



Alert# 10-03



## HEAT INJURIES

As temperatures rise the exposure to the summer elements may result in related mishaps. It is imperative that we increase awareness of heat related injuries and their cause. We must keep our members safe and alert as they participate in all CAP activities.

Operations involving high ambient temperatures and high humidity, direct physical contact with hot objects (i.e. aircraft or vehicles), or strenuous physical activities have a high potential for inducing heat stress and heat related injuries in people engaged in such operations.

AFFECTED WINGS: ALL  
AFFECTED DUTY POSITIONS: ALL  
PUBLISHED: June 17, 2010  
EFFECTIVE: Immediately  
REFERENCES: CAPR 62-2

### CAUSAL FACTORS

- I. Age, weight, degree of physical fitness, degree of acclimatization, metabolism, medications and a variety of medical conditions such as asthma, emphysema may affect a person's sensitivity to heat and may adversely impair an individual's ability to deal with heat. However, even the type of clothing worn must be considered. Prior heat injury predisposes an individual to additional injury.
- II. It is difficult to predict just who will be affected and when, because individual susceptibility varies. In addition, environmental factors include more than the ambient air temperature. Radiant heat, air movement, conduction, and relative humidity all affect an individual's response to heat.

### HEAT DISORDERS AND HEALTH EFFECTS

**HEAT STROKE** occurs when the body's system of temperature regulation fails and body temperature rises to critical levels. This condition is caused by a combination of highly variable factors, and its occurrence is difficult to predict. Heat stroke is a medical emergency. The primary signs and symptoms of heat stroke are confusion; irrational behavior; loss of consciousness; convulsions; a lack of sweating

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(usually); hot, dry skin; and an abnormally high body temperature, e.g., a rectal temperature of 40.5°C (105°F).

If body temperature is too high, it may result in death. Individuals with heat stroke have high mortality, with rates ranging from 21 to 63 percent. The elevated metabolic temperatures caused by a combination of work load and environmental heat load, both of which contribute to heat stroke, are also highly variable and difficult to predict.

If a person shows signs of possible heat stroke, professional medical treatment should be obtained immediately. The person should be placed in a shady area and the outer clothing should be removed. The person's skin should be wetted and air movement around the person should be increased to improve evaporative cooling until professional methods of cooling are initiated and the seriousness of the condition can be assessed. Fluids should be replaced as soon as possible. The medical outcome of an episode of heat stroke depends on the victim's physical fitness and the timing and effectiveness of first aid treatment.

Regardless of the person's protests, no member suspected of being ill from heat stroke should be sent home or left unattended unless a physician has specifically approved such an order.

**HEAT EXHAUSTION.** The signs and symptoms of heat exhaustion are sweating, headache, nausea, vertigo, weakness, thirst, and giddiness. Fortunately, this condition responds readily to prompt treatment. Heat exhaustion should not be dismissed lightly, however, for several reasons. One is that the fainting associated with heat exhaustion can be dangerous because the victim may be operating machinery or controlling an operation that should not be left unattended; moreover, the victim may be injured when he or she faints. Also, the signs and symptoms seen in heat exhaustion are similar to those of heat stroke, a medical emergency.

Persons suffering from heat exhaustion should be removed from the hot environment and given fluid replacement. They should also be encouraged to get adequate rest.

**HEAT CRAMPS** are usually caused by performing hard physical labor in a hot environment. These cramps have been attributed to an electrolyte imbalance caused by sweating. It is important to understand that cramps can be caused by both too much and too little salt. Cramps appear to be caused by the lack of water replenishment. Because sweat is a hypotonic solution ( $\pm 0.3\%$  NaCl), excess salt can build up in the body if the water lost through sweating is not replaced. Thirst cannot be relied on as a guide to the need for water; instead, water must be taken every 15 to 20 minutes in hot environments.

Under extreme conditions, such as working for 6 to 8 hours in heavy protective gear, a loss of sodium may occur. Recent studies have shown that drinking commercially available carbohydrate-electrolyte replacement liquids is effective in minimizing physiological disturbances during recovery.

**HEAT COLLAPSE** ("Fainting"). In heat collapse, the brain does not receive enough oxygen because blood pools in the extremities. As a result, the exposed individual may lose consciousness. This reaction is similar to that of heat exhaustion and does not affect the body's heat balance. However, the onset of heat collapse is rapid and unpredictable. To prevent heat collapse, the person should gradually become acclimated to the hot environment.

**HEAT RASHES** are the most common problem in hot work environments. Prickly heat is manifested as red papules and usually appears in areas where the clothing is restrictive. As sweating increases, these papules give rise to a prickling sensation. Prickly heat occurs in skin that is persistently wetted by unevaporated sweat, and heat rash papules may become infected if they are not treated. In most cases, heat rashes will disappear when the affected individual returns to a cool environment.

**HEAT FATIGUE.** A factor that predisposes an individual to heat fatigue is lack of acclimatization. The use of a program of acclimatization and training for tasks in hot environments is advisable. The signs and symptoms of heat fatigue include impaired performance of skilled sensorimotor, mental, or vigilance jobs. There is no treatment for heat fatigue except to remove the heat stress before a more serious heat-related condition develops.

#### **CAP SAFETY ADVISORY**

Heat injuries have the potential of affecting ground team members and flight crews. Hydration is essential and rest is a must. It is highly recommended that members affected by heat injuries follow the direction of the medical staff or health professionals. Rest, hydration, and limited duty to recover should be considered before releasing the affected member back to participation with CAP activities.

Use of the attached Heat Index chart is encouraged to be used in the decision making process of whether a CAP activity is a GO or NO-GO based on exposure risk.

Adjusting activity schedules is highly recommended to prevent unnecessary exposure to heat. Longer and more frequent break times are recommended as the Heat Index risk exposure increases with consideration for cancelling an activity as an option.

### Heat Index

How to read the chart: Find the temperature on the left hand side, then move to the right until you find the column for the approximate relative humidity. That number will be the temperature that it will "feel" like. For example, a temperature of 95°F and relative humidity of 50% will "feel" like 107°. Add up to 15° if in the direct sun.

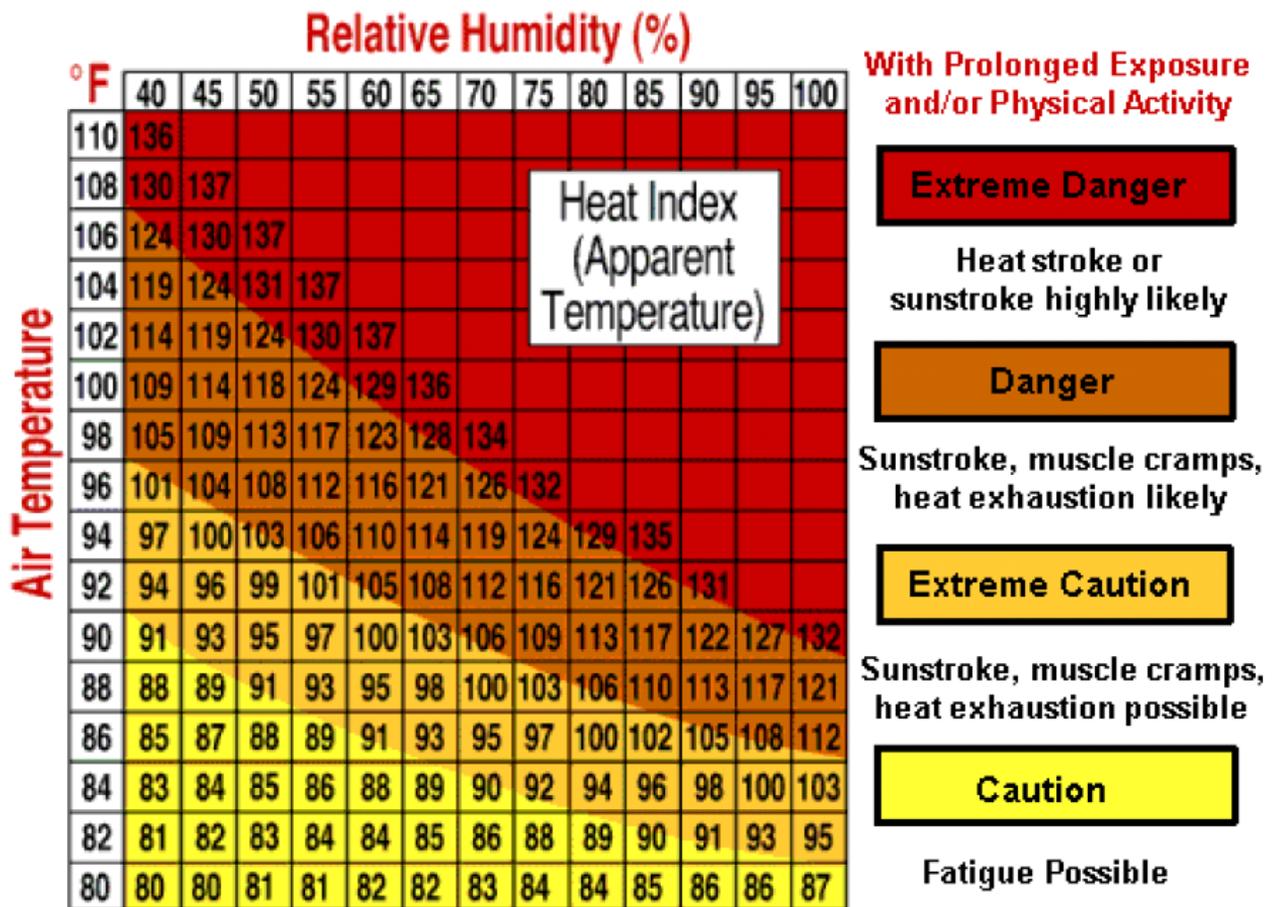
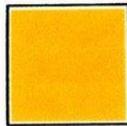


Chart source: National Oceanic and Atmospheric Administration (NOAA)

## BEST PRACTICE

### *The Pee Chart*

#### How dehydrated are you?



#### **(Highly Dehydrated)**

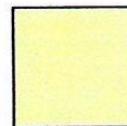
**Go drink a large bottle of water immediately!!!**



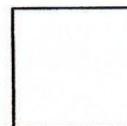
**You are still seriously dehydrated. Drinking more now will make you feel a lot better.**



**Moderately dehydrated. You lose fluid on a regular basis throughout the day. Drink more water to get hydrated.**



**Almost there. Get some more water in your system to help flush all those toxins from your body. Stay hydrated and healthy!**



**Great job. Now don't let yourself get dehydrated. Drink at least 8-12 large glasses of water throughout the day.**

**\*Caffeinated drinks dehydrate - limit your consumption.**

**\*Sport drinks can provide supplementary electrolytes, but  
Water is the Key!**

**Drink one sport drink for every three to four bottles of water. Don't wait to get thirsty. If you're thirsty, you're a quart low.**