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Normal cooling mechanisms

- **When body core temperature rises**
  - Blood flow to skin increases
  - Sweating increases
  - Heart rate increases to move blood - and heat - to the skin

- **When this works well**
  - Core temperature drops or stabilizes at a safe level
The deep organs, especially heart, lungs, and other vital organs

The arms, legs, and the tissues close to the skin are referred to as the periphery

The core and the periphery compete with each other for blood supply
So much sweat is lost that dehydration results. The body cannot cool itself by sweating, and the core temperature rises. Salt loss causes heat cramps. So much of the blood flow goes to the skin that other organs cannot function properly.
Heat Stress

- The buildup in the body of heat
  - generated by the muscles during work
  - coming from warm and hot environments

- Heat exhaustion and heat stroke occur when the body is subjected to more heat than it can cope with
HEAT-RELATED ILLNESSES
Heat Cramps

- Painful muscle cramps, usually in legs or abdomen, which warn that heat stress is developing
- Stop activity, rest in cool place, drink juice or sports beverage
- Get medical attention if no improvement in one hour
Heat Exhaustion

- The body’s response to the excessive loss of water and salt in sweat
- Symptoms:
  - Heavy sweating
  - Worker is pale and tired
  - Nausea and vomiting
  - Headache, blurred vision
  - Dizziness and fainting
Heat Stroke

- The body becomes unable to control its temperature
- Temperature by mouth can rise above 105°F in 10 to 15 minutes
- Death or permanent damage may occur if treatment is not given promptly
- Heat stroke kills 4,000 Americans yearly
Heat Stroke

● Symptoms
  • Oral temperature over 103°F
  • No sweating
  • Red, hot, dry skin
  • Throbbing headache
  • Dizziness
  • Nausea
  • Unconsciousness
FIRST AID
Heat Exhaustion First Aid

- Call 911
- Help the victim cool off
  - Rest in cool place
  - Drink cool water
  - Remove unnecessary clothing or loosen clothing
  - Shower or sponge with cool water
It takes at least 30 minutes to cool the body once a person has become overheated.
Heat Stroke First Aid

- Call 911
- Immediate, aggressive, effective cooling
  - immerse victim in tub of cool water
  - place in cool shower
  - spray with cool water from a hose
  - wrap in cool, wet sheets and fan rapidly
- Do not give anything by mouth - it won’t stay down
- Transport to hospital
EVALUATING THE RISK OF HEAT ILLNESS
Risk Factors for Individuals

- Overweight
- Very small body size
- Poor nutrition
- Poor physical condition
- Previous heat illnesses

- Lack of heat acclimatization
- Increasing age over 40
- Heart disease, high blood pressure
- Diabetes
Risk Factors for Individuals

- Skin disease
- Liver, kidney, and lung problems
- Pregnancy
- General fatigue, lack of sleep
- Diarrhea, vomiting
- Dehydration
- Infections
- Fever
- Sunburn, skin rash
- Recent illness or injury
Risk Factors for Individuals

- Recent inoculation or immunization
- Alcohol consumption during previous 24 hours
- Malnutrition
- Sleeping pills, medications which limit sweating
- Excessive consumption of caffeine

- Use of illegal drugs
- Low-salt diet
Weather

- Temperatures above 70°F during the day, 80°F at night
- Direct sunlight can equal an increase up to 13°F in air temperature
- High humidity
- Little air movement
Risk Factors of the Job

- Heavy work
- Prolonged shifts
- Heavy clothing
- Protective gear and respirators
- Exposure to any toxic agent
CONTROLLING HEAT STRESS
A Program To Prevent Heat Illness Will:

- **Protect health**
  - illness can be prevented or treated while symptoms are mild

- **Improve safety**
  - workers with heat stress symptoms are more accident-prone

- **Increase productivity**
  - people work less efficiently when they are over-heated
Train Workers and Supervisors

- To control heat stress
- To recognize, treat, and prevent heat illnesses
- Take into account weather, workload, protective gear, and worker’s condition
Body generates more heat during heavy work
The more clothing worn, the longer it takes evaporation to cool the skin.

Coated and non-woven personal protective garments block evaporation of sweat.
Selecting PPE

- Use lightest weight garments and respirators available
- Light-colored garments absorb less heat from the sun
- If cooling vests are used, they must be selected carefully and washed daily
Managers’ Responsibilities

- Monitoring environmental conditions
- Making work assignments
- Adjusting work practices as necessary
Managers’ Responsibilities

- Observing worker
  - drinking enough water?
  - rested?
  - taking medication?
  - seems to have consumed alcohol?

- Treating heat stress problems
Managers’ Responsibilities

- Overseeing acclimatization and heat stress training of new workers
- Conducting periodic safety meetings during hot weather
Workers’ Responsibilities

- Carrying out instructions and training for controlling heat stress
- Being alert for symptoms in themselves and others
- Drinking enough water
- Getting adequate rest and sleep
- Avoiding alcohol, illegal drug use, and excessive caffeine
End