Heat Injury and Illness Prevention

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Heat Illness Prevention Campaign

OSHA's Campaign

OSHA's Heat Illness Prevention campaign, launched in 2011, educates employers and workers on the dangers of working in the heat. Through training sessions, outreach events, informational sessions, publications, social media messaging and media appearances, millions of workers and employers have learned how to protect workers from heat. Our safety message comes down to three key words: **Water. Rest. Shade.**

Dangers of Working in the Heat

Every year, dozens of workers die and thousands more become ill while working in extreme heat or humid conditions. There are a range of heat illnesses and they can affect anyone, regardless of age or physical condition.

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Employer Responsibility to Protect Workers

Under OSHA law, employers are responsible for providing workplaces free of known safety hazards. This includes protecting workers from extreme heat. An employer with workers exposed to high temperatures should establish a complete heat illness prevention program.

- Provide workers with water, rest and shade.
- Allow new or returning workers to gradually increase workloads and take more frequent breaks as they acclimatize, or build a tolerance for working in the heat.
- Plan for emergencies and train workers on prevention.
- Monitor workers for signs of illness.

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Planning and Supervision

Heat-related illness can affect workers in many industries, at indoor or outdoor worksites.

Some job-related risk factors include:

- Outdoor work in warm weather
- Heat sources such as ovens, fires, or hot tar
- Strenuous physical activity
- Heavy or non-breathable work clothes

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Creation of a Heat Illness Prevention Plan

Employers should create a written plan to prevent heat-related illness. Use the tools on this presentation to help. Important elements to consider when creating the heat plan are:

- Who will provide oversight on a daily basis?
- How will new workers gradually develop heat tolerance?
- Temporary workers may be more susceptible to heat and require closer supervision.
- Workers returning from extended leave (typically defined as more than two weeks) may also be at increased risk.

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Creation of a Heat Illness Prevention Plan

- How will the employer ensure that first aid is adequate and the protocol for summoning medical assistance in situations beyond first-aid is effective?
- What engineering controls and work practices will be used to reduce heat stress?
- How will heat stress be measured?
- How to respond when the National Weather Service issues a heat advisory or heat warning?
- How will we determine if the total heat stress is hazardous?
- What training will be provided to workers and supervisors?

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Day-to-Day Supervision

Heat conditions can change rapidly and management commitment to adjusting heat stress controls is critical to prevent heat illness. An individual at the worksite should be responsible for monitoring conditions and implementing the employer's heat plan ***throughout the workday***. This individual can be a foreman, jobsite supervisor, plant manager, safety director, or anyone else with the proper training.

Proper training includes knowing how to:

- Identify and control heat hazards
- Recognize early symptoms of heat stress
- Administer first aid for heat-related illnesses
- Activate emergency medical services quickly when needed

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Monitoring Heat Illness

Ideally, the individual who is responsible for the heat plan should be on-site, where the workers are. On-site monitoring allows accurate determination of heat stress. In some industries with a widely distributed workforce, such as mail and package delivery, on-site monitoring might not be feasible. In those cases, the responsible individual at the site should be fully trained on the means and methods to contact and report to the employer any adverse heat related conditions that may develop on the site as well as any signs and symptoms of heat related illness experienced by any of the workers. The responsible individual in a central location should estimate heat stress using the best available methods for remote estimation.

Heat-Related Illnesses and First Aid

Several heat-related illnesses can affect workers. Some of the symptoms are non-specific. This means that when a worker is performing physical labor in a warm environment, any unusual symptom can be a sign of overheating.

Heat stroke

- Confusion
- Slurred speech
- Unconsciousness
- Seizures
- Heavy sweating or hot, dry skin
- Very high body temperature
- Rapid heart rate

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Heat exhaustion	▪ Fatigue ▪ Irritability ▪ Thirst ▪ Nausea or vomiting ▪ Dizziness or lightheadedness ▪ Heavy sweating ▪ Elevated body temperature or fast heart rate
Heat cramps	▪ Muscle spasms or pain ▪ Usually in legs, arms, or trunk

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Heat syncope	▪ Fainting ▪ Dizziness
Heat rash	▪ Clusters of red bumps on skin ▪ Often appears on neck, upper chest, and skin folds
Rhabdomyolysis (muscle breakdown)	▪ Muscle pain ▪ Dark urine or reduced urine output ▪ Weakness

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Employers and workers should become familiar with the heat symptoms. When any of these symptoms is present, promptly provide first aid. Do not try to diagnose which illness is occurring. Diagnosis is often difficult because symptoms of multiple heat-related illnesses can occur together. Time is of the essence. These conditions can worsen quickly and result in fatalities.

When in doubt, cool the worker and call 911.

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First Aid

OSHA's Medical Services and First Aid standard and the Medical Service and First Aid in Construction require the ready availability of first aid personnel and equipment. First aid for heat-related illness involves the following principles:

Take the affected worker to a cooler area (e.g., shade or air conditioning). Cool the worker immediately. Use active cooling techniques such as:

- Immerse the worker in cold water or an ice bath. Create the ice bath by placing all of the available ice into a large container with water, standard practice in sports. **This is the best method to cool workers rapidly in an emergency**.
- Remove outer layers of clothing, especially heavy protective clothing.
- Place ice or cold wet towels on the head, neck, trunk, armpits, and groin.
- Use fans to circulate air around the worker.

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Never leave a worker with heat-related illness alone. The illness can rapidly become worse. Stay with the worker. When in doubt, call 911!

Confusion, slurred speech, or unconsciousness are signs of heat stroke. **When these types of symptoms are present, call 911 immediately and cool the worker with ice or cold water until help arrives**.

Workers who are new to working in warm environments are at increased risk of heat-related illness. See the Protecting New Workers section of this website for more details. Especially d**uring a worker's first few days, absolutely all symptoms should be taken seriously. Workers who develop symptoms should be allowed to stop working. They should receive evaluation for possible heat-related illness**.

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Prevention

Heat-related illnesses can be prevented. Prevention requires employers and workers to recognize heat hazards. Management should commit to:

- Take extra precautions to protect new workers.
- Train supervisors and workers to control and recognize heat hazards.
- Determine, for each worker throughout each workday, whether total heat stress is too high, both from the conditions of that day and recognizing carryover effect possibilities.
- Implement engineering and administrative controls to reduce heat stress.
- Provide sufficient rest, shade, and fluids.

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Personal Risk Factors

Some workers handle heat stress less effectively than others. Heat intolerance happens for a variety of reasons. Personal risk factors include:

- Obesity (body mass index ≥ 30 kg/m^2)
- Diabetes
- High blood pressure
- Heart disease
- Lower level of physical fitness
- Use of certain medications such as diuretics (water pills) and some psychiatric or blood pressure medicines
- Some medications can result in a worker's inability to feel heat conditions and/or the inability to sweat, so symptoms of heat stress may not be evident.
- Alcohol use
- Use of illicit drugs such as opioids, methamphetamine, or cocaine

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The above list is not comprehensive. Other medical conditions can also predispose workers to heat-related illnesses.

Employers should recognize that not all workers tolerate heat the same way. Workplace controls should focus on making jobs safe for all the employees. An occupational medical monitoring program can identify workers who are at increased risk of heat illness, while maintaining the confidentiality of workers' health information.

When heat hazards are present, workers should receive training about personal factors that can make them more susceptible to heat-related illness. When in doubt, workers should talk to their healthcare provider about whether they can work safely in the heat.

Physiologic Monitoring

Workers' bodies produce automatic responses to cope with heat stress. Heart rate increases. Sweating becomes more profuse. Eventually skin temperature and core body temperature rise.

These physiologic responses can be measured by workers or employers. Physiologic monitoring has several advantages over other methods of monitoring heat stress:

- Physiologic responses provide a direct and individualized measurement of each worker's response to heat stress.

- Physiologic measurements can be used to monitor the worker's level of heat tolerance. Impermeable clothing, such as chemical protective suits, prevents cooling by sweating and may contribute to heat illness at lower temperatures.

Environmental monitoring (i.e., WBGT) does not give an accurate indication of these workers' heat stress. Physiologic monitoring, such as heart rate measurement, should be used to determine whether their heat stress is too high.
Heart rate is the easiest physiologic parameter to measure. A timepiece is the only required equipment. Workers can be trained to count their pulse. More sophisticated devices, such as heart rate monitor wristwatches, are also available.

Some employers also monitor weight changes during a work shift as a measure of water loss from sweating.

Body temperature can be measured by thermometers. Oral, skin, and aural (eardrum) thermometers are less invasive than core body temperature measurements. Caution should be used when interpreting temperature measurements, because environmental heat might affect some thermometers.

Standards

Under the General Duty Clause, Section 5(a)(1) of the Occupational Safety and Health Act of 1970, employers are required to provide their employees with a place of employment that "is free from recognized hazards that are causing or likely to cause death or serious harm to employees." The courts have interpreted OSHA's general duty clause to mean that an employer has a legal obligation to provide a workplace free of conditions or activities that either the employer or industry recognizes as hazardous and that cause, or are likely to cause, death or serious physical harm to employees when there is a feasible method to abate the hazard. This includes heat-related hazards that are likely to cause death or serious bodily harm.

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Additional Resources

The following documents provide detailed guidance about controlling occupational heat exposure. Many of the recommendations on this website were adapted from these sources:

- NIOSH. 2016. Criteria for a Recommended Standard: Occupational Exposure to Heat and Hot Environments. Chapter 1 and Figures 8-1 and 8-2 provide a good overview of the recommendations. The remaining chapters contain more detailed information.
- ACGIH. 2017 TLVs® and BEIs®. Thermal stress: heat stress and heat strain.
- OSHA Technical Manual (OTM) Section III: Chapter 4-Heat Stress.
- Department of the Army and Air Force. 2003. TB MED 507: Heat Stress Control and Heat Casualty Management. This document provides guidelines to protect military personnel from heat stress.

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Heat-Related Illnesses and First Aid

- OSHA Technical Manual (OTM) Section III: Chapter 4-Heat Stress. See Section II, entitled "Heat-related Illness."
- NIOSH. 2016. Criteria for a Recommended Standard: Occupational Exposure to Heat and Hot Environments. Section 4.2.
- Common Heat Related Illnesses. National Oceanic and Atmospheric Administration (NOAA), National Weather Service.
- First Aid for Heat Illness. NIOSH. A two-page fact sheet.
- Beat the Heat. CDC podcast about occupational heat-related illness, including a discussion of symptoms.

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Employer Help

Small and medium sized businesses may contact OSHA On-Site Consultation Program for help with identifying and mitigating workplace hazards. OSHA On-Site Consultation Program offers no-cost and confidential occupational safety and health services to small- and medium-sized businesses in all 50 states, the District of Columbia, and several U.S. territories, with priority given to high-hazard worksites. On-Site Consultation services are separate from OSHA enforcement efforts and do not result in penalties or citations. Consultants from local agencies or universities work with employers to identify workplace hazards and how to fix them, provide advice for compliance with OSHA standards, provide training and education, and assist in establishing and improving safety and health programs.

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On-Site Consultation

To locate the OSHA On-Site Consultation Program nearest you, call 1-800-321-6742 (OSHA) or visit www.osha.gov/consultation.

OSHA has developed a printable heat-related illness prevention guide for employers.

Heat Illness Prevention Training Guide, A Lesson Plan for Employers. OSHA. Use this training guide to lead interactive training with workers and supervisors. Can be used with the worksite poster as a training aid.

Also available in Spanish

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www.osha.gov

1-800-321-OSHA (6742)