

## Heat Related Injuries

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## Hyperthermia

- What is hyperthermia?
  - Hyper = elevated
  - Thermia (thermal) = think heat
- Heat related injuries are grouped under the name hyperthermia

## Hyperthermia

- The stages of hyperthermia are:
  - 1) Heat Cramps
  - 2) Heat exhaustion
  - 3) Heat Stroke

## Types of Heat Related Injuries

- 1) Heat Cramps
  - The least serious form of heat related injuries
  - Muscle spasms or cramps caused from an electrolyte imbalance to the muscles

## Types of Heat Related Injuries

- Most commonly from over exertion in hot temperatures with excessive sweating
- Typically occurs in larger muscle groups first, such as the abdominal muscles, gluteus muscles, and hamstrings.

## Heat Cramps



### **Types of Heat Related Injuries**

- 2) Heat Exhaustion
  - Extreme physical exertion in a hot humid environment and can affect even an otherwise fit individual
  - Prolonged and profuse sweating causes the body to lose large quantities of salt and water

### **Types of Heat Related Injuries**

- When salt and water are not adequately replaced, blood circulation in the body diminishes, affecting the brain, heart, and lungs
- Skin is either normal or cool in temperature, usually pale or grey in color, and sweaty

### **Types of Heat Related Injuries**

- A person with heat exhaustion commonly has slight alterations in mental status, such as dizziness or fatigue

### **Heat Exhaustion**



### **Types of Heat Related Injuries**

- 3) Heat Stroke
  - Life threatening medical emergency with a life mortality rate up to 80 percent!
  - Occurs when the heat-regulating mechanisms break down and become unable to cool the body sufficiently.

### **Types of Heat Related Injuries**

- Because no cooling takes place, the body stores increasingly more heat
- Eventually brain cells are damaged, causing permanent disability or death. Possibly causing seizures

## Types of Heat Related Injuries

- Skin will be **HOT** and red in color. Typically the body will no longer be sweating but clothing may still be moist from sweating prior to the heat stroke.
- Heat stroke should always be considered when a person has a heat-related emergency coupled with unresponsiveness.

## Heat Stroke



## Heat Related Injuries

### What is Extreme Heat?

Extreme heat is defined as temperatures that are much hotter and/or humid than normal for any particular person. Most heat injuries occur during initial heat waves or when a person travels from a cold region to a much hotter region due to a lack of acclimation.

## Acclimation

- **Acclimation is the process of in which an individual adjusts to changes in the environment including , cold, heat and humidity**
- **This allows people to maintain function and performance across a range of environmental conditions**
- **May take up to a few weeks before a person is fully acclimated**

## Other Predisposing Factors

- **Exercise and strenuous activity – can cause the loss of more that one liter of sweat per hour and increase heat production**
- **Age – the elderly and infants have poor ability to regulate body temperature**

## Other Predisposing Factors

- **Pre-existing illnesses – These include but not limited to: heart disease, kidney disease, thyroid gland disorders, obesity, diabetes, and vascular disease**
- **Drugs and Medications – Including alcohol, cocaine, amphetamines, diuretics (water pills), hallucinogens, etc. Many of these hamper sweating and increase heat production.**

### Climate

Under normal circumstances the body prevents hyperthermia in two ways:

- 1) Radiation- this is the process of heat transfer from your body (+- 98.6 degrees) to the environment. Thus, in hotter environments, this process has little to no affect. Radiation has the highest affect when temps are below 68 degrees

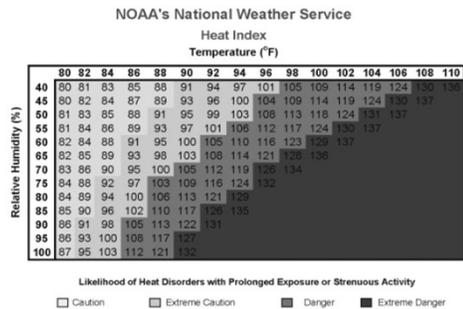
### Climate

Under normal circumstances the body prevents hyperthermia in two ways:

- 2) Evaporation- As sweat is evaporated from your skin, it causes your skin to cool. The higher the humidity, the less sweat evaporates.

### Climate

The chart on the following page breaks down the heat index. The higher the humidity, the hotter it feels!



### Preventing Heat Related Injuries

- Slowly acclimate to new environments (may take several weeks)
- Wear loose fitting, light colored, and lightweight clothing
- During extreme heat and humid days, stay inside of an air conditioned environment

**BEAT THE HEAT: Extreme Heat**  
Heat related deaths are preventable

**WHAT:** Extreme heat or heat waves occur when the temperature reaches extremely high levels or when the combination of heat and humidity causes the air to become oppressive.

**WHO:** Children, Older adults, People with disabilities, Outside workers.

**WHERE:** Houses with little to no AC, Construction work sites, Cars.

**HOW to AVOID:** Stay hydrated with water, Stay cool in an area with shade, coverings, or conditioned area, Wear light weight, light colored, loose fitting clothes.

## Preventing Heat Related Injuries

- Schedule outdoor activities carefully. Choose outdoor times early in the morning or evening.
- Never leave anyone unattended in a vehicle.
- Stay informed. Continuously monitor the weather. Many sources are available from smartphone apps to newspapers
- Stay hydrated the right way...

## Hydration

- Avoid sugary drinks, caffeine, and alcohol. These can all cause dehydration.
- Don't just drink water. When you sweat you lose minerals and sodium as well as water. The sodium and minerals can be consumed with food, tablets, and sports drinks.

## Hydration

- If planning a long hike, bike ride, or marathon, you are susceptible to exercise-associated hyponatremia (EAH) . This condition is caused from being active for a long period of time and consuming large amounts of water. This can cause life threatening fluid in the lungs and brain. Moderate water intake and ensure an adequate amount of sodium for prevention.

## Care for Heat Related Injuries

### Heat Cramps

1. Remove the person from the heat source to a cool environment. If nothing else, move the person out of the sun and into the shade
2. Ensure adequate hydration. Give the affected person sips of low-concentration salt water at the rate of one-half a glassful every 15 minutes. If possible, use a commercial product, such as Gatorade, with low sugar content.
3. Apply moist towels to the persons forehead and over the cramping muscles

## Care for Heat Related Injuries

### Heat Exhaustion

1. Call 911
2. Remove the person from heat source to a cool environment. If nothing else, move the person to the shade.
3. Remove clothing to the level of the persons comfort.
4. If possible, mist the person with water and fan them lightly.
5. If available, place cold or wet compresses to the armpits and groin area
6. Consider elevating the persons feet 8 to 12 inches. If the person is nauseated or vomiting place the person on their side.

## Care for Heat Related Injuries

### Heat Stroke

1. Call 911
  2. Remove the person from the heat source to a cool environment. Again, if nothing else, move the person to the shade.
  3. Remove as much of the clothing as possible or reasonable.
  4. Pour tepid (NOT cold) water over their body.
  5. If possible, apply cold packs or wet compresses to the armpits, groin, and each side of the neck.
  6. Fan the person aggressively or direct an electrical fan at the person.
  7. Keep their skin wet
- ❖ If a seizure occurs, move any objects that are around the person. Do not attempt to hold them down or restrain them. Continue cooling to the best of your ability.

## **Other Heat-Related Illnesses**

### **Sunburn**

- **Signs and symptoms include painful, red, and warm skin**
- **Treatment includes :**
  - **Staying out of the sun until sunburn heals**
  - **Put cool cloths on sunburned areas or take a cool bath**
  - **Use moisturizing lotions with aloe on sunburned areas**
  - **DO NOT deliberately break blisters**

## **Other heat-related illnesses**

### **Heat Rash**

- **Red clusters of small blisters that look like pimples on the skin (Usually on the neck, chest, groin, or in elbow creases)**
- **Treatment includes:**
  - **Stay in cool, dry places**
  - **Keep the rash dry**
  - **Use baby powder to soothe the rash**

## **Summary**

- **From this presentation, you should have a solid foundation of knowledge that will enable you to identify, prevent, and assist in treating a person with a heat related injury or illness.**