.gov/Publications/osha3166.pdf](http://www.osha.gov/Publications/osha3166.pdf)

### Heat

The combination of heat and humidity can be a serious health threat during the summer months. If you work outside (for example, at a beach resort, on a farm, at a construction site) or in a kitchen, laundry, or bakery you may be at increased risk for heat-related illness. So, take precautions. Here's how:

- Drink small amounts of water frequently.
- Wear light-colored, loose-fitting, breathable clothing—cotton is good.

- Take frequent short breaks in cool shade.
- Eat smaller meals before work activity.
- Avoid caffeine and alcohol or large amounts of sugar.
- Work in the shade.
- Find out from your health care provider if your medications and heat don't mix.
- Know that equipment such as respirators or work suits can increase heat stress.

There are three kinds of major heat-related disorders—heat cramps, heat exhaustion and heat stroke. You need to know how to recognize each one and what first aid treatment is necessary.

OSHA Heat Stress Fact Sheet:

[www.osha.gov/OshDoc/data\\_Hurricane\\_Facts/heat\\_stress.pdf](http://www.osha.gov/OshDoc/data_Hurricane_Facts/heat_stress.pdf)

OSHA Heat Stress Quick Card:

[www.osha.gov/Publications/osha3154.pdf](http://www.osha.gov/Publications/osha3154.pdf)

### Lyme Disease/Tick-Borne Diseases

These illnesses (i.e., Rocky Mountain spotted fever) are transmitted to people by bacteria from bites of infected deer (blacklegged) ticks. In the case of Lyme disease, most, but not all, victims will develop a "bulls-eye" rash. Other signs and symptoms may be non-specific and similar to flu-like symptoms such as fever, lymph node swelling, neck stiffness, generalized fatigue, headaches, migrating joint aches, or muscle aches. You are at increased risk if your work outdoors involves construction, landscaping, forestry, brush clearing, land surveying, farming, railroads, oil fields, utility lines, or park and wildlife management. Protect yourself with these precautions:

- Wear light-colored clothes to see ticks more easily.

- Wear long sleeves; tuck pant legs into socks or boots.
- Wear high boots or closed shoes that cover your feet completely.
- Wear a hat.
- Use tick repellants, but not on your face.
- Shower after work. Wash and dry your work clothes at high temperature.
- Examine your body for ticks after work. Remove any attached ticks promptly and carefully with fine-tipped tweezers by gripping the tick. Do not use petroleum jelly, a hot match, or nail polish to remove the tick.

OSHA Lyme Disease Fact Sheet:  
[www.osha.gov/OshDoc/data\\_LymeFacts/lyme fac.pdf](http://www.osha.gov/OshDoc/data_LymeFacts/lyme fac.pdf)

### West Nile Virus

West Nile virus is transmitted by the bite of an infected mosquito. Mild symptoms include fever, headache, and body aches, occasionally with a skin rash on the trunk of the body and swollen lymph glands. Symptoms of severe infection include headache, high fever, neck stiffness, stupor, disorientation, coma, tremors, convulsions, muscle weakness, and paralysis. You can protect yourself from mosquito bites in these ways:

- Apply Picaridin or insect repellent with DEET to exposed skin.
- Spray clothing with repellents containing DEET or permethrin. (Note: Do not spray permethrin directly onto exposed skin.)
- Wear long sleeves, long pants, and socks.
- Be extra vigilant at dusk and dawn when mosquitoes are most active.
- Get rid of sources of standing water (used tires, buckets) to reduce or eliminate mosquito breeding areas.

OSHA West Nile Virus Fact Sheet:  
[www.osha.gov/OshDoc/data\\_Hurricane\\_Facts/west\\_nile\\_virus.pdf](http://www.osha.gov/OshDoc/data_Hurricane_Facts/west_nile_virus.pdf)

OSHA Safety and Health Information Bulletin:  
 “Workplace Precautions Against West Nile Virus”

<http://www.osha.gov/dts/shib/shib082903b.pdf>

### Poison Ivy-Related Plants

Poison ivy, poison oak and poison sumac have poisonous sap (urushiol) in their roots, stems, leaves and fruits. The urushiol may be deposited on the skin by direct contact with the plant or by contact with contaminated objects, such as clothing, shoes, tools, and animals.

Approximately 85 percent of the general population will develop an allergy if exposed to poison ivy, oak or sumac. Forestry workers and firefighters who battle forest fires have developed rashes or lung irritations from inhaling the smoke of burning plants.

- Wear long-sleeved shirts and long pants, tucked into boots. Wear cloth or leather gloves.
- Apply barrier creams to exposed skin.
- Educate workers on the identification of poison ivy, oak, and sumac plants.
- Educate workers on signs and symptoms of contact with poisonous ivy, oak, and sumac.
- Keep rubbing alcohol accessible. It removes the oily resin up to 30 minutes after exposure.

OSHA Web Page—Poisonous Plants:  
[www.osha.gov/SLTC/etools/sawmills/poison.html](http://www.osha.gov/SLTC/etools/sawmills/poison.html)

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For more complete information:



U.S. Department of Labor

[www.osha.gov](http://www.osha.gov)  
 (800) 321-OSHA



# OSHA ALERT

## Prevent Heat Illness at Work

Outdoor and indoor heat exposure can be dangerous.

Nearly **3 out of 4 heat illness fatalities** happen during the **first week of work**. New and returning workers need to build tolerance to heat by taking frequent breaks and working shorter shifts in the heat to start.

Dangerous heat exposure can occur indoors or outdoors, in any season. Employers can keep workers safe by following these simple safety practices:

- **Follow the 20% Rule** — on the 1<sup>st</sup> day, don't allow employees to work more than 20% of a shift at full intensity in the heat. Increase their time by no more than 20% a day until they are used to working in the heat.
- **Provide cool drinking water** – encourage workers to drink at least one cup every 20 minutes, even if they are not thirsty.
- **Rest breaks** — allow workers time to recover from heat in a shady or cool location.
- **Dress for the heat** — have workers wear a hat and light-colored, loose-fitting, breathable clothing if possible.
- **Watch out for each other** — encourage workers to monitor themselves and others for signs of heat illness.
- **Look for any signs of heat illness**, including fainting, dizziness, nausea, and muscle spasms, and act quickly — when in doubt, **call 911**.
- **Offer training** on the hazards of heat exposure and how to prevent illness.
- **Develop an Emergency Action Plan** on what to do if a worker shows signs of heat-related illness.

To learn more about heat illness prevention and first aid, visit [www.osha.gov/heat](http://www.osha.gov/heat).

**Prevent Heat Illness at Work**  
Outdoor and indoor heat exposure can be dangerous.

**Ways to Protect Yourself and Others**

- Follow the 20% Rule**: Nearly 3 out of 4 fatalities from heat illness happen during the first week of work. New and returning workers need to build tolerance to heat (acclimatize) and take frequent breaks. Follow the 20% rule. On the first day, work no more than 20% of the shift's duration at full intensity in the heat. Increase the duration of work at full intensity by no more than 20% a day until workers are used to working in the heat.
- Drink Cool Water**: Drink cool water every 20 minutes, even if you're not thirsty — at least 1 cup every 20 minutes.
- Take Heat Breaks**: Take enough time to recover from heat given the temperature, humidity, and conditions.
- Find Shade or a Cool Area**: Take breaks in a designated shady or cool location.
- Dress for the Heat**: Wear a hat and light-colored, loose-fitting, and breathable clothing if possible.
- Watch Out for Each Other**: Monitor yourself and others for signs of heat illness.
- If Wearing a Face Covering**: Change your face covering if you get wet or soiled. Verify that it offers frequent.

**First Aid for Heat Illness**

**The following are signs of a medical emergency!**

- Altered thinking or behavior
- Slurred speech
- Seizures
- Loss of consciousness

1. CALL 911 IMMEDIATELY  
2. COOL THE WORKER RIGHT AWAY WITH WATER OR ICE  
3. STAY WITH THE WORKER UNTIL HELP ARRIVES

**Watch for any other signs of heat illness and act quickly. When in doubt, call 911.**

**If a worker experiences:**

- Headache or nausea
- Weakness or dizziness
- Heavy sweating or hot, dry skin
- Elevated body temperature
- Thirst
- Decreased urine output

**Take these actions:**

- Move to a cool area
- Remove unnecessary clothing
- Move to a cooler area
- Cool with water, ice, or a fan
- Do not have alcohol
- Seek medical care if needed

For more information: 1-800-321-OSHA (6742)  
TTY 1-877-889-9627 [www.osha.gov/heat](http://www.osha.gov/heat)

OSHA Occupational Safety and Health Administration

OSHA alerts are issued on occasion to draw attention to worker safety and health issues and solutions.

## Protecting Workers from Heat Stress

### Heat Illness

Exposure to heat can cause illness and death. The most serious heat illness is heat stroke. Other heat illnesses, such as heat exhaustion, heat cramps and heat rash, should also be avoided.

There are precautions that can be taken any time temperatures are high and the job involves physical work.

### Risk Factors for Heat Illness

- High temperature and humidity, direct sun exposure, no breeze or wind
- Heavy physical labor
- No recent exposure to hot workplaces
- Low liquid intake
- Waterproof clothing

### Symptoms of Heat Exhaustion

- Headache, dizziness, or fainting
- Weakness and wet skin
- Irritability or confusion
- Thirst, nausea, or vomiting

### Symptoms of Heat Stroke

- May be confused, unable to think clearly, pass out, collapse, or have seizures (fits)
- May stop sweating

### To Prevent Heat Illness:

- Establish a complete heat illness prevention program.
- Provide training about the hazards leading to heat stress and how to prevent them.
- Provide a lot of cool water to workers close to the work area. At least one pint of water per hour is needed.



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- Modify work schedules and arrange frequent rest periods with water breaks in shaded or air-conditioned areas.
- Gradually increase workloads and allow more frequent breaks for workers new to the heat or those that have been away from work to adapt to working in the heat (acclimatization).
- Designate a responsible person to monitor conditions and protect workers who are at risk of heat stress.
- Consider protective clothing that provides cooling.



## How to Protect Workers

- Know signs/symptoms of heat illnesses; monitor yourself; use a buddy system.
- Block out direct sun and other heat sources.
- Drink plenty of fluids. Drink often and BEFORE you are thirsty. Drink water every 15 minutes.
- Avoid beverages containing alcohol or caffeine.
- Wear lightweight, light colored, loose-fitting clothes.



## What to Do When a Worker is Ill from the Heat

- Call a supervisor for help. If the supervisor is not available, call 911.
- Have someone stay with the worker until help arrives.
- Move the worker to a cooler/shaded area.
- Remove outer clothing.
- Fan and mist the worker with water; apply ice (ice bags or ice towels).
- Provide cool drinking water, if able to drink.

IF THE WORKER IS NOT ALERT or seems confused, this may be a heat stroke. CALL 911 IMMEDIATELY and apply ice as soon as possible.



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For more information:



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