



TDCJ Risk Management's  
*Training Circular*

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# Heat Wave



## Understanding Heat Related Illness

### A National Problem

Heat kills by taxing the human body beyond its abilities. In a normal year, about 175 Americans succumb to the demands of summer heat.

Among the large continental family of natural hazards, only the cold of winter - not lightning, hurricanes, tornadoes, floods, or earthquakes - takes a greater toll.

In the 40-year period from 1936 through 1975, nearly 20,000 people were killed in the United States by the effects of heat and solar radiation. In the disastrous heat wave of 1980, more than 1,250 people died.

And those are the direct casualties. No one can know how many more deaths are advanced by heat wave weather - how many diseased or aging hearts surrender, which under better conditions would have continued functioning.

North American summers are hot; most summers see heat waves in one section or another of the United States.

East of the Rockies, they tend to combine both high temperatures and high humidity although some of the worst have been catastrophically dry.

### How Heat Affects the Body

Human bodies dissipate heat by varying the rate and depth of blood circulation, by losing water through the skin and sweat glands, and - as the last extremity is reached - by panting, when blood is heated above 98.6 degrees.



The heart begins to pump more blood, blood vessels dilate to accommodate the increased flow, and the bundles of tiny capillaries threading through the upper layers of skin are put into operation.

The body's blood is circulated closer to the skin's surface, and excess heat drains off into the cooler atmosphere. At the same time, water diffuses through the skin as perspiration. The skin handles about 90 percent of the body's heat dissipating function.

Sweating, by itself, does nothing to cool the body, unless the water is removed by evaporation - and high relative humidity retards evaporation.

The evaporation process itself works this way: the heat energy required to evaporate the sweat is extracted from the body, thereby cooling it.

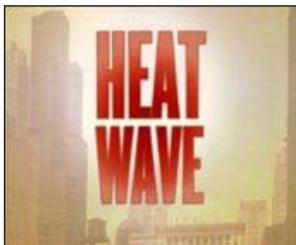
Under conditions of high temperature (above 90 degrees)

and high relative humidity, the body is doing everything it can to maintain 98.6 degrees internally.

The heart is pumping a torrent of blood through dilated circulatory vessels; the sweat glands are pouring liquid - including essential dissolved chemicals, like sodium and chloride - onto the surface of the skin.

### Heat Related Emergencies

Overexposure to the sun or heat can lead to cramps, exhaustion, and even death. Proper protection is essential for preventing sun and heat related illness. Prevention is simple, effective, and by far preferable to treatment.



Proper prevention measures significantly reduce probability of sun and heat related illness. Your actions in identifying and reacting to the signs of heat related illness could mean the difference between life and death.

### The Sun and Radiation

Over-exposure to the sun's ultraviolet rays can have detrimental effects on your skin. Here are some tips you may follow to reduce the risks of skin cancer:

- Avoid midday sun (10:00 am to 4:00 pm)
- Apply a waterproof sunscreen (SPF of 15 or greater)
- Wear tightly woven clothing to block sun
- Wear a broad brimmed hat to shadow face, neck and ears

Also keep in mind that:

- Sunlight reflected from snow and concrete increases the intensity of light on your skin
- Light cloud cover will not block or protect you from ultraviolet sunlight
- Water does not filter most ultraviolet light, thus being underwater (e.g. Snorkeling) will not protect you from the sun.

### Heat Related Illness

Overexposure to heat, humidity, or over exertion of the body can lead to heat related illness. This usually takes one of three forms:

### Heat Cramps

Heat cramps occur most com-

monly in the most worked muscles after heavy exercise in the heat. A high level of humidity, recent ingestion of alcohol, or being over the age of forty may increase the likelihood of heat cramps.



### Treatment for Heat Cramps

- Remove the patient from the hot environment.
- Take the patient into the shade or into a cool sheltered area.
- Have the patient sit or lie down to rest the cramping muscles.
- The patient should attempt to gently stretch the affected muscles.
- Encourage the patient to drink orange or tomato juice, a soft drink or a commercially available sodium balanced thirst quencher.
- Do not give liquids to a patient who is unconscious or not alert.
- Remove any sweat with a damp cloth.

If patient does not get better within 30 minutes, seek further medical attention. Dial 911 if necessary and ask for an ambulance. The paramedic dispatcher will give you further instructions.

Do not provide the patient with more water since this may further dilute the salt levels in the body. It is also not advisable to give the patient a salt-water mix or salt tablets since these may have other negative effects on the patient.

### Heat Exhaustion

Excessive loss of bodily fluids due to prolonged sweating, especially in a hot environment, can lead to heat exhaustion.

#### Symptoms of Heat Exhaustion

- Headache
- Fatigue
- Vomiting
- Nausea
- Thirst
- Giddiness
- Profuse sweating



The patient is usually cold and damp to the touch and skin may appear gray.

#### Treatment of Heat Exhaustion

- Remove the patient from the hot environment.
- Take the patient into the shade, or preferably, into a sheltered, air conditioned environment.



- Remove any extra clothing and loosen any clothing which is tight or restrictive.
- Urge the patient to lie down.
- If the patient is conscious and alert, provide suitable fluids such as tomato or orange juice, soft drinks or other commercially available sodium balanced thirst quenchers.

Further medical attention is highly recommended. Dial 911 and ask for the ambulance. The paramedic dispatcher will give you further instructions.

### Heat Stroke

Heat stroke occurs when the body is subjected to more heat than the body can possibly handle. Heat stroke is a serious medical condition and may lead to death without immediate emergency medical attention.

In heat stroke, body temperature rises too quickly resulting in the death of body tissue.

#### Symptoms of Heat Stroke

- Chills
- Nausea
- Vomiting
- Throbbing in the head
- Disorientation
- Slowing down of sweating

#### Treatment of Heat Stroke

The patient's life depends on rapid emergency medical care. Dial 911 and ask for an ambulance. The paramedic dispatcher will give you further instructions.



The patient's body must be cooled as rapidly as possible. Remove the patient from the hot environment and remove any excessive clothing while waiting for the ambulance.

#### Heat Illness Prevention Slow down

Strenuous activities should be

reduced, eliminated, or re-scheduled to the coolest time of the day. Individuals at risk should stay in the coolest available place, not necessarily indoors.

### **Dress for summer**

Lightweight, light-colored clothing reflects heat and sunlight, and helps your body maintain normal temperatures.



### **Put less fuel on your inner fires**

Foods (like proteins) that increase metabolic heat production also increase water loss.

### **Drink plenty of water or other non-alcoholic fluids**



Your body needs water to keep cool. Drink plenty of fluids even if you don't feel thirsty. Persons who (1) have epilepsy or heart, kidney, or liver disease, (2) are on fluid

restrictive diets, or (3) have a problem with fluid retention should consult a physician before increasing their consumption of fluids.

### **Do not drink alcoholic beverages**

### **Do not take salt tablets unless specified by a physician**

Persons on salt restrictive diets should consult a physician before increasing their salt intake.

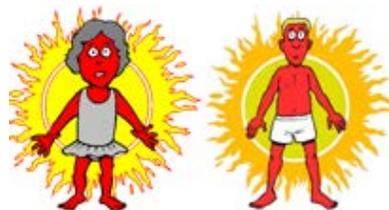
### **Spend more time in air-conditioned places**

Air conditioning in homes and other buildings markedly reduces danger from the heat.

If you cannot afford an air conditioner, spending some time each day (during hot weather) in an air-conditioned environment affords some protection.

### **Don't get too much sun**

Sunburn makes the job of heat dissipation that much more difficult.



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