

Resources to Complete CPR Certification

IMAGINE you are walking in the park and you see a man collapse. His friend shouts for help and says the man is not breathing. Someone uses a cell phone to call 911. Is there anything you can do to help? If you were certified in CPR, you would know exactly what to do. When CPR is effectively administered, a victim's chance of survival is doubled. In this unit, you will learn the basic techniques for administering CPR to infants and adults.



Objective:



Explain the basic techniques for cardiopulmonary resuscitation (CPR).

Key Terms:



adult
airway
apnea
automated external
defibrillator (AED)
cardiac arrest

cardiopulmonary
resuscitation (CPR)
child
foreign body airway
obstruction (FBAO)
head-tilt/chin-lift
maneuver

healthcare
professionals
Heimlich maneuver
infant
lay rescuers
respiratory arrest

CPR in Emergency Situations

Cardiopulmonary resuscitation (CPR) is a combination of artificial breaths and chest compressions used to treat victims of cardiac arrest and respiratory arrest. It is a first-aid technique to keep victims alive and to prevent brain damage while medical help is on the way.

CARDIAC ARREST

Cardiac arrest is the lack of an effective heartbeat, which quickly causes body-wide circulatory failure. Cardiac arrest is an extreme medical emergency. It takes only minutes for a lack of adequate oxygen to lead to multiple-organ injury. The most common cause is an electrical problem within the heart. If cardiac arrest is not corrected quickly, it is fatal.

Signs and symptoms of cardiac arrest are:

- ◆ Loss of consciousness
- ◆ Rapid, shallow breathing progressing to **apnea** (the absence of breathing)
- ◆ Extremely low blood pressure (hypotension), with no pulse felt over major arteries
- ◆ No heart sounds

RESPIRATORY ARREST

Respiratory arrest is closely associated with cardiac arrest and occurs when breathing slows or stops. It is also called “apnea.” In “prolonged apnea,” the person has stopped breathing, but the heart is still active. Prolonged apnea is a life-threatening condition. Seek immediate medical help if a person with any type of apnea turns blue, has a seizure, becomes limp, remains drowsy, or becomes unconscious. When prolonged apnea is accompanied by a lack of cardiac activity and a lack of responsiveness, the medical condition is cardiac arrest.

BASIC CPR TECHNIQUES

Chest compressions consist of putting pressure on a victim’s chest and artificially pumping the heart to provide blood supply to the heart, body, and brain. Complete chest compressions involve putting pressure on the chest and then releasing the pressure to allow the chest to return to its normal position.

Chest ventilations are a way of breathing for a victim to ventilate the lungs and to supply the victim with oxygen. Complete ventilations consist of creating a seal around the victim’s airway, forcing air into the lungs until the chest rises, and then releasing the seal and letting the chest fall. When doing chest ventilations on an adult, seal the victim’s mouth while pinching the nose. You may be able to cover the mouth and nose of an infant or child victim with your mouth for the ventilations.



FIGURE 1. Demonstration of the chest compression.



FURTHER EXPLORATION...

ONLINE CONNECTION: ABCs of CPR

Visit the following Web site to view a video demonstrating the ABCs of CPR. The expert in the video explains each step: Check the airway, breathing, and circulation. He also shows how to tilt the victim's head without causing additional damage if there is damage to the neck or spine.

<http://www.youtube.com/watch?v=3A6LF7JqJCw>

The CPR steps are as easy to remember as your ABCs: airway, breathing, and circulation. First, check the victim's airway. Then check for breathing. Kneel and hold your ear to the victim's mouth while looking at the victim's chest. Even if you cannot see or hear the victim breathing, you may be able to feel breath on your ear when you lean in close. Treat gasping as if the victim is not breathing at all, as gasping will not sustain life. Next, check the victim's circulation by feeling for a pulse. If the victim is an adult or a child, press two fingers to the carotid artery on the victim's neck. For infants, feel for a pulse on the inside of the bicep.

Current Guidelines

Current guidelines emphasize the need to focus more energy on chest compressions. This is true for healthcare professionals and hospital personnel as well as nonprofessionals who may need to administer CPR in emergency situations. Research shows that rescuers do not adequately perform chest compressions. Earlier guidelines called for 15 chest compressions for every two breaths. New guidelines double the required number of compressions to 30 for every two breaths. You also must let the victim's chest rise completely between compressions. The new guidelines greatly increase the likelihood of rescuers being able to supply enough blood flow for the heart, brain, and body.

STEPS IN CPR AND TREATMENT FOR CHOKING

CPR and the treatment for choking have similar steps. The CPR sequence has five steps and is designed to keep blood flowing throughout the body and air flowing in and out of the lungs.

Step One

The first step is to check for responsiveness by shaking and talking to the victim. If there is no response, call 911 immediately.

Step Two

The second step is to check the airway. Perform the **head-tilt/chin-lift maneuver**—the action in which a first responder tilts the head back and lifts the victim's chin. To do this, first

place one hand over the victim's forehead and apply firm, backward pressure to tilt the head. The line from the chin to the jaw should be perpendicular to the floor. Place the fingers of your other hand under the bony part of the lower jaw near the chin. Bring the chin forward, but do not hyperextend the neck. Do not press into the soft tissue under the chin, which could create an airway obstruction. Remove the victim's dentures only if necessary.

Step Three

The third step is to give two breaths. If the victim's chest does not rise, repeat the second step. If the chest still does not rise when you give breaths, the victim may have choked on something, and the airway may be blocked. Continue to treat the person with CPR. If the chest rises, feel for a pulse. If the victim has a strong pulse, perform rescue breathing—usually one breath every five seconds—until help arrives. Use face shields to prevent the spread of germs when giving mouth-to-mouth ventilations.

Step Four

The fourth step is to position your hands in the center of the victim's chest.

Step Five

The fifth step is to administer chest compressions. Firmly push down 2 inches on the chest 30 times. Continue the sequence with two breaths and 30 compressions until medical help arrives.

AUTOMATED EXTERNAL DEFIBRILLATOR

An **automated external defibrillator (AED)** is a small machine that attaches to a victim's chest, analyzes him or her, and delivers electric shocks externally to stop the arrhythmia and to reestablish an effective heart rhythm. A victim's survival rate declines 10 percent for every minute an AED is not used.

FOREIGN BODY AIRWAY OBSTRUCTION

Foreign body airway obstruction (FBAO) is a blockage in the airway that causes choking. The **airway** consists of the throat, trachea, and bronchial



FIGURE 2. Using an AED may be critical in saving a victim's life.

tubes. The obstruction of any area by food or another object prevents the flow of oxygen and carbon dioxide, which the body must exchange to maintain consciousness. The universal sign for choking is two hands crossed over the neck.

Steps for Heimlich Maneuver

If a person is actively choking (choking but conscious), the Heimlich maneuver should be used. The **Heimlich maneuver** is a procedure of abdominal thrusts to remove the FBAO. To perform the Heimlich maneuver:

1. Stand behind the choking person, and place one leg between the legs of the victim. Bend your knees to lower your center of gravity, thereby providing more control over the victim if he or she passes out.
2. Wrap your arms around the victim's abdomen, and place one fist just above the victim's navel with your thumb against the abdomen.
3. Cover your fist with the other hand. Thrust up and in with sufficient force to lift the victim off his or her feet. The obstruction should be dislodged.

If the obstruction is not dislodged by using the maneuver, the victim may become passive and lose consciousness. In this case, gently lower the victim to the ground to control body position and to avoid any head or body injuries. Start CPR after checking the airway.

If the choking victim is pregnant, place your arms around the victim's chest instead of the abdomen, but follow the same steps.

If an infant is actively choking, tip the head down and support the infant with one arm, with your hand under the infant's chin. Use the palm of your hand to deliver five back slaps between the shoulder blades while keeping the infant's head down and neck supported. Turn the infant over onto the other hand and deliver five chest compressions, while supporting the back of the head. Continue back slaps and compressions until the infant coughs up the obstruction or becomes passive. If the victim becomes passive, begin CPR.

TREATING INFANTS, CHILDREN, AND ADULTS

It is important to classify a victim by age when assessing a medical emergency. Infants, children, and adults require different techniques when administering CPR or treating FBAO. An **infant** is a newborn to the age of one. Some one-year-old children may be larger than average and may qualify as toddlers or children. A **child** is a person from one year of age until the onset of puberty. Larger children may need to be treated as adults. An **adult** is a person who has reached puberty.

Compression recommendations differ between adults, children, and infants. For adults and children, give 30 compressions for every two breaths. If you are the only first responder, give infants 30 compressions for every two breaths. If there are two rescuers, give 15 compressions

for every two breaths. The depth of compressions also varies. Compress an adult or child's chest two inches. Compress an infant's chest about one-third of its depth.

For adults and children, ventilations must make the chest visibly rise and fall. Infants need only a puff of air, not a full breath.

Ideally, there would be two people to respond to an emergency involving an infant. One person could immediately begin CPR, and the other person could call 911. If you are alone with the infant, however, administer one full cycle of CPR on an unconscious infant to ensure some oxygen and blood flow before calling for help.

Lay rescuers are non-healthcare professionals who know the steps of CPR and FBAO. They are often the first responders to an emergency scene. First responders are important in the chain of survival to treat victims until advanced care arrives. They also assess the victim's situation and call 911 when needed.

Healthcare professionals are professionals in a hospital workforce. They are important but may be limited in numbers and are often unable to be everywhere a victim may need them.



FIGURE 3. When administering CPR to an infant, compress the chest about one-third of its depth.

Summary:



Lay rescuers often respond to an emergency scene before healthcare professionals. Many lay rescuers are certified in CPR and are able to begin treating victims of cardiac or respiratory arrest while another bystander calls 911. There are five basic steps in administering CPR: check for responsiveness, check the airway, give two breaths, place hands on the victim's chest, and give two chest compressions.

Foreign body airway obstruction victims have a blockage in the airway that, in most cases, must be treated with the Heimlich maneuver. A responder skilled in these techniques can increase a victim's chance of survival while waiting for advanced medical help.

Checking Your Knowledge:



1. What is cardiac arrest?
2. What are the ABCs of CPR?
3. What are the five steps in administering CPR?

4. What is an FBAO?
5. What are the steps of the Heimlich maneuver?

Expanding Your Knowledge:



Look through newspapers or search the Internet for stories in which lay rescuers were the first responders to an emergency situation. Review with a classmate the various life-saving techniques, such as CPR and the Heimlich maneuver, that you may have used in each situation. Discuss when you should call 911 for additional help if you and the victim are alone. If your class has access to a CPR dummy, you can role play a scene in which you come upon an emergency. Describe what you would do to treat the victim, contact additional medical help, and control the crowd of bystanders.

Web Links:



Cardiopulmonary Resuscitation

<http://www.mayoclinic.com/health/first-aid-cpr/fa00061>

Heimlich Maneuver

<http://www.americanheart.org/presenter.jhtml?identifier=4605>

Cardiac Arrest Warning Signs

<http://www.americanheart.org/presenter.jhtml?identifier=3053>