A Union of Professionals

WORK SHOULDN'T HURT

The Hazards of Heat

It's hot out there! High humidity and high temperatures can be a dangerous combination. Our bodies are good at adapting to these bad conditions—but only to a certain point. Our bodies maintain a fairly constant internal temperature, even when we are being exposed to varying environmental temperatures.

To keep internal body temperatures within safe limits, the body must get rid of its excess heat, primarily through varying the rate and amount of blood circulation through the skin and the release of fluid onto the skin by the sweat glands. Sweating helps cool us down.

These automatic responses usually occur when the temperature of the blood exceeds 98.6 degrees Fahrenheit. However, *sweating does not cool the body unless the moisture is removed from the skin by evaporation*.

In this process of lowering internal body temperature, the heart begins to pump more blood; blood vessels expand to accommodate the increased flow; and the microscopic blood vessels (capillaries) that thread through the upper layers of the skin begin to fill with blood.

The blood circulates closer to the surface of the skin, and the excess heat is lost to the cooler environment. If heat loss from increased blood circulation through the skin is not adequate, the brain continues to sense overheating and signals the sweat glands in the skin to shed large quantities of sweat onto the skin surface.

Evaporation of sweat cools the skin, eliminating large quantities of heat from the body. As environmental temperatures approach normal skin temperature, cooling of the body becomes more difficult.

If air temperature is as warm as or warmer than the skin, blood brought to the body surface cannot lose its heat.

Under these conditions, the heart continues to pump blood to the body surface, the sweat glands pour liquids containing electrolytes onto the surface of the skin and the evaporation of the sweat becomes the principal effective means of maintaining a constant body temperature.

Preparing for the Heat

We are, to a large extent, capable of adjusting to the heat. This adjustment to heat, under normal circumstances, usually takes about five to seven days; during this time, the body will undergo a series of changes that will make continued exposure to heat more endurable.

On the first day in a hot environment your body temperature, pulse rate and general discomfort will be higher. With each succeeding daily exposure, all of these responses will gradually decrease, while the sweat rate will increase.

When the body becomes acclimated to the heat, you will find it possible to perform work with less strain and distress.

Hot weather conditions of the summer are likely to affect a person who is not acclimatized to heat. Gradual exposure to heat gives the body time to become accustomed to higher environmental temperatures.

Heat disorders in general are more likely to occur among people who have not been given time to adjust to working in the heat or among those who have been away from hot environments and have become accustomed to lower temperatures.

Health problems

Excessive exposure to a hot work environment can bring about a variety of heat-induced disorders.

Heat stroke is the most serious health problem associated with working in hot environments. It occurs when the body's temperature regulatory system fails and sweating becomes inadequate.

- The body's only effective means of removing excess heat is compromised with little warning to the victim that a crisis stage has been reached.
- A heat stroke victim's skin is hot, usually dry, red or spotted. Body temperature is usually 105 degrees Fahrenheit or higher, and the victim is mentally confused, delirious, perhaps having convulsions, or unconscious.
- Unless the victim receives quick and appropriate treatment, death can occur.
- Any person with signs or symptoms of heat stroke requires immediate hospitalization.
- However, first aid should be immediately administered. This includes removing the victim to a cool area, thoroughly soaking the clothing with water, and vigorously fanning the body to increase cooling.
- Further treatment at a medical facility should be directed to the continuation of the cooling process and the monitoring of complications that often accompany the heat stroke.
- Early recognition and treatment of heat stroke are the only means of preventing permanent brain damage or death.

Heat exhaustion includes several clinical disorders having symptoms that may resemble the early symptoms of heat stroke.

- Heat exhaustion is caused by the loss of large amounts of fluid by sweating, sometimes with excessive loss of salt.
- A worker suffering from heat exhaustion still sweats but experiences extreme weakness or fatigue, giddiness, nausea or headache.
- In more serious cases, the victim may vomit or lose consciousness.
- The skin is clammy and moist; the complexion is pale or flushed; and the body temperature is normal or only slightly elevated.
- In most cases, treatment involves having the victim rest in a cool place and drink plenty of liquids.
- Victims with mild cases of heat exhaustion usually recover spontaneously with this treatment. Those with severe cases may require extended care for several days.
- There are no known permanent effects.

Heat cramps are painful spasms of the muscles that occur among those who sweat profusely in heat, drink large quantities of water, but do not adequately replace the body's salt loss.

- The drinking of large quantities of water tends to dilute the body's fluids, while the body continues to lose salt. Shortly thereafter, the low salt level in the muscles causes painful cramps.
- The affected muscles may be in the arms, legs or abdomen, but tired muscles (those used in performing the work) are usually the ones most susceptible to cramps.
- Cramps may occur during or after work hours and may be relieved by taking salted liquids by mouth.

Caution: If you have a heart condition or if you are on a low-sodium diet, consult your physician on managing your condition in a hot work environment.

Fainting happens when a worker who is not accustomed to hot environments and who stands erect and immobile in the heat collapses.

- With enlarged blood vessels in the skin and in the lower part of the body due to the body's attempts to control internal temperature, blood may pool there rather than return to the heart to be pumped to the brain.
- Upon lying down, the worker should soon recover. By moving around, and thereby preventing blood from pooling, the patient can prevent further fainting.

Heat rash, also known as prickly heat, is likely to occur in hot, humid environments where sweat is not easily removed from the surface of the skin by evaporation and the skin remains wet most of the time.

- The sweat ducts become plugged, and a skin rash soon appears. When the rash is extensive or when it is complicated by infection, prickly heat can be very uncomfortable and may reduce a worker's performance.
- The worker can prevent this condition by resting in a cool place part of each day and by regularly bathing and drying the skin.

Number and duration of exposures

Rather than be exposed to heat for extended periods of time during the course of a job, people should, wherever possible, be permitted to distribute the workload evenly over the day and incorporate work-rest cycles.

Work-rest cycles give the body an opportunity to get rid of excess heat, slow down the production of internal body heat, and provide greater blood flow to the skin.

People employed outdoors are especially subject to weather changes. A hot spell or a rise in humidity can create overly stressful conditions.

These practices can help to reduce heat stress:

- Postpone nonessential tasks;
- Permit only those individuals acclimatized to heat to perform the more strenuous tasks; or
- Provide additional people to perform the tasks, keeping in mind that all workers should have the physical capacity to perform the task and that they should be accustomed to the heat.

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Thermal conditions in the workplace

A variety of engineering controls can be introduced to minimize exposure to heat.

- For instance, improving the insulation on a furnace wall can reduce its surface temperature and the temperature of the area around it.
- In a laundry room, exhaust hoods installed over those sources releasing moisture will lower the humidity in the work area.

In general, the simplest and least expensive methods of reducing heat and humidity can be accomplished by opening windows in hot work areas; using fans; or using other methods of creating airflow, such as exhaust ventilation or air blowers.

Rest areas

Providing cool rest areas in hot work environments considerably reduces the stress of working in those environments. There is no conclusive information available on the ideal temperature for a rest area. However, a rest area with a temperature near 76 degrees Fahrenheit appears to be adequate and may even feel chilly to a hot, sweating worker, until acclimated to the cooler environment.

The rest area should be as close to the workplace as possible. Individual work periods should not be lengthened in favor of prolonged rest periods. Shorter but frequent work-rest cycles are the greatest benefit to the worker.

Drinking water

In the course of a day's work in the heat, a worker may produce as much as two to three gallons of sweat. Because so many heat disorders involve excessive dehydration of the body, it is essential that water intake during the workday be about equal to the amount of sweat produced.

Most persons exposed to hot conditions drink less fluids than needed because of an insufficient thirst drive. A worker, therefore, should not depend on thirst to signal when and how much to drink.

Instead, the worker should drink five to seven ounces of fluids every 15 to 20 minutes to replenish the necessary fluids in the body. There is no optimum temperature of drinking water, but most people tend not to drink warm or very cold fluids as readily as they will cool ones.

Whatever the temperature of the water, it must be palatable and readily available to the worker. Individual drinking cups should be provided—never share a drinking cup.

Heat-acclimatized individuals lose much less salt in their sweat than do people who are not adjusted to the heat. The average American diet contains sufficient salt for acclimatized people even when sweat production is high. If, for some reason, salt replacement is required, the best way to compensate for the loss is to add a little extra salt to the food. Salt tablets should not be used.

Special considerations during prolonged heat spells

During unusually hot weather conditions lasting longer than two days, the number of heat illnesses usually increases. This is due to several factors, such as progressive body fluid deficit, loss of appetite (and possible salt deficit), buildup of heat in living and work areas, and breakdown of air-conditioning equipment.

Therefore, it is advisable to make a special effort to adhere rigorously to the above preventive measures during these extended hot spells and to avoid any unnecessary or unusual stressful activity.

Sufficient sleep and good nutrition are important for maintaining a high level of heat tolerance. People who may be at a greater risk of heat illnesses are the obese, the chronically ill and older individuals.

When feasible, the most stressful tasks should be performed during the cooler parts of the day (early morning or at night). Rest periods should be extended to alleviate the increase in the body heat load.

The consumption of alcoholic beverages during prolonged periods of heat can cause additional dehydration. People taking certain medications (e.g., medications for blood pressure control, diuretics or water pills) should consult their physicians to determine if any side effects could occur during excessive heat exposure. Daily fluid intake must be sufficient to prevent significant weight loss during the workday and over the workweek.

For more information, contact the Health and Safety team at 4healthandsafety@aft.org [May 2022]