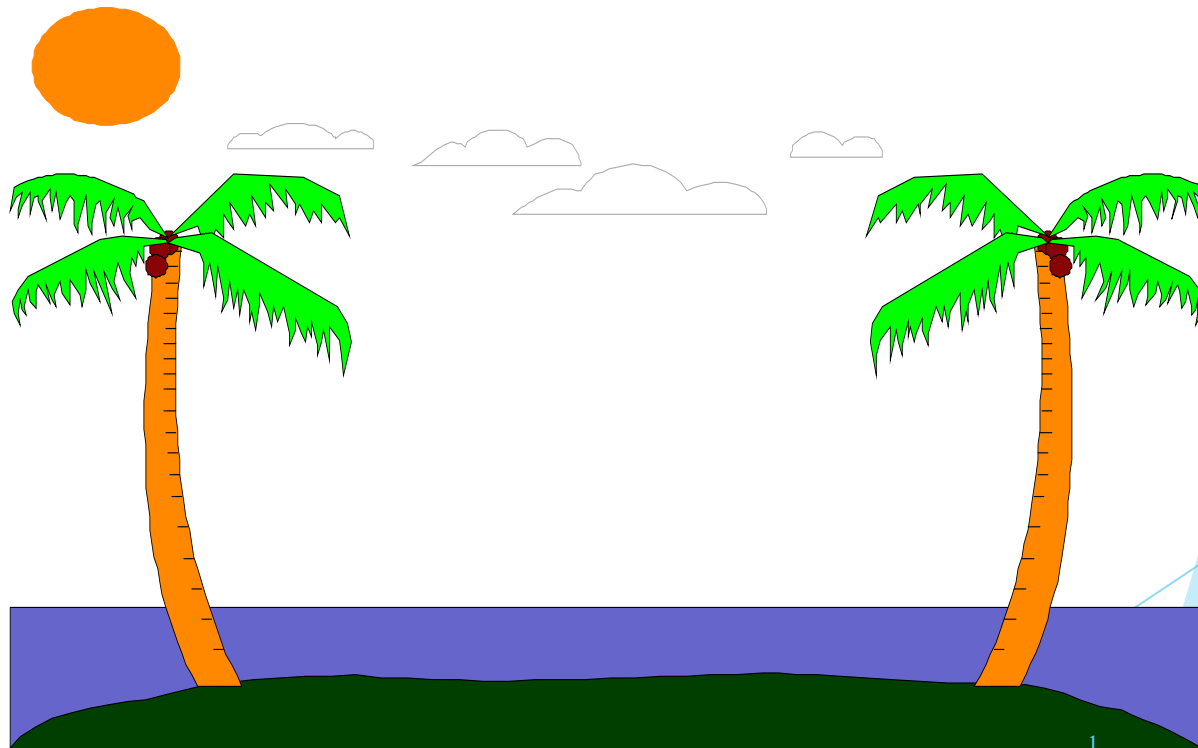


Occupational health/3rd year

Dr. Nedal/ L3-HEAT INJURY PREVENTION



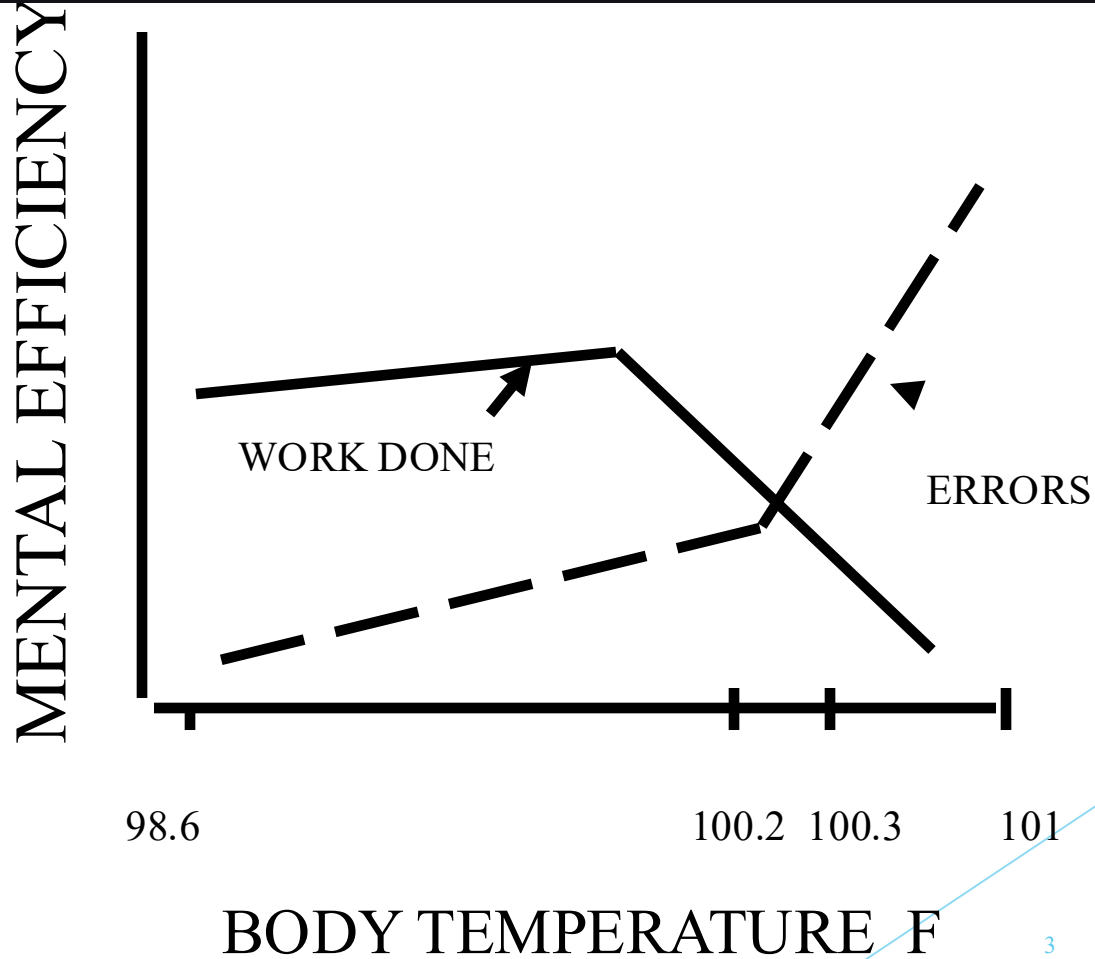
WHY IS HEAT PREVENTION IMPORTANT

- ✓ Combat capability is dependent upon the ability to adapt to the environment
- ✓ The body can survive only at a narrow range of core temperatures

EFFECTS OF HEAT ON THE BODY

Formula

$$(100^{\circ}\text{F} - 32) \times 5/9 = 37.778^{\circ}\text{C}$$



HOW THE BODY RELEASES HEAT

- 1. Radiation:** transfer of heat from a hotter object to a cooler object through space by radiant energy
- 2. Conduction:** transfer of heat from molecule to molecule of adjacent objects

HEAT RELEASE CONTINUED

3. Convection: transfer of heat in liquids or gases in which molecules are free to move

4. Evaporation: heat loss involves the changing of a substance from its liquid state to its gaseous form

INFLUENCING FACTORS

1. Air temperature
2. Temperature of surrounding objects
3. Sun's radiant heat
4. Relative humidity
5. Air movement
6. Amount and type of clothing worn
7. Heat produced by the body

TYPES OF HEAT INJURIES

1. Heat Cramps

2. Heat Exhaustion

3. Heat Stroke

HEAT CRAMPS

1. Excessive salt lose
2. Painful cramps of muscles usually in arms, legs and stomach area
3. Heat exhaustion may be present
4. Body temperature may be normal
5. Avoided by acclimation, proper nutrition and hydration

HEAT EXHAUSTION

1. Excessive salt and water loss
2. Skin is cool and moist; pulse is rapid and blood pressure may be low
3. Other symptoms are profuse sweating, headaches, tingling in hands and feet, paleness, difficulty breathing, irregular heart beat, loss of appetite, nausea and vomiting
4. Oral temperature may be lower than normal if the person is hyperventilating

HEAT EXHAUSTION CONT.

5. Trembling, weakness, lack of coordination and a slight clouding of senses to momentary loss of consciousness complete the classic picture
6. **Avoided by proper work/rest cycles and good hydration**

!!!!CAUTION!!!!

Those that suffered from heat exhaustion are 'fragile' and can have another episode easily

HEAT STROKE

1. A medical emergency and death rate is high
2. The body's heat regulatory mechanism stops functioning and the main avenue of heat loss is blocked
3. Early signs are headache, dizziness, delirium, weakness, nausea, vomiting and excessive warmth
4. Skin is usually hot, red and dry
5. Body temperature may be as high as 106 F

HEAT STROKE CONT.

6. The casualty (Victim) may go through heat cramps or heat exhaustion; a sudden collapse and loss of consciousness followed by coma and convulsions may occur
7. Sweating may or may not be present
8. Avoided by proper work/rest cycles and full hydration

!!!!CAUTION!!!!

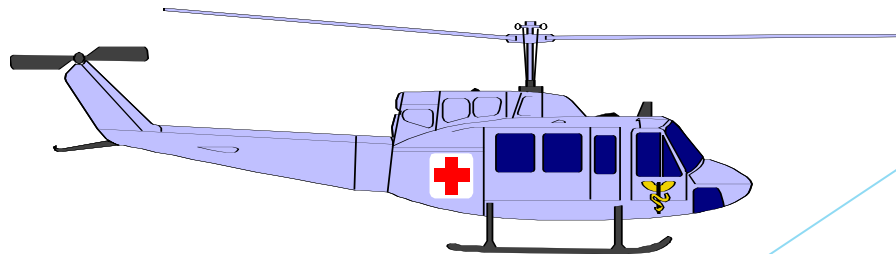
Heat stroke casualties are more susceptible to a second attack

FIRST AID FOR HEAT CRAMPS AND EXHAUSTION

1. Move patient to a shady area and loosen clothing if possible
2. Slowly give large amounts of cool water
3. Pour water on patient and fan
4. Elevate legs for exhaustion
5. Watch patient, if possible release from strenuous activity
6. Get medical help if symptoms continue

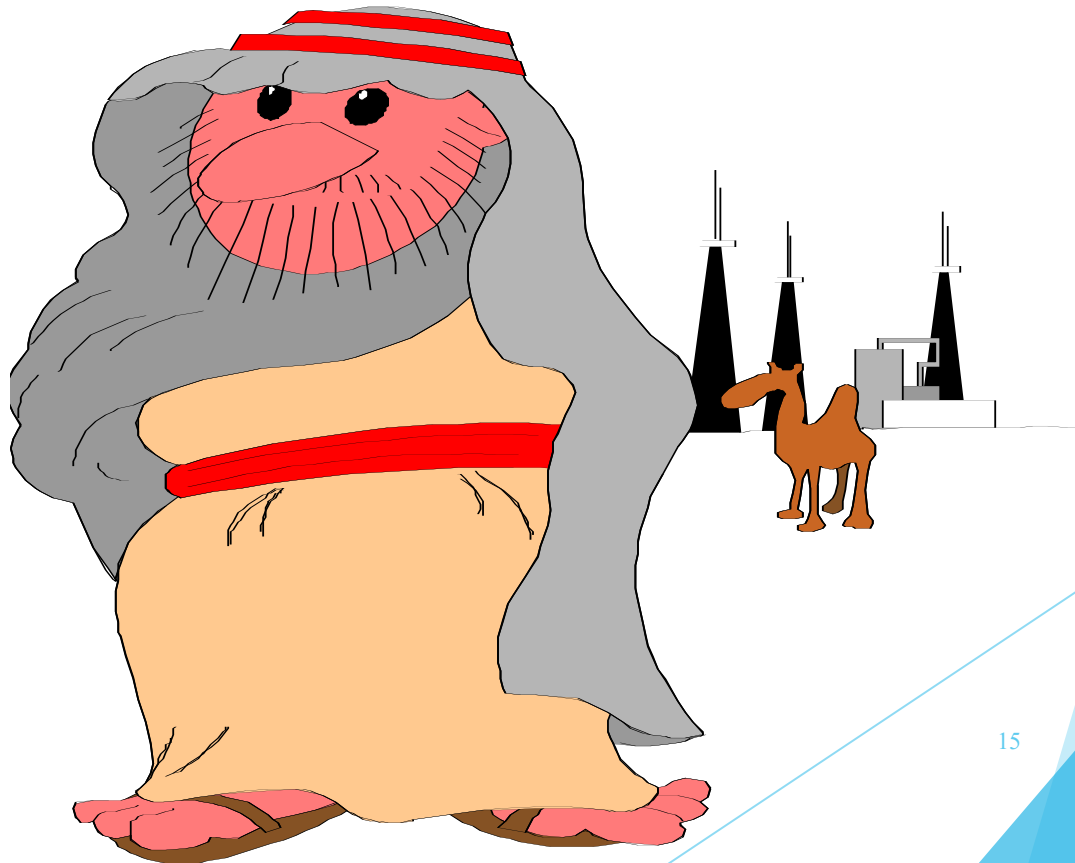
FIRST AID FOR HEAT STROKE

- Lower casualty's body temperature ASAP
- Elevate patient's legs
- Have patient drink water if possible
- **GET MEDICAL HELP**



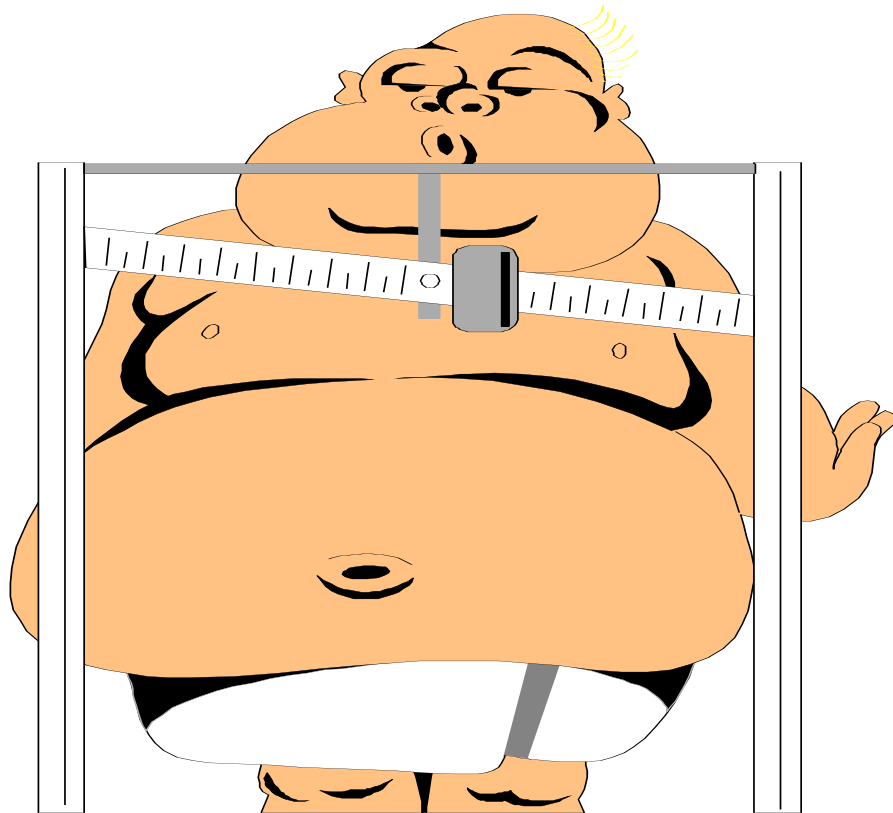
PREDISPOSING FACTORS

Acclimatization; 7-14 days, 2 hours a day



PREDISPOSING FACTORS

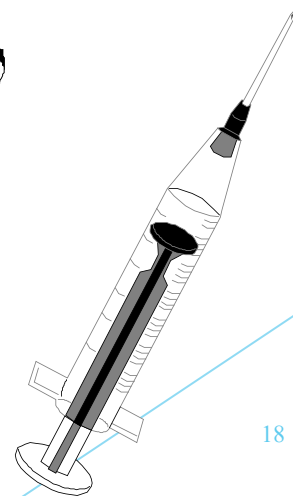
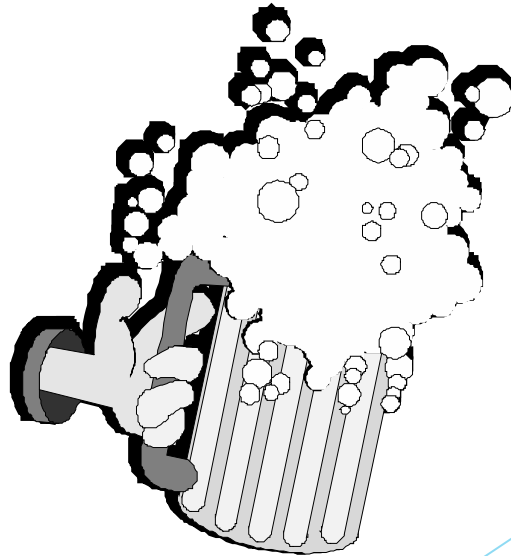
Overweight and fatigue



PREDISPOSING FACTORS

Alcohol and drugs

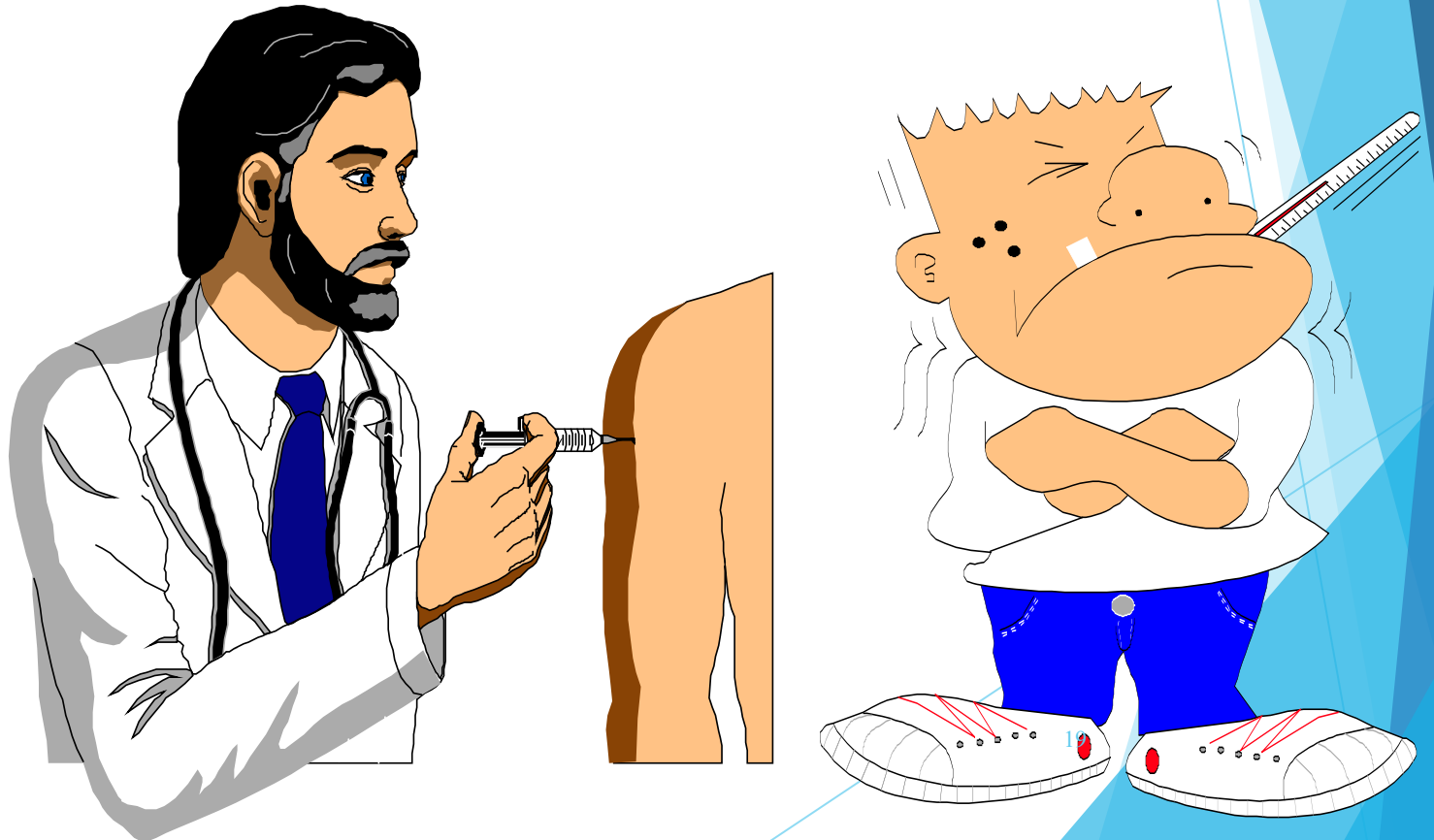
- ▶ Drugs that inhibit sweating are atropine, antihistamines, some tranquilizers, cold medicine and some antidiarrheal medicines



PREDISPOSING FACTORS

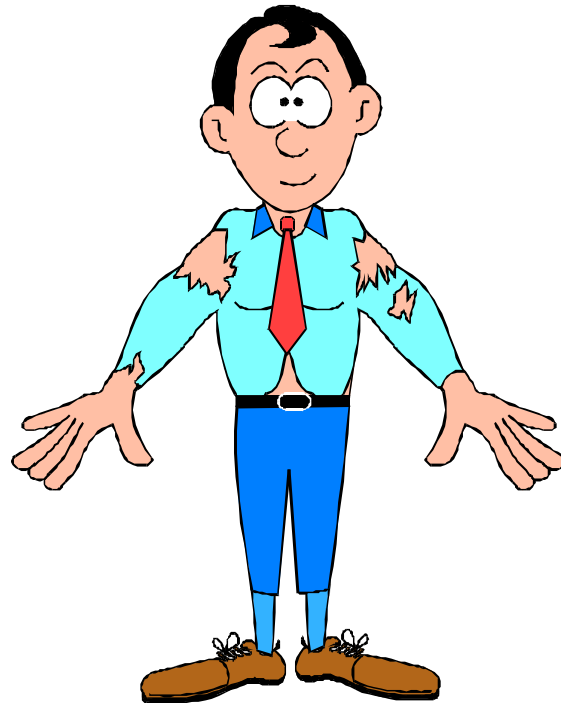
Fevers

Many immunizations produce fevers



PREDISPOSING FACTORS

Tight clothing



PREVENTING HEAT INJURIES

1. Replace water loss; by sweating a person can lose more than 1 quart per hour. = 0.95 liters in the US
2. Drink small amounts of water frequently regardless of thirst
3. Use heat injury prevention chart as a guide
4. Provide adequate water at all times

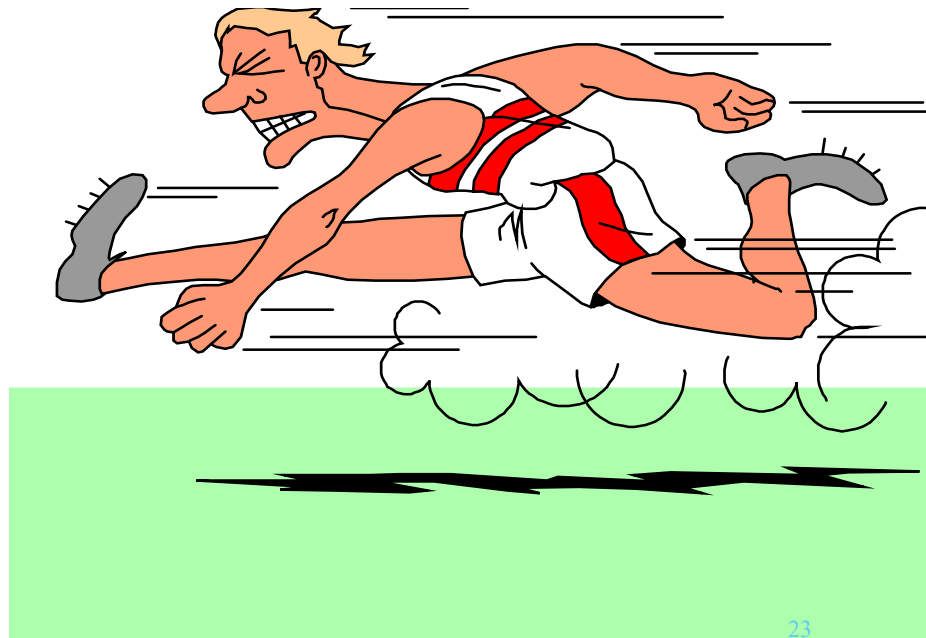
PREVENTING HEAT INJURIES

5. Maintain acclimatization

- ▶ Begin acclimatization with first exposure
- ▶ Continue with two 50 minutes periods daily
- ▶ Limit intensity and time of exposure for those not acclimatized
- ▶ Acclimatization can be lost if remove from the hot environment for 1 month

PREVENTING HEAT INJURIES

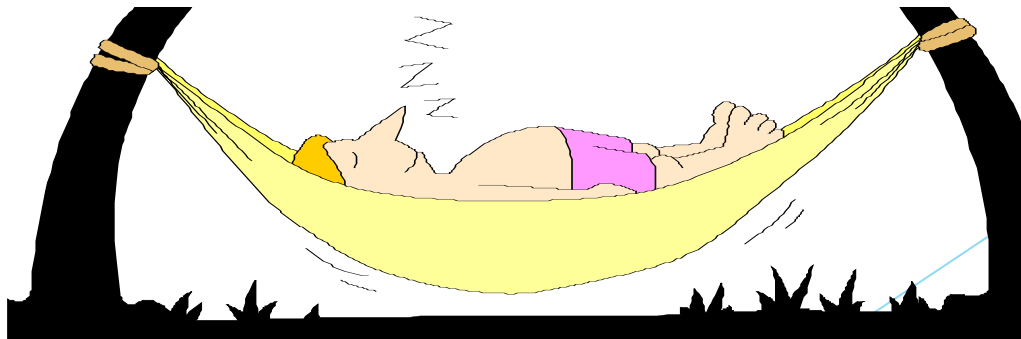
6. Maintain good physical condition



PREVENTING HEAT INJURIES

7. Establish a good work/rest schedule; must be tailored to fit climate, physical condition of personnel and military situation

- ▶ Work in cooler hours
- ▶ Avoid working in direct sunlight
- ▶ Slowly increase exposure to those becoming acclimatized
- ▶ Use heat injury prevention chart as a guide



!!!CAUTION!!!

Overexertion can cause heat injuries at temperatures lower than 75 degrees F on the WBGT index

The WetBulb Globe Temperature (WBGT) is a measure of the heat stress in direct sunlight, which takes into account: temperature, humidity, wind speed, sun angle and cloud cover (solar radiation). This differs from the heat index, which takes into consideration temperature and humidity and is calculated for shady areas.



PREVENTING HEAT INJURIES

8. Use proper clothing to protect yourself

1. Loose clothing
2. Wear least amount when possible
3. Obtain the WBGT

