

Recognizing and preventing heat stress

A comprehensive effort to prevent heat stress will improve worker safety and boost productivity.

By Karen Lewis & Helen Murphy

Hot summer days are ahead, and it is time to refresh our knowledge in the recognition, prevention, and first aid of heat-related disorders. Working outdoors in hot weather can put yourself and employees at risk for heat exhaustion or heat stroke. Heat exhaustion is a serious health problem, and heat stroke can kill.

The Worker Protection Standard requires that pesticide handlers and early entry workers understand how to prevent, recognize, and give correct first aid for heat illness. Employers are required to take any necessary steps to prevent heat illness among workers wearing protective gear. Employers are expected to evaluate their workplaces and determine if their employees will be at risk from heat-related illness during temperature extremes and hot weather. Workplaces must have a safety plan in place to train employees how to recognize symptoms and prevent heat-related illness.

Heat illness, symptoms and first aid

Heat rash. Heat rash is a cluster of pimples or small blisters, also known as prickly heat, caused by clogging of the sweat glands. It becomes a problem with prolonged contact with damp clothing. Keep the affected area dry and clean. Calamine lotion or talcum powder can be applied for relief; avoid ointments or creams.

Heat syncope (fainting). Heat syncope is a brief loss of consciousness that is regained as soon as the person falls to the ground. It occurs in the unacclimatized worker who stands for long periods of time in the heat. Heat syncope (fainting) is the result of blood pooling in the lower legs and feet. Keep the individual lying down with feet raised, cool down with wet cloths and ventilation, provide fluids and then move to a cooler location. The worker should not return to work and should be seen by a medical provider for further evaluation. If fainting occurs in a worker who is performing any substantial labor it should be considered HEAT STROKE until proven otherwise and considered a medical emergency. Cool the victim down by any means and call 911.

Heat cramps. Heat cramps are painful muscle spasms that can occur in the legs, arms, and/or stomach. They usually indicate a temporary fluid and electrolyte imbalance due to

salt depletion. Heat cramps may be accompanied by heavy sweating and thirst, heralding impending heat exhaustion. In this case provide first aid for heat exhaustion (see following). Cramps may happen during work or later in the evening. Treatment consists of replacing the salt with fluids and salty foods or an electrolyte solution such as sports drinks. Salt tablets are not recommended because of the risks of overdosing.

Heat exhaustion. Heat exhaustion may include some or all of the following: profuse, excessive sweating; cool, clammy, pale skin; weakness, and fatigue; dizziness, nausea, and vomiting; weak rapid pulse; and early neurological symptoms such as headache, anxiety, and impaired judgment. Heat exhaustion is due to the reduction of body water content or blood volume. The condition occurs when the amount of water lost (as sweat) exceeds the volume of water taken in during the heat exposure.

If not treated, it can progress to heat stroke.

Treating heat exhaustion

To properly treat a person with heat exhaustion:

—Move victim to a cool/shaded area.

—Place victim slightly on his or her side (in case of impending heat stroke and seizures) with feet raised above heart level.

—Remove excess clothing.

—In case this is early impending heat stroke, cool the worker down using water and ventilation. Wet the skin and remaining clothes with copious amounts of water and fan vigorously.

—Slowly administer sips of water or a sports drink.

—Transfer the worker to a medical facility for further evaluation.

Heat stroke

Heat stroke is the most serious heat-related illness and is a medical emergency. Victims of heat stroke usually die unless treated promptly. The higher the temperature and the longer it stays up, the greater risk of dying. Heat stroke is caused by the body's inability to regulate the body core temperature. In about 50 to 75 percent of individuals, sweating slows or stops completely, preventing the body from releasing the excess heat.

The signs and symptoms are the same as heat exhaustion but differ in that stroke victims have altered mental functioning (irrational behavior, psychosis, aggressive behavior, incoherent speech), a high body temperature (104.5°F or more), HOT skin that may be red and dry, and a rapid pulse. The person may pass out, convulse, and slip into a coma.

A worker who becomes irrational, confused or collapses on the job should be considered a heat stroke victim—act quickly and call for medical help immediately. Early

recognition of symptoms and prompt emergency treatment is the key to aiding someone with heat stroke.

Call 911. While waiting for medical assistance, IMMEDIATELY cool the victim down by any means available. Get the individual into the shade or cooler environment and remove outer clothing.

Place victim slightly to the side (in case of seizures) with feet raised above heart level.

Cool down the body by WATER and VENTILATION. Wet the skin and remaining clothes with copious amounts of water and FAN vigorously.

If available, immerse body in tub of ice water, while being sure to maintain the airway.

Preventing heat stress

Acclimate to the heat. An acceptable schedule for achieving acclimatization is found in the figure “Acclimatization Schedule.” This schedule should be followed for new employees and those returning after being absent two weeks or longer. To become properly acclimated, a person must work in the heat at the activity level required by the job. Handlers and others may adjust to the heat naturally if the temperatures rise gradually.

Drink plenty of water. Relying on when you feel thirsty or how much you perspire to dictate when you drink is not a good rule to follow. By the time you are thirsty, you are already about 2 percent dehydrated. Heat illness kicks in at about 3 percent dehydration and heat stroke at about 8 percent dehydration. One quart (about 1 liter) per hour is the standard recommendation for prevention of dehydration. It should not be consumed all at once. Safest is 1 cup (8 oz.) every 15 minutes or a pint (500 cc) every half hour. Cool water (50-59°F) or sports drinks with electrolytes are the best choices. Caffeinated products (Red Bull, colas) do not hydrate and in fact are risk factors for heat illness. Employers and managers must impress upon piece-rate workers the need and benefits of staying hydrated; this group may be inclined to not take the time for water and resulting restroom breaks. Bottom line is that if an employee is not urinating, he or she is not adequately hydrated.

Limit exposure to the heat and sunlight. On days when temperatures are predicted to be in the 90s and higher, schedule as many activities as practical for the coolest part of the day.

Take rest breaks. Rest breaks should be scheduled at frequent and regular intervals, in a cool and shaded area. Anyone experiencing extreme heat discomfort should rest immediately.

PE selection. PPE (Personal Protective Equipment) selection can be a significant step in prevention of heat-related illnesses. PPE interferes with the body’s natural cooling system, and overheating can quickly become a problem. Follow the label requirements for PPE, but do not “overprotect” when heat stress is a concern. It is better to delay the tasks. In general, the more protective the PPE, the more it adds to the heat load. When it

is possible and safe to do so, choose woven fabrics over nonwoven polyolefin, plastic, treated, or rubberized fabrics. Woven fabrics tend to “breathe” while the latter do not. The buddy system works. If you have employees working in isolated areas set up a buddy system. Instruct the pairs to stay in close communication with each other throughout the day. Make sure each person knows how to recognize heat stress symptoms, provide basic first aid, and have a way to call for assistance. Quite often, a coworker will see the signs and symptoms of heat stress before the person who is suffering from the illness. At the very minimum, ensure that there is increased communication with workers working alone on hot days.

A comprehensive program to prevent heat illness in workers will protect health, improve safety, and increase productivity.

Acclimatization schedule

Acclimatization time Work load/Time exposure

Day 1 50%

Day 2 60%

Day 3 70%

Day 4 80%

Day 5 90%

PESTICIDE POISONING OR HEAT EXHAUSTION?

Heat Exhaustion

- Sweating
- Headache
- Fatigue
- Nervous system problems
 - Loss of coordination
 - Confusion
 - Loss of consciousness
 - Wakes up*
- *Dry* mucous membranes
 - Dry mouth
 - No tears
 - No spit
- *Dilated* pupils
- Nausea

Organophosphate - Carbamate Poisoning

- Sweating
- Headache
- Fatigue
- Nervous system problems
 - Loss of coordination
 - Confusion
 - Loss of consciousness
 - Coma, *does not wake up*
- *Moist* mucous membranes
 - Salivation
 - Tearing
 - Spit present
- *Small* pupils
- Nausea and *diarrhea*

HEAT STRESS TRAINING ASSISTANCE

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Washington State Department of Labor and Industries

Contact your local L & I office for a consultation appointment

OR contact Paul Snow, Division of Occupational Safety and Health

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Online Information and Resources

Department of Labor and Industries

www.LNI.wa.gov/safety/topics/AtoZ/heatstress

This web site is comprehensive. It includes timely and user-friendly training resources from various sources and information on Web-based training courses. Most of the training materials are available in both English and Spanish.