

WORKERS' GUIDE TO HEAT STRESS

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Heat stress can be a serious problem in hot working environments. The core body temperature for a human must be maintained within a very narrow range, regardless of work load or adverse environmental conditions. An increase in core body temperature of 6.5½F above normal can result in death. The body initially responds to heat by sweating and by circulating blood closer to the skin's surface to lower the main body temperature.

When exposure to heat takes place over an extended period, a process of physiological adaptation called acclimatization occurs. Acclimatization may take weeks, although significant adaptation occurs within a few days of the first exposure. Once acclimatization is achieved, working in the heat results in increased production of a more dilute sweat and less of an increase in heart rate and body temperature.

HEAT RELATED DISORDERS

High temperatures, high humidity, sunlight, and heavy workloads increase the likelihood of heat stress. Too much heat can also make workers lose their concentration or become fatigued or irritable and thus increases the chance of accidents and injuries. Understanding how to deal with heat stress can help to prevent or reduce accidents and is important to workers' health and well-being.

Heat rash is an early signal of potential heat stress. It is commonly associated with hot, humid conditions in which skin and clothing remain damp due to unevaporated sweat. Heat rash may involve small areas of the skin or the entire torso. Even after the affected area of skin is healed, sweat production will not return to normal for another 4 to 6 weeks. Treatments include cleaning the affected area and applying mild lotions to it. Keeping the skin clean and dry for at least 12 hours each day will prevent severe heat rash.

Heat syncope is characterized by dizziness or fainting while standing still in the heat for an extended period. Heat syncope is the least serious of heat-induced disorders. Its most serious aspect is that it may cause people to fall or injure themselves while operating machinery.

Heat cramp symptoms include painful cramps or spasms in the legs, arms, or abdomen. The victim will probably sweat heavily. Spasms may occur during work or in the evening after work. Heat cramps are often caused by a temporary fluid and salt imbalance during hard physical work in hot environments.

Heat exhaustion results from 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 drunk during the heat exposure. The victim of heat exhaustion may have some or all of the signs or symptoms: heavy sweating; clammy, flushed, or pale skin; weakness; dizziness; nausea; rapid and shallow breathing; headache; vomiting; or fainting.

First-aid treatments for heat exhaustion consist of the following:

- Move the victims to a cool area.
- Place them on their backs with their feet raised.
- Loosen clothing and apply cool, moist cloths to the body, or fan the victim.
- Slowly administer sips of salt water (plain water for those with heart or blood pressure problems).
- Call a Occupational Health Services at Olin, especially if victims faint or vomit.

Heat stroke is a life-threatening, heat-related disorder associated with working under very hot and humid conditions. Heat stroke can result in coma or death. The early signs and symptoms of heat stroke include:

- a high body temperature, 104½F or over,
- hot, dry skin that appears bluish or red;
- absence of sweat in 50 to 75 percent of victims;
- rapid heart rate;
- dizziness, shivering, nausea, irritability, and severe headache progressing to mental confusion, convulsions, and unconsciousness.

A worker who becomes irrational or confused or collapses on the job should be considered a heat stroke victim, and medical help should be called immediately. Early recognition of symptoms and prompt emergency treatment is the key to aiding someone with heat stroke. While awaiting the ambulance, begin efforts to cool the victim down by performing the following:

- Move the victim to a cooler environment and remove outer clothing.
- Wet the skin with water, and fan vigorously or repeatedly apply cold packs or immerse the victim in a tub of cool (not ice) water.
- If no water is available, fanning will help promote cooling.

PREVENTING HEAT STRESS

Acclimatization (to heat) is a process of adaptation that involves a stepwise adjustment to heat over a week or sometimes longer. An acceptable schedule for achieving acclimatization is to limit occupational heat exposure to one-third of the work day during the first and second days, one-half of the workday during the third and fourth days, and two-thirds of the workday during the fifth and sixth days. The acclimatization procedure must be repeated after days off due to illness or a vacation of one week or more. To achieve acclimation, a person must work in the heat at the activity level required by the job.

Always drink plenty of water when in the heat. Simply relying on feeling thirsty will not ensure adequate hydration. To replace the four to eight quarts of sweat that may be produced in hot environments, people require one-half to one cup of water every 20 minutes of the workday. Water at 55½F is preferable to ice water or warm water.

- Limit exposure time. Schedule as many hot activities as practical for the coolest part of the day (early morning or late afternoon).
- Employ additional help or increase mechanical assistance if possible.
- Minimize heat exposure by taking advantage of natural or mechanical ventilation (increased air velocities up to 5 mph increase the rate of evaporation and thus the rate of heat loss from the body) and heat shields when applicable.
- Take rest breaks at frequent, regular intervals, preferably in a cool environment sheltered from direct sunlight. Anyone experiencing extreme heat discomfort should rest immediately.
- Wear clothing that is permeable to air and loose fitting. Generally less clothing is desirable in hot environments, except when a person is standing next to a radiant heat source. Then covering exposed skin is beneficial to reducing heat stress.

Adapted from "Preventing Heat Stress in Agriculture", New Jersey Agriculture Experiment Station Fact Sheet FS747