

Sudden Illnesses

14

► Unexplained Change in Responsiveness

Victims can be fully alert (responsive), completely unresponsive, or can range anywhere between these two. Not all responsive victims are fully alert and they may respond to different levels of stimulation (eg, respond to your voice or squeezing of shoulder muscle). The level of responsiveness and mental status indicate how well the brain is functioning.

The main causes for a decrease in a person's alertness and responsiveness are brain injury and lack of either oxygen or glucose reaching the brain. The mnemonic STOP offers clues to the cause(s) of changes in responsiveness **Table 1**.

► Heart Attack

Heart muscle needs oxygen to survive. A coronary attack (heart attack) occurs when the blood flow that brings oxygen to the heart muscle is severely reduced or cut off completely. This happens when coronary arteries that supply the heart with blood slowly become thicker and harder from a buildup of plaque (ie, fat, cholesterol, and other substances). This slow process is known as atherosclerosis **Figure 1A**. When plaque in a heart artery breaks free, a blood clot forms around the plaque, this blood clot can block the artery and shut off blood flow to the heart muscle. When the heart muscle is starved for oxygen and nutrients, it is called ischemia. When damage or death of part of

chapter *at a glance*

- Unexplained Change in Responsiveness
- Heart Attack
- Angina
- Stroke (Brain Attack)
- Asthma
- Hyperventilation
- Chronic Obstructive Pulmonary Disease
- Fainting
- Seizure
- Diabetic Emergencies
- Emergencies During Pregnancy

Table 1 STOP Mnemonic

S	Sugar	Blood glucose too low (insulin reaction) or too high (diabetic coma)
	Seizures	
	Stroke	
	Shock	
T	Temperature	Too high (heatstroke) or too low (hypothermia)
O	Oxygen	Inadequate oxygen
P	Poisoning	Drug/alcohol overdose Carbon monoxide poisoning
	Pressure on brain	Head injury

the heart muscle occurs as a result of ischemia, it is called a **heart attack** or myocardial infarction (MI)

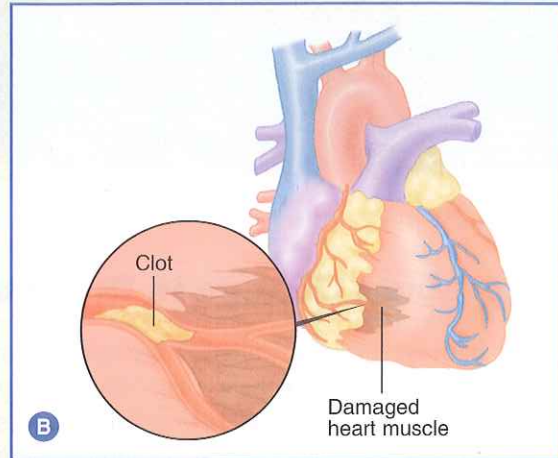
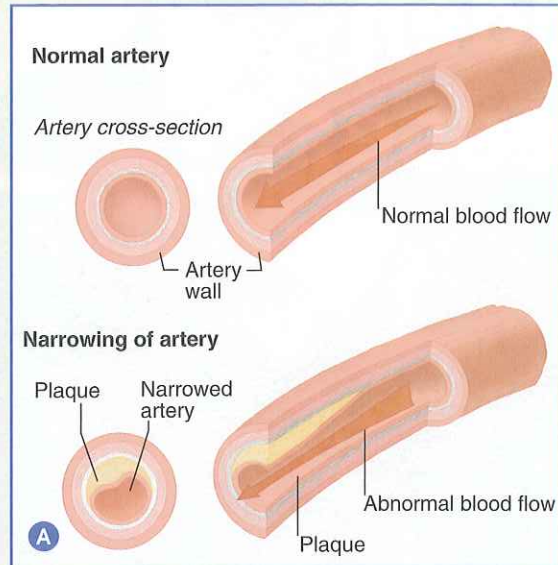
Figure 1B

Heart and blood vessel disease is America's number one killer. About half of the deaths from heart and blood vessel disease are from coronary heart disease, which includes heart attack. About 325,000 people a year die of coronary attack before they get to a hospital emergency department.

Difference Between Heart Attack and Cardiac Arrest

The conditions *heart attack* and *cardiac arrest* confuse many people. The two are very different, and so is the first aid and emergency care for them.

- **Heart attack.** When one or more of the arteries delivering blood to the heart becomes blocked, a heart attack results. Oxygen-rich blood cannot reach the heart muscle, and the heart muscle becomes damaged. This damage to the heart muscle can lead to disturbances of the heart's electrical system and can lead to a cardiac arrest.
- **Cardiac arrest.** Cardiac arrest occurs when either the heart stops beating (asystole) or when the heart's lower chambers (ventricles) suddenly develop a rapid irregular rhythm (ventricular fibrillation), causing the ventricles to quiver rather than contract. The quivering motion of the ventricles renders the heart an ineffective pump that can no longer

**Figure 1**

A. A normal artery with normal blood flow and an artery with plaque buildup. B. A heart attack occurs when a clot prevents blood flow to a part of the heart.

supply the body and brain with oxygen-rich blood. Within seconds, the victim becomes unresponsive and has no pulse. Only immediate action such as cardiopulmonary resuscitation (CPR) and external defibrillation can offer hope of survival.

Recognizing a Heart Attack

Some heart attacks are sudden and intense, leaving no doubt about what is happening. Most heart attacks, however, start slowly, with mild pain or discomfort.

Heart attack victims are often not sure what is wrong and wait too long before getting help.

The National Heart, Lung and Blood Institute offer these signs of a possible heart attack:

- **Chest discomfort.** Most heart attacks involve discomfort in the center of the chest that lasts more than a few minutes or that goes away and comes back. 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 one or both arms, the back, neck, jaw, or stomach.
- **Shortness of breath** with or without chest discomfort.
- **Other signs** may include breaking out in a cold sweat, nausea, or lightheadedness.

The most common heart attack symptom for both men and women is chest pain or discomfort. However, women are somewhat more likely than men to experience some of the other symptoms, especially shortness of breath, nausea/vomiting, and back or jaw pain.

FYI

No Chest Pain in One Third of Heart Attacks

A study of hundreds of thousands of heart attack victims found that as many as one third had no chest pain and that they were less likely to seek help and twice as likely to die.

The study found that women, people of color, people older than 75 years, and people with previous heart failure, stroke, or diabetes were most likely to have painless heart attacks. Although doctors have long known about painless heart attacks, many said they did not realize the number was so high.

Patients with chest pain were more than twice as likely to be diagnosed at admission and to receive clot-busting drugs or undergo angioplasty to open clogged arteries.

Source: Canto JG, Shlipak MG, Rogers WJ, et al. Prevalence, clinical characteristics, and mortality among patients with myocardial infarction presenting without chest pain. *JAMA*. 2000. 283:3223-3229.

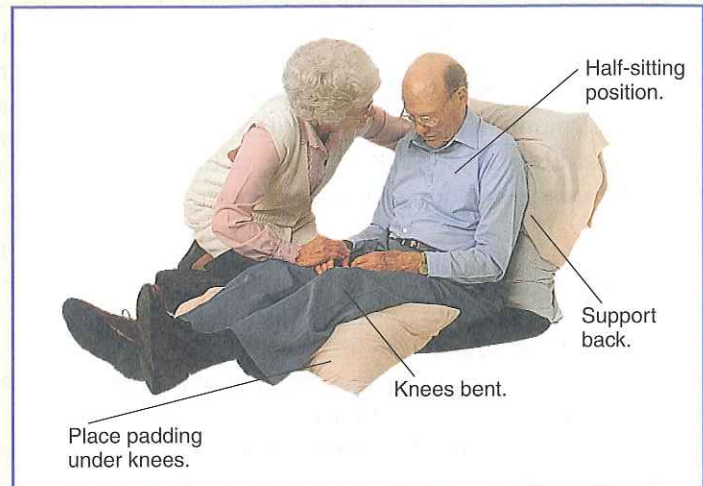


Figure 2

Help the victim into a relaxed position to ease strain on the heart.

Care for Heart Attack

Treat a suspected heart attack in the following manner:

1. Immediately call 9-1-1 if a heart attack is suspected or if the chest pain does not go away in a victim taking nitroglycerin. Medications to dissolve a clot must be given early. Do not drive yourself or anyone else to the hospital.
2. Monitor breathing. If the victim becomes unresponsive and stops breathing, begin CPR.
3. Help the victim to the most comfortable resting position, usually sitting [Figure 2](#). Loosen clothing around the neck and waist. Be calm and reassuring.
4. If the victim is alert, able to swallow, and not allergic to aspirin, help the victim take one adult aspirin (325 mg) or two chewable children's aspirin (81 mg each). Pulverize them or have the victim crunch them with his or her teeth before swallowing.

Find out if the victim is using nitroglycerin. Nitroglycerin tablets, spray, or ointment can relieve chest pain from angina but not always from a heart attack. Nitroglycerin dilates the coronary arteries, which increases blood flow to the heart muscle. It also lowers blood pressure and dilates the veins, thus decreasing the work of the heart and the heart muscle's need for oxygen.

Caution: Because nitroglycerin lowers blood pressure, the victim should sit or lie down once it is taken. Let the victim take one pill or one spray under the tongue. If necessary, help him or her take it. If the chest pain or discomfort does not improve within 5 minutes after the one dose, call 9-1-1. Previously, victims were told to take up to three doses, 5 minutes apart.

► Angina

Chest pain called **angina pectoris** can result from coronary heart disease just as a heart attack does (Table 2). Angina occurs when coronary arteries supplying the heart muscle with oxygen-rich blood become narrow and cannot carry sufficient blood to meet the demands during:

- Physical exertion
- Excitement
- Emotional upset
- Eating of a heavy meal
- Extreme hot or cold temperature exposure
- Cigarette smoking

Recognizing Angina

It can be difficult to differentiate a heart attack from angina, even for physicians. Chest pain from a heart attack is as likely to happen at rest as during activity, the pain lasts longer than 10 minutes, and it is not relieved by nitroglycerin. Differentiate angina from a heart attack by these signs and symptoms:

- Chest pain is described as crushing, squeezing, or like somebody standing on the victim's chest.
- Pain can spread to the jaw, the arms (frequently the left arm), and the mid-back.
- Pain usually lasts from 3 to 10 minutes, but rarely longer than 10 minutes.
- The pain is almost always relieved by the victim's prescribed nitroglycerin.
- Pain can be associated with shortness of breath, nausea, or sweating.
- Victim feels anxious.

Table 2 Chest Pain

Cause of Pain	Characteristics	Care
Muscle or rib pain from exercise or injury	Reproduced by movement Tender spot when pressed	Rest Aspirin or ibuprofen
Respiratory infection (eg, pneumonia, bronchitis, pleuritis)	Cough Fever Sore throat Production of sputum	Antibiotics
Indigestion	Belching Heartburn Nausea Sour taste	Antacids
Angina pectoris	Lasts less than 10 minutes (but pain is similar to that of a heart attack)	Rest Victim's nitroglycerin
Heart attack (myocardial infarction)	Lasts more than 10 minutes Pressure, squeezing, or pain near center of the chest Pain spreads to shoulders, neck, or arms Lightheadedness, fainting, sweating, nausea, shortness of breath	Call 9-1-1 Check breathing Resting position Victim's nitroglycerin

FYI**Other Causes of Chest Pain**

Not all causes of chest pain relate to the heart, including:

- Muscle or rib pain due to exercise, excessive coughing, or injury. The victim can reproduce the pain by movement, and often the area of complaint is tender when pressed. Rest and aspirin or ibuprofen relieves the pain.
- Respiratory infections such as pneumonia, bronchitis, pleuritis, or lung injury. Chest pain due to these conditions usually worsens when the victim coughs or breaths deeply. Fever and colored sputum might be present. The victim needs medical care and may require prescribed medications.
- Indigestion, usually accompanied by belching, heartburn, nausea, and a sour taste in the mouth. This type of pain is relieved by antacids.

Care for Angina

Angina can be treated with drugs that affect the blood supply to the heart muscle, the heart's demand for oxygen, or both. Drugs that affect the blood supply are coronary vasodilators; they cause blood vessels to relax. When this happens, the opening inside the vessels (the lumen) gets bigger. Then blood flow improves, letting more oxygen and nutrients reach the heart muscle.

Nitroglycerin mainly relaxes the veins and relaxes the coronary arteries a little. By relaxing the veins, it reduces the amount of blood that returns to the heart and eases the heart's workload. By relaxing the coronary arteries, it increases the heart's blood supply. Physicians often prescribe nitroglycerin for those with angina.

1. Have the victim stop what he or she is doing and sit down. Keep bystanders away. Provide calm reassurance to help reduce the victim's anxiety.
2. If the victim has medically prescribed nitroglycerin, either tablets or a spray, let the victim use it. This is one pill or one spray under the tongue. Follow the prescription label's directions. If necessary, help him or her use it.
3. If the chest pain or discomfort does not improve within 5 minutes after taking one

FYI**Why Don't They Call?**

A study asked heart attack victims who waited for more than 20 minutes before getting help why they delayed. Their answers included the following:

- They thought the symptoms would go away.
- The symptoms were not severe enough.
- They thought it was a different illness.
- They were worried about medical costs.
- They were afraid of hospitals.
- They feared being embarrassed.
- They wanted to wait for a better time.
- They did not want to find out what was wrong.

The average time that elapsed between symptom onset and hospital arrival was 2 hours; 28% waited at least 1 hour, 33% waited 1 to 3 hours, 15% waited 3 to 6 hours, and 23% waited more than 6 hours. Most victims reported they were not sure their symptoms were severe enough to merit action as drastic as calling 9-1-1.

The same study concluded that one way to shorten out-of-hospital delay is to encourage victims with heart-related symptoms to use EMS rather than slower transportation methods.

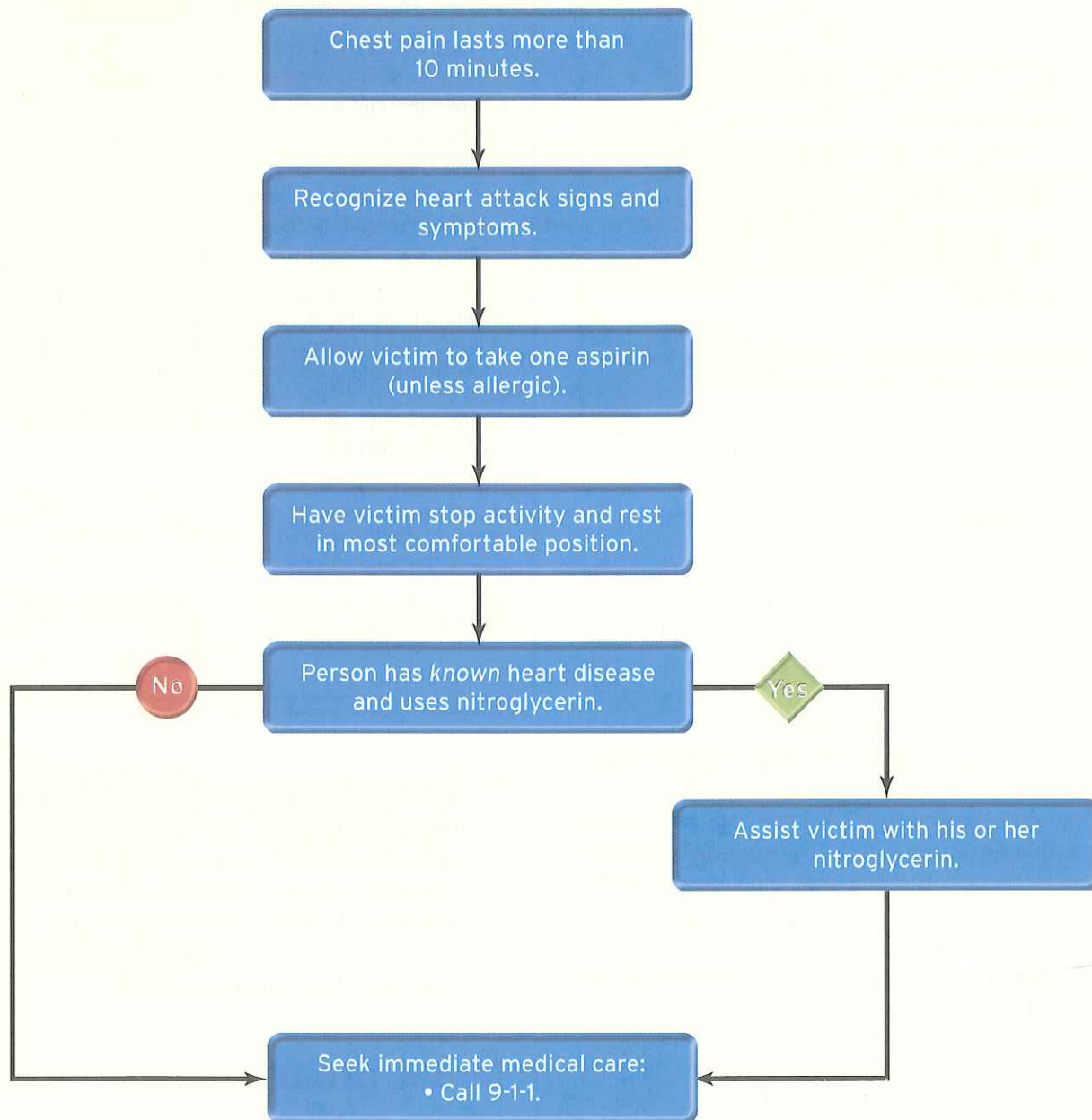
Source: Meischke H, Eisenberg MS, Schaeffer SM, Larsen MP. 1995. Reasons patients with chest pain delay or do not call 911. *Ann Emerg Med.* 25(2):193-197.

dose of nitroglycerin, call 9-1-1. Previously, victims were told to take up to three nitroglycerin tablets, 5 minutes apart, when they had chest pain or discomfort. This procedure has been changed so that if there is no improvement within 5 minutes after taking one dose, 9-1-1 should be called.

► Stroke (Brain Attack)

A **stroke**, also called a brain attack, occurs when there is a sudden interruption of blood flow to the brain. This occurs when arteries in the brain rupture or become blocked so part of the brain does not receive the blood flow it needs (Figure 3). Deprived of oxygen-rich blood, nerve cells in the affected area of the brain cannot function and die within minutes. Because dead brain cells are not replaced, the devastating effects of strokes often are permanent. When nerve cells do

Heart Attack



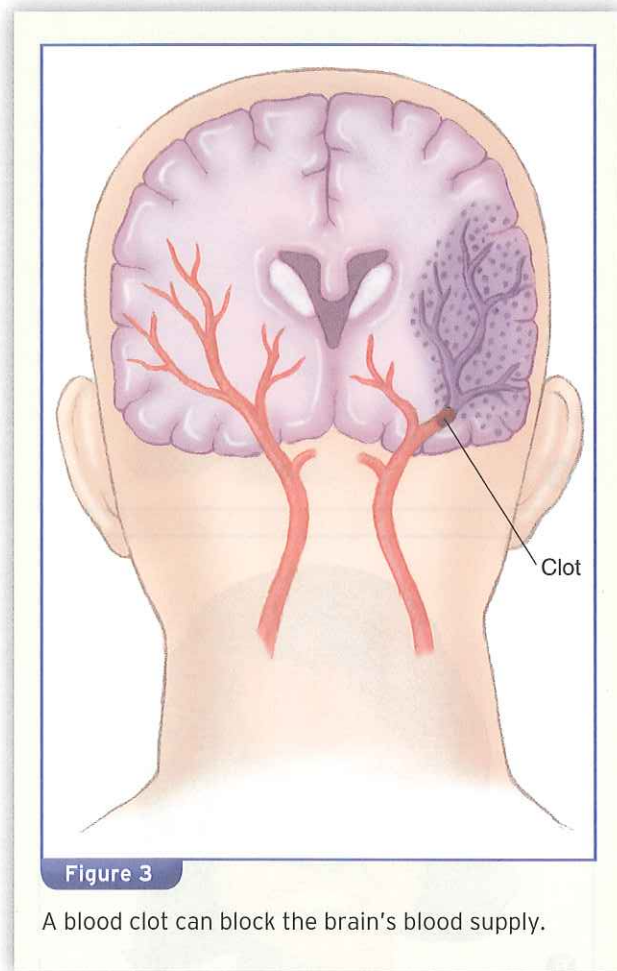


Figure 3

A blood clot can block the brain's blood supply.

not function, the part of the body they control cannot function either. Each year, about 800,000 Americans suffer a new or recurrent stroke, and about one fourth of these victims die, making it the third leading cause of death.

Strokes are classified as ischemic or hemorrhagic:

- **Ischemic stroke.** This type of stroke occurs when blood vessels to the brain become narrowed or clogged with fatty deposits called plaque, cutting off blood flow to brain cells. High blood pressure is the most important risk factor for ischemic stroke and can be controlled. Ischemic strokes are the most common type of stroke and account for about 85% of all strokes. Ischemic strokes usually occur at night or first thing in the morning.

Because tissue plasminogen activators (tPA) and other clot-busting drugs must be given as soon as possible after stroke onset (within 3 hours), it is important to recognize a stroke and to seek immediate medical care.

FYI

Give Me 5 for Stroke

The American Academy of Neurology, the American College of Emergency Physicians, and the American Heart Association/American Stroke Association formed a joint campaign known as "Give Me 5" for Stroke. Women especially need to know the warning signs, because they account for over 60% of the deaths from stroke. They are also often the health information keepers for their families. Give Me 5 for Stroke uses easy-to-remember words to help identify the five signs of stroke. The key words are:

- **Walk:** Is their balance off?
- **Talk:** Is their speech slurred or face droopy?
- **Reach:** Is one side weak or numb?
- **See:** Is their vision all or partly lost?
- **Feel:** Is their headache severe?

- **Hemorrhagic stroke.** About 15% of all strokes happen when a blood vessel ruptures in or near the brain. This kind of stroke is often associated with a very severe headache, nausea, and vomiting. Usually the symptoms appear suddenly.

Immediately seek medical care if there is a possibility of stroke. Any or all of the following procedures might be needed:

- Medication to control high blood pressure
- Medication to reduce brain swelling
- Surgery to repair an aneurysm or remove a blood clot

Recognizing Stroke

Symptoms of stroke include the following:

- Weakness, numbness, or paralysis of the face, an arm, or a leg on only one side of the body
- Blurred or decreased vision, especially in one eye
- Problems speaking or understanding
- Dizziness or loss of balance
- Sudden, severe, and unexplained headache
- Deviation of the eyes from PEARL (pupils equal and reactive to light), which might mean the brain is being affected by lack of oxygen

Table 3 Cincinnati Prehospital Stroke Scale

Test	Normal	Abnormal
Facial droop Figure 4 (Ask victim to show teeth or smile.)	Both sides of face move equally well.	One side of the face does not move as well as the other.
Arm drift Figure 5 (Ask victim to close eyes and hold out both arms with palms up.)	Both arms move the same, or both arms do not move.	One arm does not move, or one arm drifts down compared with the other side.
Speech (Ask victim to say, "The sky is blue in Cincinnati.")	Victim uses correct words with no slurring.	Victim slurs words, uses inappropriate words, or is unable to speak.

CAUTION

DO NOT give a stroke victim anything to drink or eat. The throat can be paralyzed, which restricts swallowing.

The Cincinnati Stroke Scale is a proven method for quickly identifying stroke victims. When you suspect a stroke, apply these three simple tests **Table 3**:

- Facial droop
- Arm drift
- Speech

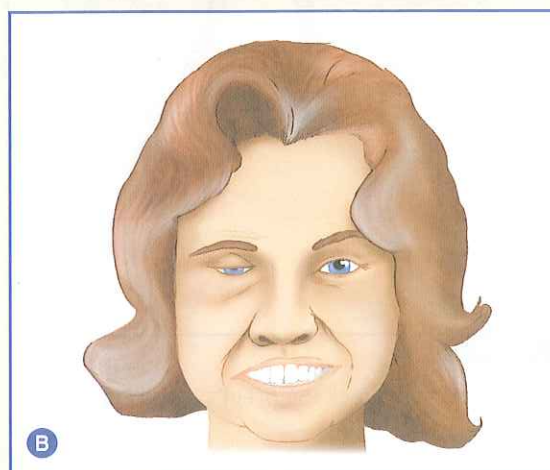
Care for a Stroke Victim

First aid for a stroke victim is limited to supportive care:

1. Call 9-1-1 immediately. Minimize brain damage by getting the victim to medical care.
2. Check the time at which the first signs appeared. A physician can use the information to determine whether a clot-busting drug can be given.



A



B

Figure 4

A. A normal smile. B. Facial droop.

3. Monitor breathing. If the victim becomes unresponsive and stops breathing, begin CPR.
4. If the victim is unresponsive and breathing, place the victim in the recovery position to keep the airway open and to permit possible secretions and vomit to drain from the mouth.
5. If the victim is responsive, get the victim into a comfortable position with the head elevated. Be sure that the victim does not exert himself or herself.
6. Do not give the victim anything to drink or eat.
7. Reassure and keep the victim warm until EMS arrives.

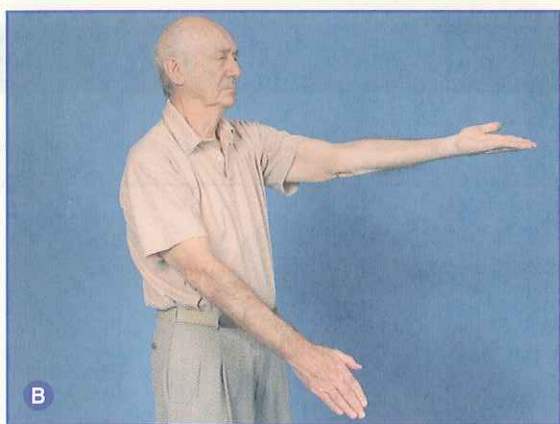
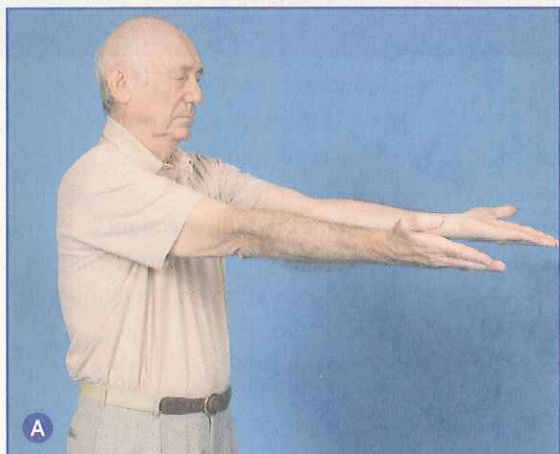


Figure 5

A. Normal arm position. B. Arm droop.

► Asthma

Asthma is a chronic (long-term) lung disease that inflames and narrows the airways. Asthma causes recurring periods of wheezing (a whistling sound when a person breathes), chest tightness, shortness of breath, and coughing. The coughing often occurs at night or early in the morning.

Asthma affects people of all ages, but it most often starts in childhood and has the highest prevalence rate in those ages 5 to 17 years. In the United States, about 23 million people are known to have asthma.

The airways are tubes that carry air into and out of the lungs. People who have asthma have inflamed airways. This makes the airways swollen and very sensitive. They tend to react strongly to certain substances that are breathed in.

When the airways react, the muscles around them tighten. This causes the airways to narrow, allowing

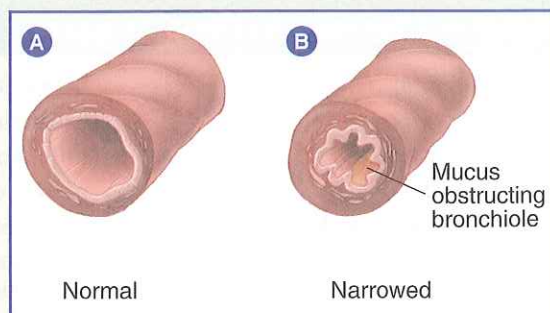


Figure 6

A. A cross-section of a normal airway. B. A cross-section of an airway during asthma symptoms, with the airway narrowed and inflamed, a thickened airway wall, and mucus.

less air to flow to the lungs. Swelling makes the airways even narrower. Cells in the airways may make more mucus than normal (Figure 6). Mucus is a sticky, thick liquid that can further narrow a person's airways.

This chain reaction can result in asthma symptoms. Symptoms can happen each time the airways are irritated. Sometimes symptoms are mild and go away on their own or after minimal treatment with an asthma medicine. At other times, symptoms continue to get worse. An asthma attack is when symptoms get more intense and/or additional symptoms appear.

It is important to treat symptoms when they are first noticed. This helps prevent the symptoms from worsening and causing a severe asthma attack. Severe asthma attacks may require medical care, and they can cause death.

Some of the known triggers of asthma are listed in Table 4.

Recognizing an Asthma Attack

Asthma varies a great deal from one person to another. Symptoms can range from mild to moderate to severe and can be life-threatening. The episodes can come occasionally or often. Between episodes, the person has no breathing difficulties.

The common asthma signs and symptoms include:

- **Excessive coughing.** Coughing from asthma is often worse at night or early in the morning.
- **Wheezing.** Wheezing is a whistling or squeaky sound that occurs when the victim breathes.

Table 4 Common Asthma Triggers**Environmental**

- Cold air
- House dust mites
- Cockroaches
- Animals (eg, cats, dogs, rodents)
- Indoor irritants (eg, wood-burning stoves)
- Outdoor air pollution (eg, vehicle emissions)
- Indoor or outdoor molds and fungi
- Tobacco smoke
- Pollen (eg, grass, trees)

Drugs or Chemicals

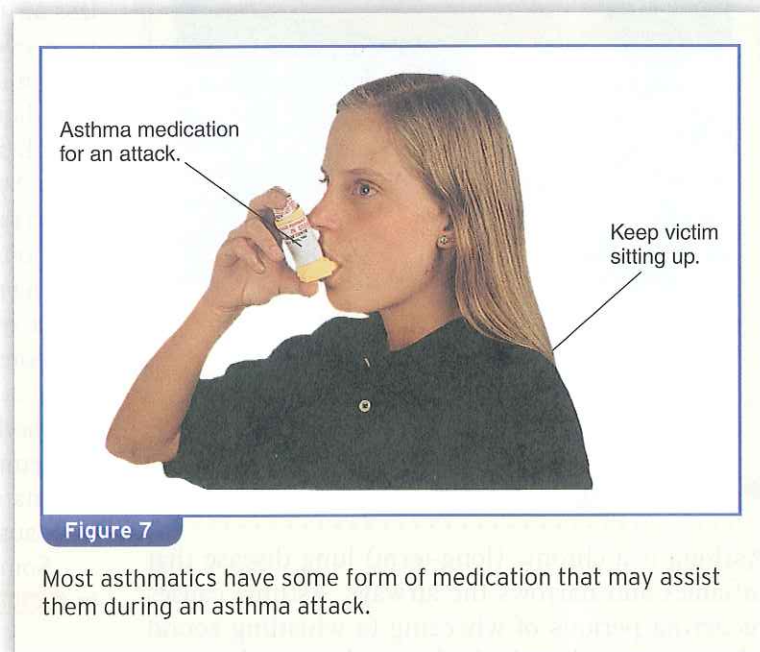
- Aspirin
- Beta blocker medicine
- Food or drug preservatives
- Seafood, shellfish
- Occupational exposure to chemicals
- Household cleaning agents
- Perfumes

Conditions or Events

- Gastroesophageal reflux
- Allergic rhinitis
- Panic attacks
- Menstruation, pregnancy
- Viral respiratory infections
- Emotional stress, excitement
- Exercise

- **Chest tightness.** This may feel like something is squeezing or sitting on the chest.
- **Shortness of breath.** Some people who have asthma say they cannot catch their breath or they feel out of breath.
- **Sitting in the tripod position.** This position involves leaning forward with hands on knees or other support, trying to breathe.
- **Inability to speak in complete sentences** without pausing for breath.
- **Nostrils flaring** with each breath.

Not all people who have asthma have these symptoms. Likewise, having these symptoms does not always mean that the person has asthma.

**Figure 7**

Most asthmatics have some form of medication that may assist them during an asthma attack.

Care for an Asthma Attack

1. Place the victim in a comfortable, upright position, leaning slightly forward (tripod position).
2. Ask the victim about any asthma medication he or she uses. Most asthmatics have some form of medication, usually administered through physician-prescribed, handheld inhalers or a device (nebulizer) that turns liquid medicine into a mist for inhalation

Figure 7

Asthma is treated with two types of medicines: long-term control and quick-relief medicines. Quick-relief, or “rescue,” medicines relieve asthma symptoms that may flare up; a first aider should know about these medications.

All people who have asthma need a quick-relief medicine to help relieve asthma symptoms that may flare up. Inhaled short-acting beta-agonists are the first choice for quick relief. These inhaled medicines act quickly to relax tight muscles around the airways during a flare-up, allowing the airways to open up so

FYI**Using a Physician-Prescribed Quick-Relief Inhaler (Metered-Dose Inhaler)**

Check the inhaler's expiration date.

The inhaler should be at room temperature.

If there is a spacer/holding chamber, attach the inhaler to it.

Shake the inhaler several times.

The victim should blow out the air in the lungs.

The victim's lips should be placed around the inhaler and the victim should begin to inhale deeply.

The victim depresses the handheld inhaler to release the medicine as he or she breathes in slowly until the lungs are full.

If using a spacer/holding chamber, the victim should press down on the inhaler and then wait 5 seconds before breathing in.

The victim should hold his or her breath for at least 10 seconds, allowing the medication to be absorbed into the lungs.

Wait for several breaths before taking a second dose.

air can flow through them. Asthma symptoms should respond to inhaled medicine quickly (within 1 hour).

The quick-relief medicine should be taken when the first asthma symptoms are noticed. The quick-relief inhaler should be with the person at all times. Most people who have asthma can safely manage their symptoms using their medications.

3. If asthma signs and symptoms (eg, coughing, wheezing, tight chest) begin, the victim can take two puffs of the quick-relief medicine. If the victim's condition does not improve but symptoms are mild, call the victim's physician for advice and administer up to four more puffs over 30 minutes.
4. If the medicine is not helping, breathing is hard and fast, the nose opens wide during breathing, or the victim cannot walk or talk well, call 9-1-1 or take the victim to the nearest emergency department if that would be faster. The victim can take four more puffs of the quick-relief medicine (two puffs at a time, waiting 15 minutes between each set of two puffs) while awaiting EMS or traveling to the hospital.

► Hyperventilation

Fast, deep breathing, called hyperventilation, is common during emotional stress. The victim might be hysterical or quite calm. Other factors that can cause rapid breathing include untreated diabetes, severe shock, certain poisons, and brain swelling due to injury or high altitude.

Recognizing Hyperventilation

Signs of hyperventilation include:

- Shortness of breath
- Fast breathing (more than 40 breaths per minute)
- Tingling or numbness of the hands, feet, and around the mouth
- Dizziness or lightheadedness

Care for Hyperventilation

If you encounter someone who is hyperventilating, these steps can help:

1. Calm and reassure the victim.
2. Take the victim to a quiet place or ask bystanders to leave. Have the victim sit down.
3. Encourage the person to breathe slowly, using the abdominal muscles: inhale through the nose, hold the full inhalation for 1 to 2 seconds, then exhale slowly through pursed lips.

FYI**Breathing Into a Paper Bag**

A popular remedy for anxiety-related hyperventilation is to breathe into a paper bag. Do not do this. Tests on healthy people show that bag rebreathing rarely restores blood-gas balance but often causes dangerous stress to the heart and respiratory system, especially in people with a chronic respiratory disease.

Source: Callahan M. Hypoxic hazards of traditional paper bag rebreathing in hyperventilating patients. *Ann Emerg Med.* 18(6):622-628.

► Chronic Obstructive Pulmonary Disease

Chronic obstructive pulmonary disease (COPD) is a broad term applied to emphysema, chronic bronchitis, and related lung diseases. The incidence of COPD is

very high in North America, and the most common causative factor is cigarette smoking.

Chronic obstructive pulmonary disease describes a disease that makes it hard for a person to breathe because the normal flow of air into and out of the person's lungs is partially obstructed.

Because COPD takes many years to develop before a person notices difficulty breathing, COPD is usually considered a disease of older adults and is most commonly diagnosed in people older than 60 years.

Chronic bronchitis is caused by chronic infection, which can be brought on by irritations such as tobacco smoke. The bronchi become thick, unable to stretch, and partially blocked. Early symptoms include a cigarette cough or a cough due to a cold. Later, more severe symptoms include difficulty breathing, increased sputum, and severe coughing.

Emphysema often occurs with chronic bronchitis. The alveoli of the lungs are partially destroyed, and the lungs have lost their elasticity, making it difficult for the victim to exhale. Common symptoms include coughing, wheezing, and shortness of breath. Breathing is extremely difficult for people with emphysema.

Recognizing Chronic Obstructive Pulmonary Disease

The signs and symptoms of COPD are similar to those of asthma. Most victims will wheeze; coughing and shortness of breath might be more prominent in people with COPD than in asthma. Many people with COPD depend on a constant low level of artificially supplied oxygen to maintain breathing.

Care for Chronic Obstructive Pulmonary Disease

Use the following guidelines when caring for someone with COPD:

1. Persons with COPD usually will have their own physician-prescribed medications. Assist the victim to take any prescribed medications.
2. Place the victim in the sitting position that provides the greatest comfort.
3. Encourage the victim to cough up any secretions.
4. For acute breathing distress, obtain immediate medical assistance. The victim might need oxygen, which is available from EMS and at hospital emergency departments.

Fainting

A sudden, brief loss of responsiveness not associated with a head injury is known as **syncope** (fainting) or **psychogenic shock**.

Simple fainting is common and benign and can have physical or emotional causes. Fainting can happen suddenly when blood flow to the brain is interrupted. The nervous system dilates blood vessels to three to four times their normal size and allows blood to pool in the legs and lower body.

Syncope, or simple fainting, can be precipitated by unpleasant emotional stimuli such as the sight of blood or strong fear. It usually occurs when the victim is in the upright position.

Most fainting episodes are associated with decreased blood flow causing deficient oxygen or glucose in the brain. The decreased blood flow can be caused by a slow heart rate (vagal reaction, in which the vagus nerve, which slows the heart rate, is overstimulated by fright, anxiety, drugs, or fatigue), heart-rhythm disturbances, dehydration, heat exhaustion, anemia (low hemoglobin), or bleeding. Decreased glucose (**hypoglycemia**) can be caused by diabetes, medications used to treat diabetes, or infections.

Sitting or standing for a long time without moving, especially in a hot environment, can cause blood to pool in dilated vessels, which results in a loss of effective circulating blood volume, causing the blood pressure to drop. As the blood flow to the brain decreases, the person loses consciousness and collapses.

Recognizing Fainting

A person who is about to faint usually will have one or more of the following signs and symptoms:

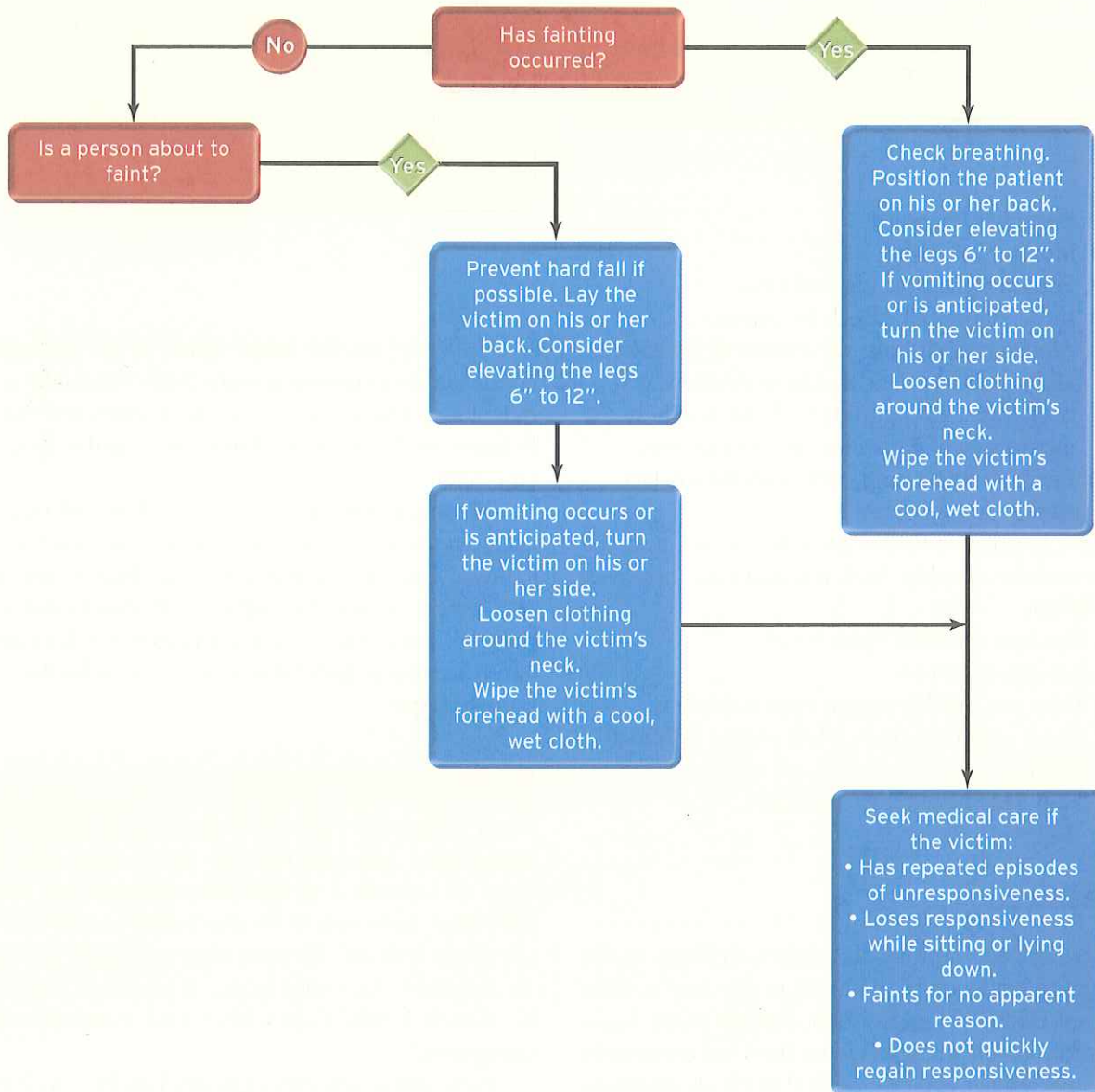
- Dizziness
- Weakness
- Seeing spots
- Visual blurring
- Nausea
- Pale skin
- Sweating

Care for Fainting

If a person appears about to faint:

1. Prevent the person from falling.
2. Help the person lie down.
3. Loosen tight clothing at the neck and waist.
4. Stay with the victim until he or she recovers.

Fainting



CAUTION

- DO NOT** splash or pour water on the victim's face.
- DO NOT** use smelling salts or ammonia inhalants.
- DO NOT** slap the victim's face in an attempt to revive him or her.
- DO NOT** give the victim anything to drink until he or she has fully recovered and can swallow.

FYI**Knowledge of Epilepsy**

A survey found that about half of all persons have witnessed an epileptic seizure either in person or on television; about one third of all persons know someone with epilepsy, but relatively few are familiar with epilepsy, how to respond to a seizure, or the Epilepsy Foundation.

Source: Kobau R, Price P. 2003. Knowledge of epilepsy and familiarity with this disorder in the U.S. population. *Epilepsia*. 44(11):1449-1454.

If fainting has happened:

1. Monitor breathing.
2. Loosen tight clothing and belts.
3. If the victim fell, check for injuries.
4. After recovery, have the victim sit for a while, and when he or she is able to swallow, give cool, sweetened liquids to drink and help the victim slowly regain an upright posture.
5. Fresh air and a cold, wet cloth for the face usually aid recovery.

Most fainting episodes are not serious, and the victim recovers quickly. Seek medical care, however, if the victim:

- Has had repeated episodes of unresponsiveness
- Does not quickly regain responsiveness
- Loses responsiveness while sitting or lying down
- Faints for no apparent reason

► Seizure

Seizures are a symptom of epilepsy. Epilepsy is the underlying tendency of the brain to produce sudden bursts of electrical energy that disrupt other brain functions. Having a single seizure does not necessarily mean a person has epilepsy. Several medical conditions increase the instability or irritability of the brain and can lead to seizures, including the following:

- Lack of oxygen
- Heatstroke
- Poisoning
- Electric shock
- Hypoglycemia
- High fever in children
- Brain injury, tumor, or stroke
- Alcohol withdrawal, drug abuse, or overdose

Epilepsy, on the other hand, is an underlying condition (or permanent brain injury) that affects the delicate systems that govern how electrical energy behaves in the brain, making it susceptible to recurring seizures.

Most people with seizures have idiopathic epilepsy; that is, the cause of the seizures is not known. Epilepsy is not a mental illness, and it is not a sign of low intelligence. It also is not contagious. Between seizures, a person with epilepsy can function as normally as a person who does not have epilepsy.

Recognizing Seizures

Many different types of seizures exist. People may experience just one type or more than one. The kind of seizure a person has depends on which part and how much of the brain is affected by the electrical disturbance that produces seizures. To simplify the many types of seizures, they can be divided into convulsive and nonconvulsive categories.

Convulsive seizures typically last for 1 to 2 minutes (but may last longer), and the person may experience the following signs and symptoms:

- Sudden falling to the floor or ground
- Stiffening of arm and leg muscles followed by jerky movement with arching of the back
- Foaming at the mouth
- Grinding of teeth
- Bluish-gray color of the face and lips
- Eyes roll upward
- Loss of bladder and bowel control

Nonconvulsive seizures last only a few seconds, and the person may experience the following signs and symptoms:

- Staring, confused, or inattentive
- Frequent eye blinking
- Involuntary movements (eg, lip smacking, picking at clothes, fumbling)

Nonconvulsive seizures are so brief that they often escape detection.

Status Epilepticus

Most seizures end after a few seconds or a few minutes. If they are prolonged, or occur in a series, it is called **status epilepticus**. This is an emergency situation and requires immediate medical care. Repeated, uncontrolled seizures can lead to brain damage, fractures, severe dehydration, and aspiration. In adults, the most common cause of status epilepticus is failure to take prescribed medicines for epilepsy.

Caring for a Seizure

The following information is adapted from the Epilepsy Foundation and can be used for seizure victims with a known seizure disorder.

First Aid for a Convulsive Seizure

- Do not restrain or hold the person down or try to stop his or her movements.
- Clear the area around the person of anything hard or sharp. Remove glasses.
- Loosen ties, scarves, or anything around the neck that could interfere with breathing.
- Place something flat and soft, like a folded jacket, under the head.

CAUTION

DO NOT restrain the victim.

DO NOT put anything between the victim's teeth during the seizure.

DO NOT splash or pour water or any other liquid on the victim's face.

DO NOT move the victim to another place (unless it is the only way to protect the victim from injury).

DO NOT leave a victim until he or she is fully alert and recovered.

- Turn him or her gently onto one side to help keep the airway open.
- Do not try to force the mouth open with any hard implement or with fingers. Efforts to hold the tongue down can injure the teeth or jaw. A person having a seizure cannot swallow his or her tongue.
- Stay with the person until the seizure ends naturally. Do not leave him or her alone until the person is fully conscious, alert, and able to speak normally.
- Ask if there is anyone who should be called to help him or her get home.
- Look for a medical ID (although its absence does not rule out a seizure).

This may not be a medical emergency, even though it looks like one. It stops naturally after a few minutes. The average person with a known seizure disorder who has a typical seizure should rest and then continue about his or her activities. The person will need limited assistance, if any, unless he or she needs to be driven home. People who have just seized should not be permitted to drive. If this is a person's first seizure or if it represents a change in a person's seizure disorder (eg, more frequent, different kind), call 9-1-1.

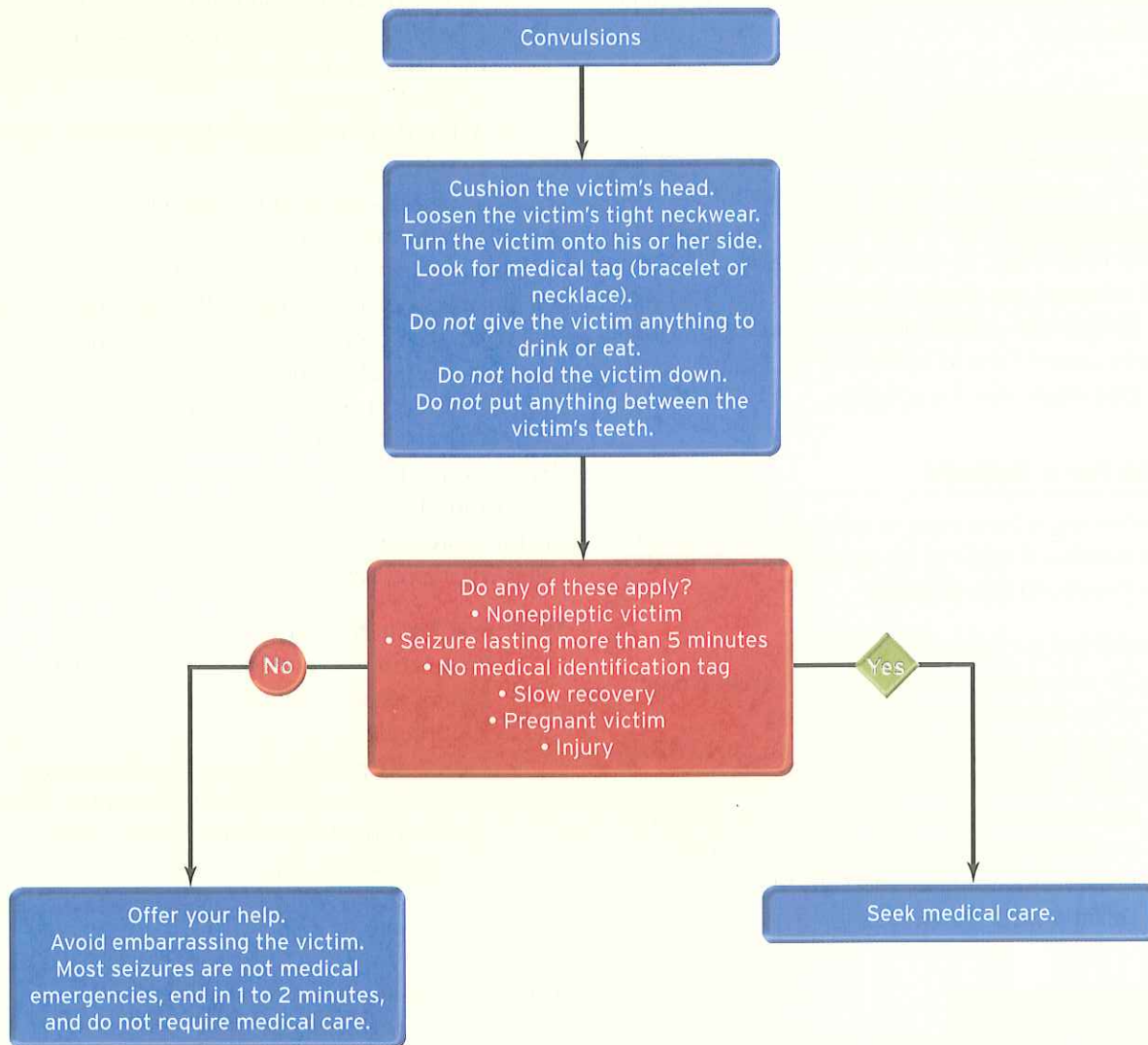
First Aid for a Nonconvulsive Seizure

- Watch the person carefully and explain to others what is happening. They may think that the dazed person is drunk or on drugs.
- Guide the person gently away from any danger (eg, steps, highway, hot stove). Do not grab and hold them because they may struggle or lash out.
- Stay with the victim until he or she has fully recovered.

When to Call 9-1-1

- A seizure lasts more than 5 minutes.
- A second seizure starts soon after the first has ended.
- Alertness does not start to return after shaking has stopped.
- The seizure happened in water.
- The victim is injured (eg, bleeding from the head, unequal pupils, vomiting), diabetic, or pregnant.
- No medical identification tag is found, and there is no way of knowing whether the seizure is caused by epilepsy.
- The victim has never had a seizure before.

Seizures



► Diabetic Emergencies

Insulin is a hormone produced by the pancreas that assists the body in using energy from food (Figure 8). Insulin takes glucose from the blood and then carries it into the cells where it is used. When excess glucose remains in the blood and is not transferred to the cells, they must rely on fat for fuel. Because blood glucose is a major source of fuel used by the body, when it cannot be used it will build up in the blood. The blood glucose then overflows into the urine, passing through the body unused and discarded. When this occurs, a condition called **diabetes** develops (Table 5). Insulin is either ineffective or lacking in the body. Diabetes is not contagious and in most cases special diet and/or medication can control it.

The body is continuously balancing glucose and insulin. Too much insulin and not enough glucose

leads to low blood glucose and possibly insulin reaction. Insulin reaction results from severe low blood glucose, causing unconsciousness and possibly death. Too much glucose and not enough insulin leads to high blood glucose, the production of ketones, and possibly diabetic coma. Ketones cause a sweet or fruity odor on the breath.

Types of Diabetes

Type 1 Diabetes

Type 1 diabetes (formerly called juvenile-onset or insulin-dependent diabetes) is most commonly diagnosed in childhood, but it may present at any age in life. About 2 million of the individuals with diabetes have type 1 diabetes. This type of diabetes requires external insulin (not made by the body), which enables the glucose to enter the cells. External insulin is necessary because the

body is unable to produce the insulin the cells require. When a person with type 1 diabetes is deprived of external insulin, he or she will become very ill. Type 1 diabetics will usually be thin or not overweight.

Type 2 Diabetes

Type 2 diabetes used to be known as non-insulin-dependent or adult-onset diabetes. The incidence of type 2 diabetes is reaching epidemic proportions in the United States. More than 21 million people currently have type 2 diabetes. Excess body weight and a sedentary lifestyle are widely recognized risk factors, especially because type 2 diabetes is being diagnosed in a growing number of children and adolescents. Other risk factors include a family history of type 2 diabetes and age older than 45 years. The age of onset is usually over the age of 40 years, but it can occur at any age. This type of diabetes may require insulin replacement and other medication.

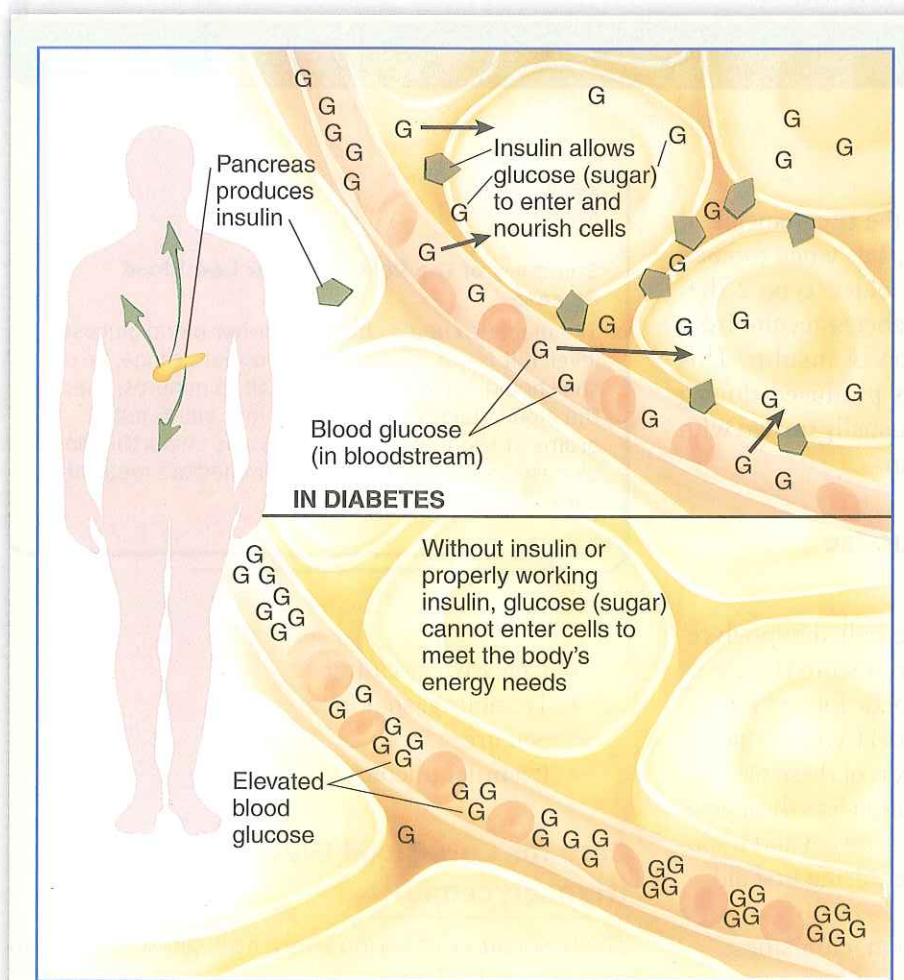


Figure 8

Normal metabolism (top) and diabetes (bottom).

Table 5 Diabetic Emergencies

	Diabetic Coma (high blood glucose)	Insulin Shock (low blood glucose)
Cause	Not enough insulin; too much glucose	Too much insulin; not enough glucose
Insulin level	Insufficient	Excessive
Onset of symptoms	Gradual	Sudden
Skin	Flushed, dry, warm	Pale, clammy
Breath	Fruity odor	Normal
Thirst	Severe	Normal
Urination	Frequent	Normal
Behavior	Normal to disorientation, drowsiness, and change in mood	Appearance of intoxication: combativeness, bad temper, anger, confusion, disorientation
Other symptoms	Drowsiness, vomiting, heavy breathing, eventual stupor or unconsciousness	Sudden hunger, eventual stupor, or unresponsiveness
First aid	If in doubt, give sugar. Give fluids to fight dehydration. Take victim to hospital.	Give sugar. Seek medical care.

Gestational Diabetes

Gestational diabetes occurs in some pregnancies. It usually ends after a baby is born, but when women who had gestational diabetes get older, type 2 diabetes can develop. Gestational diabetes results from the body's resistance to the action of insulin. This resistance is caused by hormones produced during pregnancy. Gestational diabetes is usually treated with diet, but some women need insulin.

Recognizing Low Blood Glucose (Hypoglycemia)

The condition of low blood glucose, called hypoglycemia, is sometimes referred to as an insulin reaction.

This condition occurs in a diabetic for several reasons: too much insulin, too little or delayed food intake, exercise, alcohol, or any combination of these factors.

The American Diabetes Association lists the following signs and symptoms in insulin reaction and hypoglycemia as diabetic emergencies requiring first aid:

- Sudden onset
- Staggering, poor coordination, clumsiness
- Anger, bad temper
- Pale face color
- Confusion, disorientation
- Sudden hunger

FYI

Summary of the Rule of 15s for Low Blood Glucose

The diabetic should check his or her blood glucose level. If it is not within the appropriate range, he or she should eat 15 g of sugar, wait 15 minutes, check the blood glucose again and, if low, eat 15 more grams of sugar, wait 15 minutes and check the blood glucose again. If still low, seek immediate medical care.

- Excessive sweating
- Trembling, shakiness
- Seizure
- Eventual unconsciousness

Care for Low Blood Glucose (Hypoglycemia)

The best course of action is giving sugar to the victim using the rule of 15s.

1. The diabetic should check his or her blood glucose. If it is not within a proper range, he or she should eat 15 g of sugar. If the diabetic

Table 6 Fast-Acting Sugar (10 to 15 grams)

- Two to five glucose tablets
- One tube of glucose gel
- 4 oz of regular soda (not diet)
- 4 oz of orange or apple juice
- 2 Tbsp of raisins
- Five to seven Lifesavers candy
- 6 to 8 oz of skim or 1% milk
- Two tsp of honey or corn syrup

is not able to test his or her blood glucose, and you strongly suspect that the victim has low blood glucose, give the victim 10 to 15 g of fast-acting sugar if all the following conditions are present **Table 6**:

- The victim is a known diabetic.
 - The victim's mental status is not altered.
 - The victim is alert enough to swallow.
2. Wait 15 minutes for the sugar to get into the blood.
 3. If the diabetic is able, check the blood glucose level again. If it is still low, he or she should consume 15 more grams of sugar. If testing is not available, and there is no

Q&A**How can you tell the difference between hypoglycemia (insulin reaction) and hyperglycemia (diabetic coma)?**

It is difficult to determine whether a person has hypoglycemia or hyperglycemia. Sugar helps the person with hypoglycemia, but not the person with hyperglycemia. However, do not debate whether to give sugar; sugar will cause no harm in either condition.

Ask the diabetic two questions: "Have you eaten today?" and "Have you taken your insulin today?" If the diabetic has taken his or her insulin but has not eaten, suspect hypoglycemia. If the diabetic has eaten but has not taken insulin, suspect hyperglycemia. If you are unsure which condition exists, give sugar.

improvement in 15 minutes, give the victim 15 more grams of sugar.

4. If there is no improvement, seek immediate medical care.

If the victim is or becomes unresponsive, call 9-1-1 immediately. In all cases, seek medical care following a diabetic episode and advise the victim's physician of the incident. Hypoglycemia can be a life-threatening emergency.

Another emergency procedure uses an injected medication called glucagon, available by a physician's prescription, to raise blood glucose quickly. Glucagon works the opposite of insulin. It mobilizes glucose stored in the muscles and liver as glycogen. Be aware that many people vomit after receiving glucagon. A family member or friend should learn when and how to inject glucagon in an emergency.

Recognizing High Blood Glucose (Diabetic Coma, Hyperglycemia)

The opposite reaction of hypoglycemia is called diabetic coma or **hyperglycemia**. This condition occurs when a diabetic has too much glucose in their blood. There are several scenarios that can cause this medical condition, such as insufficient insulin, overeating, illness, inactivity, stress, or a combination of these factors.

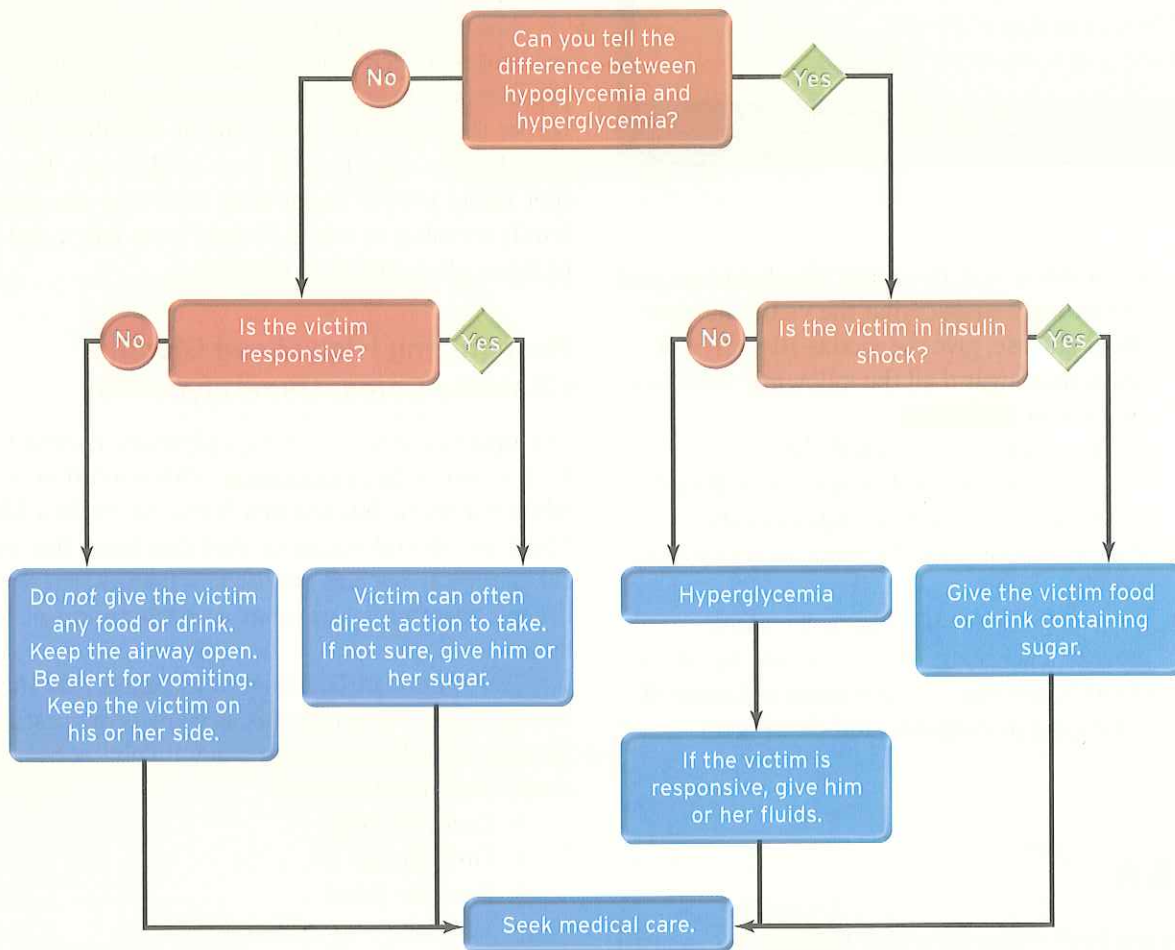
The American Diabetes Association lists the following signs and symptoms as warranting first aid in the case of a diabetic emergency involving hyperglycemia and diabetic coma:

- Gradual onset
- Drowsiness
- Extreme thirst
- Very frequent urination
- Flushed skin
- Vomiting
- Fruity breath odor
- Heavy breathing
- Eventual unconsciousness

Care for High Blood Glucose (Diabetic Coma, Hyperglycemia)

If you are uncertain whether the victim has a high or low blood glucose level and the victim is responsive and able to drink, give him or her a beverage or food containing sugar. If there is no improvement in the victim's condition within 15 minutes, seek medical care immediately.

Diabetic Emergencies



► Emergencies During Pregnancy

Most pregnancies are normal and occur without complications. However, sometimes problems do arise and medical care is required. It is essential that you remain calm, focused, and considerate of the mother during this unforeseen and stressful situation.

Recognizing Emergencies During Pregnancy

Immediately notify a doctor to report the following signs and symptoms in a pregnant woman:

- Vaginal bleeding
- Cramps in lower abdomen
- Swelling of the face or fingers
- Severe continuous headache
- Dizziness or fainting
- Blurring of vision or seeing spots
- Uncontrollable vomiting

Care for Pregnancy Emergencies

If the victim is experiencing vaginal bleeding or abdominal pain:

1. Keep the woman quiet, warm, and on her left side.
2. Have victim or another woman place a sanitary napkin or any sterile or clean pad over the opening of the vagina.
3. Have victim or another woman replace, but save, any blood-soaked pads and all tissues that are passed. Send this with the woman to medical help for examination by the physician.
4. Seek medical care immediately.

If the victim has injuries to her lower abdomen:

1. Keep the woman quiet, warm, and on her left side.
2. Monitor breathing.
3. Seek medical care.

► Emergency Care Wrap-up

Condition	What to Look For	What to Do
Heart Attack	Chest pressure, squeezing, or pain Pain spreading to shoulders, neck, jaw, or arms Dizziness, sweating, nausea Shortness of breath	Help victim take his or her prescribed medication. Call 9-1-1. Help victim into a comfortable position. Give one adult or two children's aspirin. Monitor breathing.
Angina	Chest pain similar to a heart attack Pain seldom lasts longer than 10 minutes	Have victim rest. If victim has his or her own nitroglycerin, help the victim use it. If pain continues beyond 10 minutes, suspect a heart attack and call 9-1-1.
Stroke	Sudden weakness or numbness of the face, an arm, or a leg on one side of the body Blurred or decreased vision Problems speaking Dizziness or loss of balance Sudden, severe headache	Call 9-1-1. If responsive, help victim into a comfortable position with head and shoulders slightly raised. If unresponsive, move onto his or her side.

Condition	What to Look For	What to Do
Breathing Difficulty	Abnormally fast or slow breathing Abnormally deep or shallow breathing Noisy breathing Bluish lips Need to pause while speaking to catch breath	Unknown Reason Help victim into a comfortable position. Call 9-1-1. Asthma Attack Help victim into a comfortable position. Help victim use inhaler. Call 9-1-1 if victim does not improve. Hyperventilation Encourage victim to inhale, hold breath a few seconds, then exhale. Call 9-1-1 if condition does not improve.
Hyperventilation	Fast breathing (> 40 breaths per minute)	Calm and reassure victim. Inhale slowly through nose, hold for 1-2 seconds, exhale slowly through pursed lips.
COPD	Similar to asthma—wheeze, cough, short of breath	Help in taking prescribed medicine. Place in comfortable sitting position. Drink clear fluids. Might need medical care for oxygen.
Fainting	Sudden, brief unresponsiveness Pale skin Sweating	Check breathing. Check for injuries if victim fell. Consider raising feet 6 to 12 inches. Call 9-1-1 if needed.
Seizures	Sudden falling Unresponsiveness Rigid body and arching of back Jerky muscle movement	Prevent injury. Loosen any tight clothing. Roll victim onto his or her side. Call 9-1-1 if needed.
Diabetic Emergencies	Low blood glucose Develops very quickly Anger, bad temper Hunger Pale, sweaty skin High blood glucose Develops gradually Thirst Frequent urination Fruity, sweet breath odor Warm and dry skin	If uncertain about high or low blood glucose level, give sugar. Repeat in 15 minutes if no improvement. Call 9-1-1 if victim does not improve.
Pregnancy Emergencies	Vaginal bleeding Cramps in lower abdomen Swelling of face or fingers Severe continuous headache Dizziness or fainting Blurring of vision or seeing spots Uncontrollable vomiting	Keep the woman warm. For vaginal bleeding, place sanitary napkin or sterile or clean pad over opening of vagina. Send blood-soaked pad and tissues with the woman to medical care. Seek medical care.

► Ready for Review

- A heart attack occurs when the heart muscle tissue dies because its blood supply is reduced or stopped.
- Angina pectoris can result from coronary heart disease just as a heart attack does.
- A stroke occurs when part of the blood flow to the brain is suddenly cut off.
- Asthma is chronic, inflammatory lung disease characterized by repeated breathing problems. Hyperventilation is fast, deep breathing and is common during emotional stress.
- Chronic obstructive pulmonary disease (COPD) is a broad term applied to emphysema, chronic bronchitis, and related lung diseases.
- Fainting is a sudden brief loss of responsiveness not associated with head injury.
- A seizure results from an abnormal stimulation of the brain's cells causing uncontrollable muscle movements.
- Diabetes is a condition in which insulin is lacking or ineffective.
- Hypoglycemia is very low blood glucose and can be caused by too much insulin, too little or delayed food intake, exercise, alcohol, or a combination of these factors.
- Hyperglycemia occurs when the body has too much glucose in the blood and can be caused by insufficient insulin, overeating, inactivity, illness, stress, or a combination of these factors.

► Vital Vocabulary

angina pectoris A spasmodic pain in the chest, characterized by a sensation of severe constriction or pressure on the anterior chest; associated with insufficient blood supply to the heart, aggravated by exercise or tension, and relieved by rest or medication.

asthma A condition marked by recurrent attacks of breathing difficulty, often with wheezing, due to spasmodic constriction of the air passages, often as a response to allergens or to mucus plugs in the bronchioles.

diabetes A condition that develops when glucose builds up in the blood, overflows into the urine, and passes through the body unused.

heart attack Lay term for a condition resulting from blockage of a coronary artery and subsequent death of part of the heart muscle; an acute myocardial infarction; sometimes called simply a coronary.

hyperglycemia An abnormally increased concentration of glucose in the blood.

hypoglycemia An abnormally diminished concentration of glucose in the blood.

psychogenic shock A shock-like state due to severe emotional distress; may result in a fainting spell resulting from a transient decrease in blood flow to the brain.

seizure Generalized, uncoordinated muscular activity associated with a loss of responsiveness; a convulsion; an attack of epilepsy.

status epilepticus The occurrence of two or more seizures without a period of complete consciousness between them.

stroke A brain injury due to bleeding in the brain tissue or to a blockage of blood flow, causing permanent damage.

syncope Fainting; a brief period of unresponsiveness.

prep kit

► Assessment in Action

You are on a 5-day backpack trip in the mountains with your friends. On day three, and after several tough miles into the hike, your friend seems to be disoriented and is stumbling over rocks and tree roots on the trail. He falls to the ground and is responsive. You know that this friend has type 1 diabetes and did take his insulin in the morning.

Directions: Circle Yes if you agree with the statement; circle No if you disagree.

- Yes No 1. This person is very likely suffering from hyperglycemia.
- Yes No 2. Low blood glucose levels can be caused by too much insulin, too little or delayed food intake, exercise, and alcohol.
- Yes No 3. To give sugar in this scenario, the victim must be a known diabetic, have an altered mental status, and must be awake enough to swallow.
- Yes No 4. You should follow the rule of 15s when giving sugar to the victim in this scenario.

► Check Your Knowledge

Directions: Circle Yes if you agree with the statement; circle No if you disagree.

- Yes No 1. Heart attack victims can experience chest pain.
- Yes No 2. You can help the victim of chest pain take his or her nitroglycerin.
- Yes No 3. A responsive stroke victim should lie down with his or her head slightly raised.
- Yes No 4. Asthma victims may have a prescribed inhaler.
- Yes No 5. A victim who is breathing fast (hyperventilation) should be encouraged to breathe slowly by holding inhaled air for several seconds and then exhaling slowly.
- Yes No 6. Immobilize the spine of a victim having a seizure.
- Yes No 7. Some seizure victims display a rigid arching of the back.
- Yes No 8. A person having seizures always requires medical attention.
- Yes No 9. If in doubt about the type of diabetic emergency a victim is experiencing, give sugar to a responsive victim who can swallow.
- Yes No 10. Nitroglycerin can relieve chest pain associated with angina.