



## **HEAT EXHAUSTION & HEAT STROKE -- FACT SHEET**

### **Definitions:**

*Heat exhaustion* is diagnosis of exclusion, meaning it can only be diagnosed when "heat stroke" is ruled out by history, physical examination, and laboratory examination.

*Heat stroke* is the most severe heat illness because of its potential for high morbidity and mortality. It is sporadic and uncommon and can be difficult to treat, even in the hospitalized setting.

*NOTE: Heat cramps* are a somewhat different phenomenon. Cramps of heavily exercised muscle, most often the calves, occur after exercising and profuse sweating. Consumption of water without salt can lead to progressive hyponatremia. Muscular cramps occur as a result. Treat with cool environment, intake of fluids that have sodium (pedialyte) and transfer to a physician's care.

### **Cause of heat exhaustion and heat stroke:**

*Heat exhaustion* and *heat stroke* are caused by (1) excessive loss of body water, (2) depletion of body electrolytes, or (3) both. Physical activity on hot days can induce this condition. Risk factors include: excessive motivation to participate (field days, fun runs, etc.), failure to drink fluids, non-acclimatization to heat, and history of heat illness. Other risk factors are drinking alcohol, obesity, medications that interfere with the body's ability to cool itself, including antipsychotics, tranquilizers, antihistamines, tricyclic antidepressants, beta-blockers, and some over-the-counter sleeping pills. Being over age 65 or under age 5 are other risk factors.

Progression to *heat stroke* can occur in anyone, but those how are most susceptible have risk factors such as chronic illness, medications or drug abuse, inappropriate clothing, poor fluid intake, and poor judgment regarding exertion.

### **Symptoms:**

*Heat exhaustion* and *heat stroke* begin with symptoms of headache, nausea, vomiting, lightheadedness, malaise, and myalgias (muscle aches), and stomach cramps.

*Heat exhaustion*- Pale, clammy skin and thirst occurs with heat exhaustion. There may be a slight fever. But if body temperature is 102°F (39°C) or higher or if there is any impairment in mental function, heat stroke should be strongly suspected.

*Heat stroke* - Hot, dry skin. Irritability, ataxia (balance problems), or confusion are hallmark signs of heat stroke, versus heat exhaustion. Vital signs show: tachycardia (fast heart rate), hypotension or normtension (low to normal blood pressure), and tachypnea (panting like a dog). Temperature is usually >102°F, but exceed 107°F. Dangers are organ system dysfunction and failure. Major complications of this disease are: seizures, adult respiratory distress syndrome, acute renal failure, liver failure, and disseminated intravenous coagulation.

**Treatment:**

1. Remove person from hot environment, immediately (to air conditioned room, or at least a shady spot).
2. Arrange for immediate transportation to emergency facility.
3. Loosen or remove clothing.
4. Cool patient by:
  - Spraying patient with water and fan the patient.
  - Place ice packs over neck, and in groin and axillae (arm pits)
  - Place a wet sheet over patient.
5. If no signs of heat stroke (person has a normal mental state and can tolerate it), then give oral hydration (Pedialyte, 1% salt-water solution, or water. Nothing with caffeine).

**Prevention:**

- Acclimatizing young athletes to the heat is essential. As acclimatization takes 90 minutes of activity per day in hot conditions for one week, true acclimatization is rarely achievable in San Diego's school environment.
- Only allow slow increases of activity on hot days. Do not attempt to approach ones previous record speeds or duration of exertion on hot days.
- Exertion should be timed to avoid the hottest times of the day.
- Light, loose clothing should be worn, allowing for maximal air flow but reducing sunlight exposure. Football uniforms can be dangerous.
- Fluid intake is critical. Most athletes mistakenly believe they are drinking sufficient amounts.