Heat Injury Prevention

August 3, 2011

HIGH TEMPERATURE

HIGH HUMIDITY

+ PHYSICAL WORK

HEAT ILLNESS

HEAT STRESS

- **Heat becomes a problem when humidity, air temperature, and radiant heat combine with hard work to raise body temperature beyond safe limits**
  - **Sweat is your main defense**
  - **Drink plenty of water**
  - **Rest (take breaks)**
- **High heat stress can produce three forms of heat related illness:**
  - **Heat cramps**
  - **Heat exhaustion**
  - **Heat stroke**

HEAT CRAMPS

- Involuntary muscle contractions , typically in the large muscle groups, caused by failure to replace fluids or electrolytes, such as sodium and potassium
- Can be relieved with stretching and by replacing fluids and electrolytes
- Can be prevented by maintaining an adequate intake of
  - Water
  - Electrolyte replacement drinks
  - Eating fresh fruits and vegetables
  - Taking frequent rest breaks

HEAT EXHAUSTION

- **Heat exhaustion results when the body produces more heat that it can dissipate**
  - Inadequate fluid intake is a major contributing factor
- **Characterized by:**
  - Weakness - Headaches
  - Extreme fatigue - Nausea
  - Wet, clammy skin
- **Treat by:**
  - Resting in a cool environment
  - Removing clothing so that one's sweat can evaporate
  - Replacing fluids and electrolytes

HEAT STROKE

- **Caused by failure of the body's heat controls**
  - Sweating stops
    - Although classic teaching describes a heat stroke patient as "hot and dry", recent studies have shown that over 50% of heat stroke patients are sweating heavily
  - Body temperature rises
  - The hallmark of heat stroke is altered mental status
    - You should suspect heat stroke if fatigued person has inability to remember the day or the current situation. They may ask, "Where am I?"
- **Heat stroke is characterized by:**
  - Hot, often dry skin
  - Body temperature above 105.8 degrees fahrenheit
  - Mental confusion
  - Loss of consciousness
  - Convulsions
  - Then coma

HEAT STROKE

- **Heat stroke is a medical emergency. Brain damage and death may result if treatment is delayed!**
  - Begin rapid cooling with ice or cold water
  - Fan the victim to promote evaporation
  - For rapid cooling, partially submerge the victim's body in cool water
  - Treat for shock if necessary
  - Provide oxygen if it is available
- **Heat cramps and heat exhaustion may be treated locally; heat stroke patients should be transported to a medical facility ASAP, as their condition may worsen suddenly**

PREVENTION

- Ensure all individuals know the signs and symptoms of heat-induced illnesses and how to intervene
- Perform the heaviest work during the coolest part of the day
- Work in pairs
- Drink plenty of cool water (every 15-20 minutes)
  - Consider a carbohydrate / electrolyte sport beverage such as Gatorade as a portion of fluid replacement - this will help retain fluids and maintain energy and electrolyte levels
- Wear loose-fitting clothing
- Take frequent short breaks in cool shaded areas (allow your body to cool down)

PREVENTION

- Avoid eating large meals before working in hot environments
- Avoid caffeine and alcoholic beverages
  - These beverages make the body lose water and increase the risk for heat illnesses
- Persons are at increased risk when they
  - Take certain medications
  - Have had a heat-induced illness in the past
  - Wear personal protective equipment and clothing (i.e., respirators, etc.)

PREVENTION

- **You can assess your hydration by:**
  - **Observing the volume, color, and concentration of your urine**
    - **Low volumes of dark, concentrated urine or painful urination indicate a serious need to re-hydrate**
  - **Rapid heart rate**
  - **Weakness**
  - **Excessive fatigue**
  - **Dizziness**

HEAT INDEX

- To help prevent heat injuries:
  - Become familiar with the “Heat Index”
    - The Heat Index (HI) is the temperature the body feels when heat and humidity are combined
    - The following chart shows the HI that corresponds to the actual air temperature and relative humidity

Temperature (F) versus Relative Humidity (%)

°F	90%	80%	70%	60%	50%	40%
80	85	84	82	81	80	79
85	101	96	92	90	86	84
90	121	113	105	99	94	90
95		133	122	113	105	98
100			142	129	118	109
105				148	133	121
110						135

HI	Possible Heat Disorder:
80°F - 90°F	Fatigue possible with prolonged exposure and physical activity.
90°F - 105°F	Sunstroke, heat cramps and heat exhaustion possible.
105°F - 130°F	Sunstroke, heat cramps, and heat exhaustion likely, and heat stroke possible.
130°F or greater	**Heat stroke highly likely with continued exposure.**

NOTE: This chart is based upon shady, light wind conditions. Exposure to direct sunlight can increase the HI by up to 15°F. By using the chart, you can evaluate the potential injury and take steps to mitigate the hazard before an injury occurs. As humidity and ambient temperatures increase - so does the potential for a heat injury.

Think, Act, and Work Safely!