Heat- and Cold-Related Emergencies

• Describe how body temperature is controlled.
• Identify the factors that influence how well the body maintains its temperature.
• Identify the risk factors that increase a person’s susceptibility to heat-related illnesses and cold-related emergencies.
• List the signals of dehydration, heat cramps, heat exhaustion and heat stroke.
• Describe the care for dehydration, heat cramps, heat exhaustion and heat stroke.
• List the signals of frostbite and hypothermia.
• Describe the care for frostbite and hypothermia.
• Describe the ways to help prevent heat-related illnesses and cold-related emergencies.

Introduction

• When the body is overwhelmed in its attempt to regulate body temperature, a heat- or cold-related emergency can occur.
• A heat- or cold-related emergency can happen anywhere (indoors or outdoors) and under a variety of conditions.
• The signals of a heat- or cold-related emergency are progressive and can quickly become life threatening.
• A person can develop a heat- or cold-related emergency, even when temperatures are not extreme.

How Body Temperature Is Controlled

• The control center of body temperature is the hypothalamus.
• When the body gets too hot...
• When the body gets too cold...
How Body Temperature Is Controlled

- The body maintains its temperature by constantly balancing heat loss with heat production.
- The body generates heat primarily through converting food to energy and through muscle contractions.
- When the body gets too hot, blood vessels near the skin dilate, or widen, to bring more blood to the surface, which allows heat to escape.
- The body can also be cooled by the evaporation of sweat or by air moving over the skin.

How Body Temperature Is Controlled

- When the body is cold, the opposite occurs.
- Blood vessels near the skin constrict (narrow) and move warm blood to the center of the body. Thus, less heat escapes through the skin and the body stays warm.
- When constriction of blood vessels fails to keep the body warm, the body shivers to produce heat through muscle action.

Factors Affecting Body Temperature Regulation

- The three main factors affecting how well the body maintains normal body temperature are—
  - Air temperature.
  - Humidity.
  - Wind.
- Other factors affect how well your body manages temperature extremes. These factors include—
  - Clothing.
  - Breaks from exposure to extreme temperature.
  - Water intake.
  - Intensity of activity.
Factors Affecting Body Temperature Regulation

- People more susceptible to a heat- or cold-related emergency include—
  - Those involved in strenuous activity in a warm or cold environment.
  - Elderly people.
  - Young children.
  - Those who have predisposing health problems.
  - Those who have had a previous heat- or cold-related emergency in the past.
  - Those who have cardiovascular disease.
  - Those who take medications to eliminate water from the body (diuretics).

Heat-Related Emergencies

- Conditions associated with overexposure to heat are—
  - Heat cramps.
  - Heat exhaustion.
  - Heat stroke.
- Dehydration is another condition often related to heat-related illnesses.
- If not recognized early and cared for promptly, they can get progressively worse in a very short period of time.
Dehydration

- Dehydration refers to inadequate fluid in the body's tissues and is often caused by inadequate fluid intake, vomiting, diarrheas, certain medications, and alcohol or caffeine use.
- The signals of dehydration worsen as the body becomes dryer. Initial signals include:
  - Fatigue.
  - Weakness.
  - Headache.
  - Irritability.
  - Nausea.
  - Dizziness.
  - Excessive thirst.
  - Dry lips and mouth.

Care for a person who is dehydrated involves replacing the lost fluid.
- If the person is conscious and able to swallow, encourage him or her to drink small amounts of cool water or a commercial sports drink.
- Do not let the person gulp the fluid down; have him or her sip it at a slow pace.
- If dehydration is severe, the person will likely need more advanced medical care to receive fluids intravenously.

Heat Cramps

- Heat cramps are painful spasms of skeletal muscles.
- Heat cramps usually affect the legs and the abdomen.
- To recover from heat cramps—
  - Rest.
  - Lightly stretch the affected muscles.
  - Replenish fluids.
Heat Exhaustion

- Heat exhaustion is the earliest stage and the most common form of heat-related illness.
- Heat exhaustion is an early indicator that the body's temperature-regulating mechanism is becoming overtaxed.
  - Loss of fluids reduces blood volume which reduces flow to vital organs

The signals of heat exhaustion include—
- Cool, moist, pale, ashen or flushed skin.
- Headache, nausea, dizziness.
- Weakness, exhaustion.
- Heavy sweating.
- Muscle cramps

Heat exhaustion in its early stage can usually be reversed with prompt care.

Care for Heat Exhaustion

- Move the person from the hot environment to a cooler environment with circulating air.
- Loosen or remove as much clothing as possible.
- Apply cool, wet cloths, such as towels or sheets, taking care to remoisten the cloths periodically.
- Spraying the person with water and fanning can also help.
- If the person is conscious and able to swallow, give him or her small amounts of a cool fluid such as a commercial sports drink or fruit juice to restore fluids and electrolytes. Milk or water may also be given.
- Let the person rest in a comfortable position and watch carefully for changes in his or her condition. Do not allow the person to resume normal activities the same day.
Heat Stroke

- Heat stroke is the least common and most severe heat-related illness.
- Heat stroke most often occurs when people ignore the signals of heat exhaustion.
- Heat stroke develops when the body systems are so overtaxed by heat and begin to stop functioning.
- Sweating often stops because body fluid levels are low.
  - Body loses the ability to cool itself

Heat Stroke

- Two types of heat stroke are typically reported:
  - Classic heat stroke
    - Caused by environmental changes and often occurs during the summer months. It develops slowly over a period of days with persons presenting minimally elevated core temperatures.
  - Exertional heat stroke
    - Occurring when excess heat is generated through exercise and exceeds the body’s ability to cool off. Factors such as high air temperatures, high relative humidity and dehydration increase the risk.

Heat Stroke

- Heat stroke is a serious medical emergency.
- The signals of heat stroke include—
  - High body temperature (above 104°F)
  - Red, hot, dry skin.
  - Changes in level of consciousness, Confusion
  - Throbbing headache
  - Vomiting.
  - Seizures
Care for Heat Stroke

- Calling 9-1-1 or the local emergency number immediately.
- Cooling the body.
  - Preferred method: Rapidly cool the body by immersing the person up to the neck in cold water, if possible.
  - Alternatively, cover the person’s entire body in towels soaked with ice water, frequently rotating the cold, wet towels, spraying with cold water, fanning the person or covering the person with ice towels or bags of ice placed over the body.
  - If you are not able to measure and monitor the person’s temperature, apply rapid cooling methods for 20 minutes or until the person’s condition improves.
- Give care according for other conditions found.
- Monitoring breathing and consciousness.
- Being prepared to give rescue breathing or CPR, if needed.

Cold-Related Emergencies

- **Frostbite and hypothermia** are two types of cold-related emergencies.
- Frostbite occurs in body parts exposed to cold.
- Hypothermia develops when the body can no longer generate sufficient heat to maintain normal body temperature.

Frostbite

- Frostbite is the freezing of body tissues.
- Frostbite usually occurs in exposed areas of the body, depending on—
  - Air temperature.
  - Length of exposure.
  - Wind speed.
- Frostbite can be either superficial or deep.
  - **Superficial frostbite**—the skin is frozen but the tissues below are not.
  - **Deep frostbite**—both the skin and the underlying tissues are frozen.
Frostbite

- **Signals of frostbite include**—
  - Lack of feeling in the affected area.
  - Swelling.
  - Skin that appears waxy, is cold to the touch and is discolored (flushed, white, yellow or blue).
  - In more serious cases, blisters may form and the affected part may turn black and show signs of deep tissue damage.

Care for Frostbite

- **When caring for a victim of frostbite**—
  - Call 9-1-1 or the local emergency number.
  - Attempt to remove jewelry or restrictive clothing.
  - Handle the affected area gently; never rub the affected area.
  - If there is no chance that the frostbitten part will refreeze, you may begin rewarming the affected area.
    - Gently soak the area in water not warmer than about 105°F.
  - Loosely bandage the area with a dry, sterile dressing.
    - If fingers or toes are frostbitten, place dry, sterile gauze between them to keep them separated.
  - Avoid breaking blisters.

Hypothermia

- **Hypothermia is the general cooling of the entire body.** Body temperature drops below 95°F (35°C).
- **Signals of hypothermia include**—
  - Shivering (may be absent in the later stages of hypothermia).
  - Numbness.
  - Glassy stare.
  - Apathy.
  - Weakness.
  - Impaired judgment.
In the case of severe hypothermia—
- The victim may be unconscious.
- Breathing may have slowed or stopped.
- The body may feel stiff as the muscles become rigid.

To care for hypothermia—
- Check and care for life-threatening conditions.
- Call 9-1-1 or the local emergency number.
- Carefully remove wet clothing and dry the victim.
- Warm the body.
- Move the victim to a warm environment.
- If available, apply heat pads or other heat source to the body.

If the victim is alert, give him or her warm nonalcoholic and decaffeinated liquids to drink.
Rewarm the victim gradually and handle him or her gently.
Monitor signs of life and continue to warm the victim until EMS personnel arrive.
Be prepared to give CPR if necessary.
Preventing Heat- and Cold-Related Emergencies

- Emergencies resulting from overexposure to extreme temperatures are usually preventable.
- You can prevent overexposure to extreme temperatures by following these guidelines:
  - Avoid being outdoors
  - Dress appropriately
  - Change your activity level
  - Take frequent breaks
  - Drink large amounts of nonalcoholic or decaffeinated fluids

Closing

- Overexposure to extreme heat and cold may cause a person to become ill.
- The likelihood of illness also depends on factors such as—
  - Physical activity.
  - Clothing.
  - Wind.
  - Humidity.
  - Working and living conditions.
  - A person's age and physical condition.
- Follow the general steps of care for heat- and cold-related emergencies.
- Questions?

Scenario

Twenty-year-old Todd Wilson is doing construction work for his uncle this summer. Todd is putting fiberglass insulation in an attic. He is wearing long pants, a long-sleeved shirt, goggles, a face mask and a hat to protect him from contact with fiberglass.
Scenario

Outdoor temperatures have been running about 95º F and this day is exceptionally humid as well. Todd had hoped to have finished this job the evening before but has to return to the job around noon the next day. He expects that it will take about 5½ hours to complete the work. Because Todd is in a hurry, he is working quickly to finish the job. He figures he can save some time if he does not take any breaks. About 2 hours later, drenched with sweat, Todd starts to feel dizzy, weak and nauseated. He barely has the energy to get down from the attic.