

CPR Skills

INTRODUCTION

Cardiopulmonary resuscitation (CPR) is a lifesaving procedure for providing oxygen and circulation to someone who has suffered a cardiac and respiratory arrest. The essentials of CPR (chest compressions and mouth-to-mouth breathing) had been known for many, many years. But it was not until 1957 that CPR really came into being. Dr. Peter Safar, along with several other researchers and physicians, had been working and experimenting in an effort to combine chest compressions and mouth-to-mouth breathing into an organized, effective resuscitation technique and in that year Dr Safar published the book *The ABC of Resuscitation*. CPR – in the basic form we know today – was now available. Many years later, a specific technique for assisting someone who is choking because of an obstructed airway was developed and this technique – the Heimlich Maneuver – is now included in CPR classes.

As a medical professional, you will be required to take a CPR class and to learn the Heimlich Maneuver. You may also be instructed in the use of an automatic external defibrillator (AED). Learning how to perform CPR and the Heimlich Maneuver and how to use an AED is not difficult, you will have a lot of opportunity to practice CPR and the Heimlich Maneuver during the class: you will also be required to be recertified in these techniques every few years. But it is a good idea to review the techniques every so often because remembering CPR and the Heimlich Maneuver when you are in an emergency situation can be difficult and doing them correctly can save a life.

OBJECTIVES

When the student has finished this module, he/she will be able to:

1. Identify a definition of CPR.
2. Identify the two techniques that comprise the CPR procedure.
3. Identify the first step in CPR.
4. Identify the first action to take if CPR is truly needed on an adult.
5. Identify the three ways to determine if someone is breathing.
6. Identify where to check for a pulse on an unconscious person.
7. Identify the proper CPR cycle.
8. Identify the rescue technique used for choking victims.
9. Identify the proper way to perform this technique when the victim is under the age of one.
10. Identify the medical device used to correct a dangerous cardiac arrhythmia.

CPR: THE BASICS

The lungs deliver oxygen to the blood, and the heart pumps the oxygenated blood to the body. Once the heart stops beating and the lungs stop working, oxygen will not reach the brain, heart, kidneys, etc., and if they do not receive oxygen, these vital organs can be

permanently damaged very, very quickly. Without a functioning heart and lungs, death can occur in several minutes.

CPR is performed on people who have suffered cardiac and respiratory arrest (cessation of the heart beat and breathing). This medical emergency can be caused by accidents such as electrocution and drowning and medical problems such as cardiac arrhythmias and myocardial infarction (heart attack). **CPR is done using mouth-to-mouth breathing – more properly know as rescue breaths – and chest compressions.** If it is performed promptly and done correctly, it can bring someone back to life and help keep them stable until skilled medical help arrives.

The first step in performing CPR is to make sure that CPR is actually needed: you must make sure that the person is suffering from cardiac and respiratory arrest. Obviously, you would suspect that someone is in need of CPR if that person was unconscious and not moving. But it is certainly possible that this victim could have simply fainted, could have had an unwitnessed seizure (people who have had a seizure will be unconscious for a period of time after the seizure), could have fallen and sustained a skull fracture, could be in a diabetic coma – there are many causes of loss of consciousness beyond cardiac and respiratory arrest.

Learning Break: Can you injure someone if you perform CPR but CPR is not needed? Yes. You can fracture someone's ribs, fracture the sternum, damage internal organs, cause the person to vomit, and delay the specific medical care the victim needs. However, some experts feel that these potential injuries are less dangerous than *not* performing CPR on someone who might have suffered from a cardiac and respiratory arrest. Ask your CPR instructor for guidance regarding this question.

This is how to determine if you need to perform CPR and how you would initiate the CPR procedure:

- Tap or *gently* shake the victim while asking very loudly, “Are you okay?”
- If the person does not respond – and he/she is an adult or someone who has reached puberty – **call 911 or call loudly for help. You must do this first.** The importance of calling 911 or letting someone else know so that person can call 911 or summon skilled help cannot be overstated. CPR can save someone's life, but many times it acts as a stopgap measure, keeping the victim alive, until he/she can receive the care needed. You can't save someone by yourself.
- Check to see if the victim is breathing. Make sure the person is lying face up. If not, gently roll him/her into that position. (Note: In most cases of cardiac and respiratory arrest, if this is done properly, there should be no injuries. Ask your CPR instructor how to do it). Kneel down, place one hand under the victim's chin and the other hand on the forehead. *Gently* tilt the head back. Get down close to the victim and turn your head so that your ear is next to the mouth and you are looking at the feet. *Look* to see if the chest is moving, *listen* for the sound of breathing, and see if you can *feel* air against your ear. *Look, listen, and feel.*
- If the victim is not breathing – and he/she is an adult or someone who has obviously reached puberty – *give the person two rescue breaths.*

Learning Break: This is how to properly give someone rescue breaths. Place one hand under the victim's chin and the other hand on the forehead. *Gently* tilt the head back. Pinch the victim's nose closed. Place your mouth over the victim's and form a tight seal. Exhale forcibly and then remove your mouth from the victim's mouth: you should see the chest rise.

As a CNA, you would almost always be administering CPR in situations where rescue equipment is available. This would include face masks or shields that can be used as barriers so that there does not have to be skin-to-skin contact between the rescuer and the victim when rescue breaths are delivered. Ask your CPR instructor what you should do if a mask or shield is not immediately available.

- If the victim does not start breathing, check for a pulse. For an adult and children one year and older of age, it is recommended to check the pulse at the *carotid artery*. This is located on the neck, immediately in back of the trachea (windpipe). Check for no more than 10 seconds.
- If the victim does not have a pulse, begin performing chest compressions.

Learning Break: This is how to properly give chest compressions. Kneel next to the victim. Locate the sternum, find the tip of the sternum (breastbone), and place the heel of one hand on the sternum approximately two fingers width up towards the head from that point. Keep your fingers off the chest. Then place the heel of your other hand on top of the hand that is on the victim's chest. Straighten your arms, lock your elbows, and center your shoulders over your arms. Push down quickly and try and compress the chest 1.5 to 2 inches. When you reach the bottom of the compression, let the chest come back up while keeping your hands lightly in position. The recommended rate for chest compressions is 100 per minute.

- After 30 compressions, give two rescue breaths. Check to see if the victim is breathing – look, listen, and feel – and check to see if a carotid pulse is present. If not, give two rescue breaths and go back to delivering chest compressions.
- If the victim is an infant or a child, starting the CPR procedure and is a bit different. Do *not* leave the infant/child to call 911. Instead, call loudly for help, and then begin CPR. Tilt the head, lift the chin, and give two rescue breaths and 30 chest compressions. Repeat this for a total of five cycles, then call 911.

Learning Break: This is how to perform chest compressions on infants and children. Kneel next to the victim. Locate the sternum, find the tip of the sternum (breastbone), and place the heel of one hand on the sternum approximately two fingers width up towards the head from that point. Keep your fingers off the chest. Straighten your arms, lock your elbows, and center your shoulders over your arms. Push down quickly and try and compress the chest approximately one-third to one-half the depth of the child's chest *but only using one hand*. For an infant less than one year of age, perform compressions using two fingers. The compression rate for infants and children is 100 per minute.

CPR: SUMMARY

- Learning CPR may seem to be an intimidating, but the procedure is actually very simple.
- The first step is always (in the adult victim) to call 911 or call for help. You can't save someone by yourself.
- If the victim is an infant or a child, start CPR, do five cycles of rescue breaths and chest compressions, then call 911 or call for help.
- Make sure the victim needs CPR: check to see if he/she has stopped breathing, check to see if there is no pulse.
- The basic CPR cycle is two rescue breaths followed by 30 chest compressions. Chest compressions should be delivered at a rate of 100 per minute.
- CPR must be continued until someone with a higher level of medical training arrives on the scene who can take over, or you are simply too exhausted to continue.
- Causing significant harm by doing CPR incorrectly is not common. The best way to avoid that is to make sure the victim needs CPR and to practice the procedure.

FIRST AID FOR THE CHOKING VICTIM: THE HEIMLICH MANEUVER

Choking that is caused by an obstructed airway is one of the leading causes of death. Everyone should know how to help a person who is choking, and as medical professionals, all CNAs are required to know how to assist someone with an obstructed airway caused by a foreign body. The proper technique for doing so is called the *Heimlich Maneuver*. It is easy to learn, simple to do, and very effective.

The first step in assisting a victim who is choking because of an obstructed airway is to make *sure* he/she is choking. If a piece of food or a foreign body is lodged in the airway, the person will not be able to breathe or cough but more importantly, *will not be able to speak*. So, if you suspect someone is choking – and almost always these situations are easy to recognize – *confirm your suspicion by asking, "Can you speak?"* If the person has something stuck in the airway and *can* speak, he/she may still be capable of clearing the object with a forceful cough: let them try.

Learning Break: It is very, very unlikely that you could cause serious harm applying the Heimlich maneuver to someone who is not choking. However, if someone is not choking but is suffering from another type of medical emergency, using the Heimlich maneuver could be very frightening to that person and would delay proper care.

Once you have determined that someone is choking because of an obstructed airway, you should perform the Heimlich Maneuver. By pushing quickly and firmly on the victim's abdomen (and some times on the chest) you can forcibly push air out through the lungs. If done properly, the sudden pressure created will remove the foreign body that is obstructing the airway. Here's how to do it:

- Adults: Stand behind the victim and place both arms around his/her chest as if you were going to hug the person. Make a fist, and place the *thumb* side of your fist against the victim's abdomen, between the navel and the rib cage. Cover your fist

- with your other hand. Make a quick upward thrust with both hands. Repeat until the object is dislodged. The victim can be standing or sitting.
- Unconscious adult: Place the victim face up on a firm surface. Sit astride the victim so that you are looking at his/her face. Place the heel of one hand on the abdomen, above the navel and below the rib cage: place the heel of your other hand on top of that. Make a quick upward thrust using the weight of your body. Repeat until the object is dislodged.
 - Pregnant/obese victims: If the victim is conscious, stand behind him/her and place your arms around the chest, just below the armpits. Place the thumb side of your fist against the middle of the victim's sternum (the breastbone). Place your other hand over your fist and pull quickly and firmly backward. Repeat until the object is dislodged.
 - Infants: Lay the infant down on a hard surface. Kneel down and place your middle and index fingers below the rib cage and above the navel. Press down with your two fingers using a quick upward thrust: repeat until the object is dislodged. You can also perform this maneuver sitting down with the infant on your lap.
 - Infants less than one year of age: Place the child face down of your forearm: support the baby's head with the palm of your hand. Use the heel of your hand and quickly strike the child's back, five times, between the shoulder blades. If the object does not dislodge, turn the child over and place two fingers between the nipples. Quickly make five upward thrusts. **Abdominal thrusts are not recommended to be used in this population: there is too much risk of damage to internal organs.**
 - To save yourself: If you are at home, first, dial 911. Although you will not be able to speak, you can leave the line open and help can be on the way in case you lose consciousness. After that, place the *thumb* side of your fist on your abdomen, above the navel and below the rib cage. Cover your fist with your other hand, then make a quick upward thrust with both hands. Repeat until the object is dislodged. You can also lean against the edge of a solid object that is not likely to move – a large chair or table, for example – and push yourself forward.

Learning Break: Although not specifically mentioned, in all of these situations it is sensible to have someone call 911. The Heimlich Maneuver may be successful. But it may *not* work and it is much, much better to have emergency personnel on the way then wait until the person loses consciousness and then call for help.

Learning Break: Some authorities recommend administering five back blows to a choking victim before using the Heimlich Maneuver. However, this technique is controversial and other experts such as the American Heart Association do not recommend using the back blows. Check with your CPR instructor and follow his/her advice.

The Heimlich Maneuver is very safe if performed correctly and complications are rare. However, internal organs can be damaged, ribs can be broken, and a collapsed lung is possible. But all of these injuries can be avoided by making sure to perform the thrusts in the proper area and by performing the thrusts firmly while avoiding excessive force.

HEIMLICH MANEUVER: SUMMARY

- Make sure the person is choking: a choking victim will not be able to speak.
- Always call 911 or have someone call for help.
- For adults, the Heimlich maneuver is performed using abdominal thrusts.
- For obese adults, victims who are pregnant, use chest thrusts.
- For children over the age of one, the abdominal thrusts are performed using two fingers while the child is lying face up.
- For children under the age of one, do not do abdominal thrusts, use back blows or chest thrusts.

AUTOMATIC EXTERNAL DEFIBRILLATOR

One of the common causes of cardiac/respiratory arrest is a *cardiac arrhythmia*. Normally the heart beats between 60 and 100 times a minute and beats with a regular rhythm. This allows the chambers of the heart to fill with blood and then pump it out to the body. Many cardiac arrhythmias cause the heart to beat so quickly or so weakly and irregularly that this process is interrupted and the victim loses consciousness and stops breathing: ventricular tachycardia and ventricular fibrillation are common cardiac arrhythmias that can do this.

These arrhythmias can be stopped and a normal heart rhythm can be restored by the external application of a strong electric shock (this is often called defibrillation). One way to do that is with an *automatic external defibrillator*, which is most often referred to as an *AED*. These devices are simple to use and *they cannot deliver a shock to someone whose heart is beating normally*. AEDs have been shown to be a valuable lifesaving device. Here's how to use an AED.

- Check to see if the unconscious person is indeed in cardiac/respiratory arrest. If so, call 911 or call loudly for help.
- If an AED is not immediately at hand, start CPR. Do not delay CPR to try and find an AED.
- Expose the victim's chest and attach the AED electrode pads. (If you can, wipe the chest if it is wet or sweaty. Also, make sure the patient is not lying in water. This could transmit the AED shock to a rescuer). There is a diagram on the AED that will show where: The negative electrode is applied to the right side of the chest, above the nipple and below the shoulder. The positive electrode is applied to the left side of the chest, just below the nipple. Make sure the electrode pads are connected to the AED with the cables. Do not interrupt CPR while attaching the electrodes.
- Turn the AED on.
- Stop CPR, say "Clear" so that no one is touching the victim (the shock could be delivered to someone touching the victim) and press the button on the AED that is labeled analyze.

- The AED will check the victim's heart rhythm and determine if it is a "shockable" rhythm.
- If the AED determines that a shock is needed, you will be prompted with visual and auditory cues. Make sure no one is touching the victim and press the shock button.
- Immediately after the shock has been delivered, perform 5 cycles of rescue breaths and chest compressions. After the fifth cycle, analyze the rhythm again and deliver a shock if needed.

Learning Break: Whether or not it is safe to use an AED on children less than 8 years of age has been a controversial topic. The American Heart Association it acceptable to do as long as special pediatric electrode pads are utilized. Check with your CPR instructor and follow his/her advice about this.

AUTOMATIC EXTERNAL DEFIBRILLATOR: SUMMARY

- The AED can shock a heart back into a normal rhythm.
- The AED will not shock a heart that does not need to be shocked.
- Always call 911 or call loudly for help before using an AED.
- Perform CPR before using an AED.
- Do not interrupt CPR once the AED has been brought to the scene and is being applied.
- Make sure no one is touching the victim when the shock is applied.