

## Other Life-Threatening Emergencies

BLS providers may be called to respond to life-threatening medical emergencies that have not yet progressed to cardiac arrest. Some of these emergencies are heart attack, stroke, drowning, and anaphylaxis. You may save a life by recognizing what needs to be done and acting quickly.

### Learning Objectives

At the end of this Part, you will be able to

- Recognize signs of heart attack and describe actions to help a heart attack victim
- Recognize signs of stroke and describe actions to help a stroke victim
- Discuss examples of how to tailor rescue actions based on the cause of cardiac arrest
- Describe actions to help a victim of cardiac arrest due to drowning
- Describe signs of a severe allergic reaction and the criteria for anaphylaxis
- Describe actions to help someone with a severe allergic reaction
- Discuss how to use an epinephrine autoinjector

### Heart Attack

Heart disease has been the leading cause of death in the United States for both men and women for decades. Every 40 seconds, a person in the United States has a heart attack.

A heart attack occurs when a blockage forms or there is a severe spasm in a blood vessel that restricts the flow of blood and oxygen to the heart muscle. During a heart attack, the heart typically continues to pump blood. But the longer the victim with a heart attack goes without treatment to restore blood flow, the greater the possible damage to the heart muscle. Sometimes, the damaged heart muscle triggers an abnormal rhythm that can lead to sudden cardiac arrest.

#### Signs of Heart Attack

Signs of a heart attack may occur suddenly and be intense. Yet many heart attacks start slowly with mild pain or discomfort. Activate the emergency response system if someone is having signs of heart attack (Figure 38):

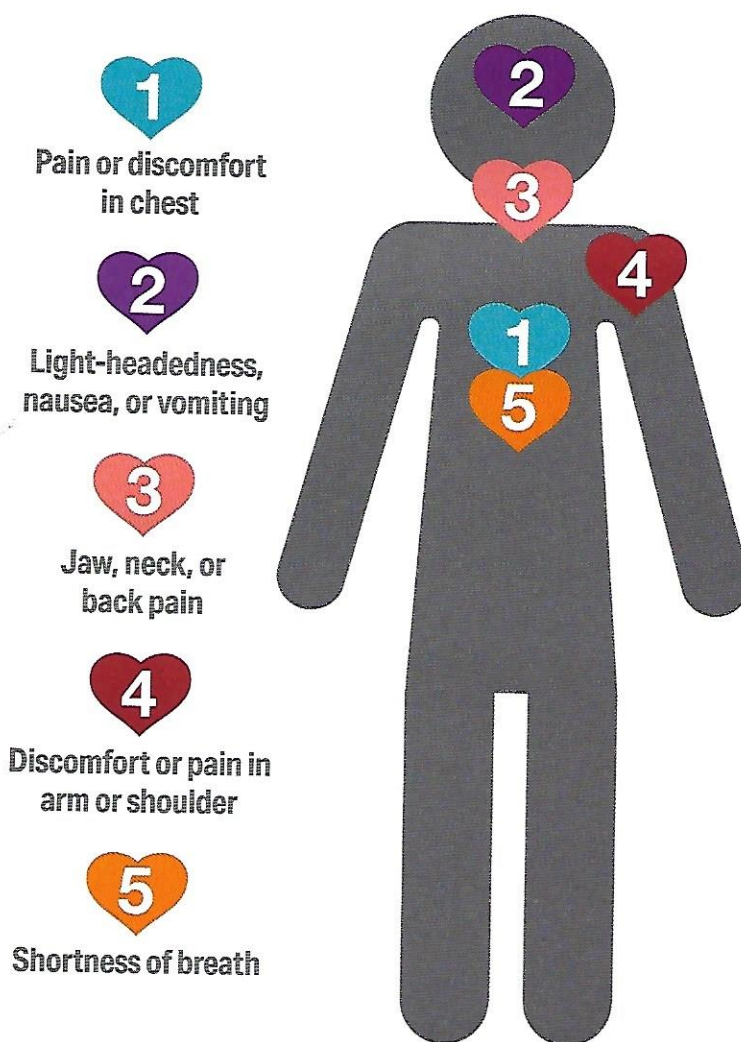
- **Chest discomfort.** Most heart attacks involve discomfort in the center of the chest that lasts more than a few minutes and often does not resolve with rest. The discomfort may go away with rest and then return. It can feel like uncomfortable pressure, squeezing, fullness, or pain.

- **Discomfort in other areas of the upper body.** Symptoms can include pain or discomfort in the left arm (commonly) but can occur in both arms, the upper back, neck, jaw, or stomach.
- **Shortness of breath.** This can occur with or without chest discomfort.
- **Other signs.** Breaking out in a cold sweat, nausea, vomiting, or light-headedness are other signs.

The typical signs of a heart attack are based on the experience of white, middle-aged men. Women, the elderly, and people with diabetes are more likely to have less typical signs of a heart attack, such as shortness of breath, weakness, unusual fatigue, cold sweat, and dizziness. Women who report chest discomfort may describe it as pressure, aching, or tightness rather than as pain.

Other less typical signs are heartburn or indigestion; an uncomfortable feeling in the back, jaw, neck, or shoulder; and nausea or vomiting. People who have trouble communicating may not be able to articulate signs of a heart attack.

**Figure 38.** Common heart attack warning signs.



## Heart Attack and Sudden Cardiac Arrest

People often use the terms *heart attack* and *cardiac arrest* to mean the same thing, but they are not the same.

- A *heart attack* is a blood flow problem. It occurs because a blockage or spasm in a blood vessel severely restricts or cuts off the flow of blood and oxygen to the heart muscle.
- *Sudden cardiac arrest* is usually a rhythm problem. It occurs when the heart develops an abnormal rhythm. This abnormal rhythm causes the heart to quiver—or stop completely—and no longer pump blood to the brain, lungs, and other organs.

Within seconds, a victim in cardiac arrest becomes unresponsive and is not breathing or is only gasping. Death occurs within minutes if the victim does not receive immediate lifesaving treatment.

Heart attack happens more frequently than cardiac arrest. Although most heart attacks do not lead to cardiac arrest, they are a common cause. Other conditions that change the heart's rhythm may lead to cardiac arrest also.

## Obstacles to Lifesaving Treatment

Early recognition, early intervention, and early transport of someone with a suspected heart attack is critical. Early access to the EMS system is often delayed because both the victim and bystanders fail to recognize the signs of a heart attack. Lifesaving treatment can be delivered by emergency medical providers on the way to the hospital, saving precious minutes and heart muscle.

Many people won't admit that their discomfort may be caused by a heart attack. People often say the following:

- "I'm too healthy" or "I'm too young."
- "I don't want to bother the doctor."
- "I don't want to frighten my spouse."
- "I'll feel silly if it isn't a heart attack."
- "It's just indigestion."

If you suspect someone is having a heart attack, act quickly and activate the emergency response system. Don't hesitate, even if the victim doesn't want to admit discomfort.

## Actions to Help a Heart Attack Victim

Heart attack is a time-critical emergency. Every minute counts. If you think someone is having a heart attack, do the following:

1. Have the victim sit and remain calm.
2. Activate the emergency response system or ask someone else to do so. Get the first aid kit and AED if available.
3. Encourage alert adults who are experiencing chest pain to chew and swallow aspirin unless they have a known aspirin allergy or have been told not to take aspirin by a healthcare provider.
4. If the victim becomes unresponsive and is not breathing or is only gasping, start CPR.

## System of Care

Effective treatment of heart attack requires a well-coordinated, timely system of care. "Time is muscle!" Every minute counts. The longer a heart attack victim waits for treatment, the more damage to the heart muscle. Timely interventions by healthcare providers in the hospital to open the blocked coronary blood vessel can determine the amount of damage to the heart muscle. One common intervention is nonsurgical treatment in the cardiac cath lab. Administration of an intravenous medication in the ED is another intervention.

Actions of healthcare providers during the first several hours of a heart attack determine how much the patient will benefit from treatment. The goal is to decrease time from symptom onset until the blockage is resolved.

Here are the steps in the out-of-hospital system of care for heart attack:

- **Early recognition and call for help.** The more quickly first responders or family recognize the warning signs of heart attack, the sooner treatment can begin. The emergency response system should be activated immediately for triage and transport. Family members should not drive the suspected heart attack victim to the hospital. Victims should not drive themselves. Emergency responders can provide some interventions at the scene or during transport, thus lessening delay to definitive treatment in the hospital.
- **Early EMS evaluation and 12-lead ECG.** The 12-lead ECG is the central component for triage of patients with chest discomfort. When EMS providers are able to perform a 12-lead ECG and transmit results to the receiving hospital, time to treatment is decreased. The ECG may be done at the scene or during transport.
- **Early heart attack identification.** Once providers confirm a heart attack, they communicate with advanced care providers and transport the patient to the most appropriate hospital.
- **Early notification.** EMS providers notify the receiving facility as soon as possible of an incoming heart attack patient. The cath lab team is activated before the patient's arrival. EMS activation of the cardiac cath lab speeds the time to diagnosis and intervention.
- **Early intervention.** The goal time from initial contact to treatment interventions is less than 90 minutes.



### **Critical Concepts: Time Is Heart Muscle**

- *Early recognition, early EMS activation, early transport by EMS, and early intervention for someone with a suspected heart attack is critical. The goal is 90 minutes from initial contact to treatment intervention.*
- *Learn to recognize the signs of a heart attack. Activate the emergency response system without delay. Give aspirin if indicated. Be prepared to start CPR if the victim becomes unresponsive.*

## **Stroke**

Every 40 seconds, someone in the United States has a stroke. More than 795 000 people have a stroke every year. Stroke is a leading cause of serious long-term disability and the fifth leading cause of death.

A stroke occurs when blood stops flowing to a part of the brain. This can happen if an artery in the brain is blocked (ischemic stroke) or a blood vessel bursts (hemorrhagic stroke). Brain cells begin to die within minutes without blood and oxygen. Treatment in the first hours after a stroke can reduce damage to the brain and improve recovery.

### **Warning Signs of Stroke**

Use the F.A.S.T. method to recognize and remember the warning signs of stroke (Table 3). F.A.S.T. stands for face drooping, arm weakness, speech difficulty, and time to phone 9-1-1. If you see any of these signs, act F.A.S.T.

**Table 3. Spot a Stroke F.A.S.T.**

Letter	Stroke warning signs
<b>F</b>	<b>Face drooping:</b> Does one side of the face droop or is it numb? Ask the person to smile.
<b>A</b>	<b>Arm weakness:</b> Is one arm weak or numb? Ask the person to raise both arms. Does one arm drift downward?
<b>S</b>	<b>Speech difficulty:</b> Is speech slurred? Is the victim unable to speak or hard to understand? Ask the person to repeat a simple sentence, like "The sky is blue." Is the sentence repeated correctly?
<b>T</b>	<b>Time to phone 9-1-1:</b> If the person shows any of these symptoms, even if the symptoms go away, phone 9-1-1 and get them to the hospital immediately.

## Other Signs of Stroke

Be alert for other common signs of stroke, such as

- Sudden dizziness, trouble walking, or loss of balance or coordination
- Sudden trouble seeing in one or both eyes
- Sudden severe headache with no known cause
- Sudden numbness of the face, arm, or leg
- Sudden weakness in part of the body
- Sudden confusion or trouble understanding others

## Actions to Help a Stroke Victim

Stroke is a time-critical emergency. Every minute counts. If you think someone has had a stroke, do the following:

1. Quickly evaluate the victim for signs of stroke.
2. Activate the emergency response system or have someone else do so.
3. Find out what time the signs of stroke first appeared.
4. Remain with the victim until someone with more advanced training arrives and takes over.
5. If the victim becomes unresponsive and is not breathing normally or is only gasping, give CPR.

## System of Care

Effective stroke treatment requires a well-coordinated, timely system of care. Delay at any step limits treatment options. The longer a stroke patient waits for treatment, the more brain tissue dies. Drugs that break up a clot must be given within about 3 hours after the time the signs first started. Providers must know the last-known-well time. This is the point at which the patient was last known to be well without signs of stroke.

Here are the steps in the out-of-hospital system of care for stroke:

1. **Recognition.** The more quickly first responders or family recognize the warning signs of stroke (Table 3), the sooner treatment can begin. Patients who do not get to the ED within a 3-hour window, from the onset of symptoms, may not be eligible for certain types of therapy.
2. **EMS dispatch.** Someone should phone 9-1-1 and get EMS on the way as quickly as possible. Family members should not transport the stroke victim to the hospital themselves.
3. **EMS identification, management, and transport.** EMS will determine if the patient is showing signs of a stroke and obtain important medical history. They will begin management and transport to the next level of care. EMS will call ahead to the receiving hospital to alert providers that a potential stroke patient will soon be arriving.
4. **Triage.** The patient should be triaged to the closest available stroke center or hospital that provides emergency stroke care.

5. **Evaluation and management.** Once the patient arrives at the ED, evaluation and management should proceed immediately.
6. **Treatment decisions.** Providers with stroke expertise will determine appropriate therapy.
7. **Therapy.** The gold standard treatment for ischemic stroke is an intravenous administration of alteplase. To be effective, alteplase must be given within about 3 hours after the time the signs first started. Another option is thrombectomy, an invasive procedure that removes the clot from inside the blood vessel or artery.



### **Critical Concepts: Time Is Brain**

*Stroke is a time-critical emergency. Every minute treatment is delayed, more brain tissue dies. Priorities are early recognition, limited scene time, and transport to the appropriate facility.*

## **Drowning**

Drowning is the third leading cause of injury death worldwide. In the United States, drowning is the second leading cause of injury death for children ages 1 to 14. Nonfatal drowning injuries can cause severe brain damage, resulting in disabilities and permanent loss of basic functioning.

### **Rescue Actions Based on Cause of Cardiac Arrest**

BLS providers may need to tailor rescue actions to the most likely cause of arrest. For example, if you are alone and see someone suddenly collapse, then it is reasonable to assume that the victim has had a sudden cardiac arrest. The steps for a sudden cardiac arrest are to activate the emergency response system, get an AED, and then return to the victim to provide CPR. CPR for a victim of sudden cardiac arrest begins with chest compressions. The sequence for a victim of drowning is different. Cardiac arrest in a drowning victim is caused by a severe lack of oxygen in the body (asphyxial arrest). The priority is to get oxygen to the brain, heart, and other tissues.

### **Actions to Help a Victim of Cardiac Arrest Due to Drowning**

Follow these steps along with the Adult BLS for Healthcare Providers algorithm to help a victim of cardiac arrest:

1. Call for help. Ask someone to activate the emergency response system. Get to the victim as quickly as possible. Move the victim to shallow water or out of the water. Pay attention to your own personal safety during the rescue process.
2. Check for breathing. If there is no breathing, open the airway. Give 2 rescue breaths that make the chest rise. Avoid delays in beginning CPR. Use mouth-to-nose ventilation as an alternative to mouth-to-mouth ventilation if needed. Sometimes it is difficult for the rescuer to pinch the victim's nose, support the head, and open the airway if the victim is still in the water.
  - a. You do not need to perform routine spinal stabilization unless there are signs that the victim may have a head or neck injury.
  - b. Do not try to clear the airway of aspirated water. Most drowning victims only aspirate a modest amount of water, and it is absorbed rapidly.
  - c. Do not use abdominal thrusts to try to remove water from the breathing passages. These actions are not recommended and can be dangerous.

3. Check for a pulse after giving 2 effective breaths.
  - a. If the victim is not breathing normally but has a pulse, provide rescue breathing only. Recheck for a pulse every 2 minutes.
  - b. If you do not feel a pulse, start CPR.
4. Start CPR with cycles of 30 compressions and 2 breaths. Give 5 cycles (about 2 minutes) and then activate the emergency response system if not already done.
5. Use the AED as soon as it is available. Attach the AED once the victim is out of the water. You only need to dry the chest area quickly before applying the AED pads.
6. Follow the AED prompts. If no shock is needed and after any shock delivery, immediately resume CPR, starting with chest compressions.

### Vomiting During Resuscitation

The victim may vomit during rescue breaths or chest compressions. If this happens, turn the victim to the side. If you suspect a spinal cord injury, roll the victim so that the head, neck, and torso are turned as a unit. This will help protect the cervical spine. Remove the vomit using your finger or a cloth. You may use suction if within your scope of practice.

### Transport

All victims of drowning should be transported by EMS to the ED for evaluation and monitoring. This includes victims who needed only rescue breaths or those who are alert and seem to have recovered. Although survival is uncommon in victims who have been underwater for a long time, there have been cases of successful recovery, especially when in cold water. For this reason, rescuers should provide CPR at the scene, and the victim should be transported in accordance with local protocols.



#### **Critical Concepts:** **Rescue Breaths First**

*The first and most important action for a drowning victim is to give rescue breaths as soon as possible. This action increases the victim's chance of survival.*

## Anaphylaxis

Most allergic reactions are mild. Some, however, worsen to a state of anaphylaxis. Anaphylaxis is a severe allergic reaction that requires urgent treatment. Treatment may include an epinephrine injection.

Prompt recognition is critical. You must be able to identify if an allergic reaction is mild or severe (anaphylaxis).

### Mild Allergic Reaction

#### **Signs of a Mild Allergic Reaction**

Signs of a mild allergic reaction are

- Stuffy nose, sneezing, and itching around the eyes
- Itching of the skin or mucous membranes
- Raised, red rash on the skin (hives)

### ***Actions for Mild Allergic Reaction***

- Get help.
- Remove the victim from the allergen if known (move out of the environment, wash the affected area of skin).
- Ask about any history of allergy or anaphylaxis; look for a medical alert bracelet or necklace.
- Consider an oral dose of antihistamine.

### **Severe Allergic Reaction**

A severe allergic reaction (anaphylaxis) can be life threatening if not recognized and treated immediately. Anaphylaxis occurs suddenly after contact with an allergen. Some common allergens associated with anaphylaxis are medicines, latex, foods, and stinging insects. In anaphylaxis, 2 or more body systems are involved.

### ***Signs of a Severe Allergic Reaction***

Signs of a severe allergic reaction may include

- **Breathing.** Swelling of the airway, trouble breathing, and abnormal breathing sounds (such as wheezing)
- **Skin.** Hives, itching, flushing, and swelling of the lips, tongue, and face
- **Circulation.** Signs of poor perfusion (shock), which may include very fast heart rate, changes in skin color, cool skin, not alert, low blood pressure
- **Gastrointestinal.** Stomach cramping, diarrhea

### ***Criteria for Anaphylaxis***

Many providers have trouble recognizing anaphylaxis. Look for the following 4 criteria:

- Signs that come on quickly and rapidly get worse
- Skin changes, such as flushing, itching, and swelling of the lips, tongue, and face
- Life-threatening airway, breathing, or circulation problems
- Involvement of 2 or more body systems

Remember that skin changes alone are not a sign of an anaphylactic reaction.

### ***Epinephrine Autoinjector for a Severe Allergic Reaction***

Epinephrine is a drug that can temporarily relieve the life-threatening problems caused by a severe allergic reaction. It is available by prescription in a self-injectable device called an epinephrine autoinjector. People who are known to have severe allergic reactions are encouraged to carry epinephrine autoinjectors with them at all times.

There are 2 types of epinephrine autoinjectors: spring activated and electronic. Doses are different for children and adults. The epinephrine injection is given in the side of the thigh, about halfway between the hip and the knee (Figure 39B). This is the safest location for administration. Epinephrine can be given on bare skin or through clothing.

Someone who has an epinephrine autoinjector will generally know how and when to use it. If the person is unable, you may help give the injection if the medication has been prescribed by a physician and state law permits it.

### ***Actions to Help Someone With a Severe Allergic Reaction***

A severe allergic reaction can be life threatening. Follow these steps to help someone with suspected anaphylaxis:

1. Activate the emergency response system or ask someone else to do so. Send someone to get the person's epinephrine autoinjector(s).
2. Give or help the person inject epinephrine with an epinephrine autoinjector as soon as possible (Figure 39). See How to Use an Epinephrine Autoinjector.
3. Send someone to get the AED.



4. Give a second dose of epinephrine if the person has continued symptoms and advanced care will not arrive in 5 to 10 minutes.
5. If the person becomes unresponsive and is not breathing or is only gasping, start CPR. You may give epinephrine by epinephrine autoinjector during cardiac arrest.
6. If possible, save a sample of what caused the reaction. Give it to the advanced responders.



**Critical Concepts:**  
**Lifesaving Action for Anaphylaxis**

*The first and most important action for someone with suspected anaphylaxis is to give an immediate injection of epinephrine using their epinephrine autoinjector.*

### **How to Use an Epinephrine Autoinjector**

You should know the correct technique for using an epinephrine autoinjector. Some devices give voice prompts to guide users through the administration of the epinephrine dose.

#### **Device Safety**

Before using the epinephrine autoinjector, quickly examine it to make sure it is safe to use. Do not use it if the

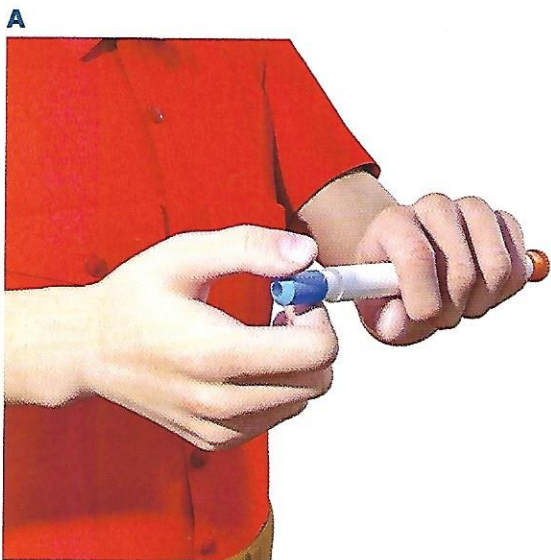
- Solution is discolored (when it is possible to see the medicine)
- Clear window on the autoinjector is red

#### **Steps for Using an Epinephrine Autoinjector**

Follow these steps to correctly use an epinephrine autoinjector:

1. Follow the instructions on the device. Make sure you are holding the device in your fist without touching either end because the needle comes out of one end. You may give the injection through clothes or on bare skin. Take off the safety cap (Figure 39A).
2. Hold the leg firmly in place just before and during the injection. Press the tip of the injector hard against the side of the person's thigh, about halfway between the hip and the knee (Figure 39B).
3. For EpiPen and EpiPen Jr injectors, hold the injector in place for 3 seconds. Some other injectors may be held in place for up to 10 seconds. Be familiar with the manufacturer's instructions for the type of injector you are using.
4. Pull the injector straight out, making sure you do not put your fingers over the end that has been pressed against the person's thigh.
5. Either the person getting the injection or the one giving the injection should rub the injection spot for about 10 seconds.
6. Note the time of the injection. Properly dispose of the injector.
7. Ensure that EMS is on the way. If there is a delay greater than 5 to 10 minutes for advanced help to arrive, consider giving a second dose, if available.

**Figure 39.** Using an epinephrine autoinjector. **A,** Take off the safety cap. **B,** Press the tip of the injector hard against the side of the thigh, about halfway between the hip and the knee.



### Safe Disposal

It's important to dispose of used needles correctly so that no one gets stuck. Follow the sharps disposal policy at your workplace. If you don't know what to do with the used injector, give it to someone with more advanced training.

## Review Questions

- Which of the following populations is most likely to show atypical signs of a heart attack, like shortness of breath and dizziness?
  - White, middle-aged men
  - Individuals with diabetes
  - Younger-aged individuals
  - People who are overweight
- What does the stroke acronym F.A.S.T. stand for?
  - Face drooping, arm weakness, speech difficulty, time to phone 9-1-1
  - Falling down, arm weakness, slurring words, time to start first aid
  - Falling down, arm tingling, speech difficulty, time to phone 9-1-1
  - Face drooping, arm tingling, sudden weakness, time to start CPR
- If you think someone might be having a stroke, what should be the first thing you do?
  - Start first aid on the individual.
  - Wait an hour and then phone 9-1-1.
  - Give the person an injection of alteplase.
  - Quickly check for signs of stroke.
- How are rescue actions for cardiac arrest due to drowning different from the rescue actions for sudden cardiac arrest?
  - Unlike sudden cardiac arrest, the priority in a drowning is to give the person CPR.
  - Unlike sudden cardiac arrest, the priority in a drowning is to give the person oxygen.
  - Unlike sudden cardiac arrest, the priority in a drowning is to locate an ambulance.
  - Unlike sudden cardiac arrest, the priority in a drowning is to give chest compressions.

5. You are attempting to rescue a person who has experienced drowning. What do you do if there are no signs of breathing?
  - a. Attempt to clear the airway of aspirated water.
  - b. Perform abdominal thrusts to remove any water.
  - c. Open the airway and administer rescue breaths.
  - d. Use spinal stabilization regardless of neck injury.
6. Which of the following is a sign that someone is experiencing anaphylaxis?
  - a. Symptoms developing quickly but getting worse slowly
  - b. Presence of a medical alert bracelet or necklace
  - c. Person responding well to oral antihistamines
  - d. Life-threatening breathing or circulation problems
7. You notice someone showing all the signs of a severe allergic reaction. What is the first and most important action you should take?
  - a. Call an advanced responder.
  - b. Use the epinephrine device.
  - c. Give the person an oral antihistamine.
  - d. Locate an external defibrillator.
8. Where on the body should you administer an epinephrine injection?
  - a. On the person's thigh, about halfway between the hip and the knee
  - b. On the person's torso, about halfway between the hip and the ribs
  - c. On the person's arm, about halfway between the elbow and the wrist
  - d. On the person's neck, about halfway between the ear and the shoulder

See Answers to Review Questions in the Appendix.