

Chapter -2

Cardio-Pulmonary Resuscitation (CPR)

2.1 History

In the 19th century, Doctor H. R. Silvester described a method (The Silvester Method) of artificial respiration in which the patient is laid on his back, and his arms are raised above the head to aid inhalation and then pressed against the chest to aid exhalation. The procedure is repeated sixteen times per minute.

However, it was not until the middle of the 20th century that the wider medical community started to recognize and promote artificial respiration combined with chest compressions as a key part of resuscitation following cardiac arrest. The combination was first seen in a 1962 training video called "The Pulse of Life" created by James Jude, Guy Knickerbocker and Peter Safar. Jude and Knickerbocker, along with William Kouwenhoven and Joseph S. Redding had recently discovered the method of external chest compressions, whereas Safar had worked with Redding and James Elam to prove the effectiveness of artificial respiration. It was at Johns Hopkins University where the technique of CPR was originally developed. The first effort at testing the technique was performed on a dog by Redding, Safar and JW Perason. Soon afterward, the technique was used to save the life of a child. Their combined findings were presented at annual Maryland Medical Society meeting on September 16, 1960 in Ocean City, and gained rapid and widespread acceptance over the following decade, helped by the video and speaking tour they undertook. Peter Safar wrote the book ABC of resuscitation in 1957. In the U.S., it was first promoted as a technique for the public to learn in the 1970s.

2.2 Definition

Cardiopulmonary resuscitation, commonly called CPR, combines rescue breathing (one person breathing into another person) and chest compression in a lifesaving procedure performed when a person has stopped breathing or a person's heart has stopped beating.



2.3 Purpose

When performed quickly enough, CPR can save lives in such emergencies as loss of consciousness, heart attacks or heart “arrests,” electric shock, drowning, excessive bleeding, drug overdose, and other conditions in which there is no breathing or no pulse. The purpose of CPR is to bring oxygen to the victim’s lungs and to keep the blood circulating so that oxygen gets to every part of the body. When a person is deprived of oxygen, permanent brain damage can begin in as less as four minutes and death can follow minutes later.

2.4 Description

Cardiopulmonary arrest is the cessation of heart function and respiration. The patient in cardiopulmonary arrest has no respiration and no pulse. The process of biological death begins as the cells are deprived of Oxygen. If the patient remains in cardiopulmonary arrest for longer than 4 to 6 minutes irreversible brain damage is likely to occur. The longer the patient remains in this state the lower is the chance of survival.

CPR is part of the emergency cardiac care system designed to save lives. Many deaths can be prevented by prompt recognition of the problem and notification of the emergency medical system (EMS), followed by early CPR, defibrillation (which delivers a brief electric shock to the heart in an attempt to get the heart to beat normally), and advanced cardiac life support measures.

CPR must be performed within four to six minutes after cessation of breathing so as to prevent brain damage or death. It is a two-part procedure that involves rescue breathing and external chest compressions. To provide oxygen to a person’s lungs, the rescuer administers mouth-to-mouth breathing, then helps circulate blood through the heart to vital organs by external chest compressions. Mouth-to-mouth breathing and external chest compression should be performed together, but if the rescuer is not strong enough to do both, then only the external chest compressions should be done. This is more effective than no resuscitation attempt, as is CPR that is performed “poorly.”

When performed by a bystander, CPR is designed to support and maintain breathing and circulation until emergency medical personnel arrive and take over. When performed by healthcare personnel, it is used in conjunction with other basic and advanced life support measures.

CPR by bystanders may prolong life during deadly ventricular fibrillation, giving emergency medical service personnel time to arrive.

However, many CPR attempts are not ultimately successful in restoring a person to a good quality of life. Often, there is brain damage even if the heart starts beating again. CPR is therefore not generally recommended for the chronically or terminally ill or frail elderly. For these people, it represents a traumatic and not a peaceful end of life.



2.5 Performing CPR

Untrained. If you're not trained in CPR, then provide hands-only CPR. That means uninterrupted chest compressions of about 100 a minute until more help arrive (described in more detail below). You don't need to try rescue breathing.

Trained, and ready to go. If you're well trained, and confident in your ability, then you can opt for one of two approaches: 1. Alternate between 30 chest compressions and two rescue breaths. 2. Just do chest compressions. (Details described below.)

Trained, but rusty. If you've previously received CPR training, but you're not confident in your abilities, then **just do chest compressions at a rate of at least 100 a minute.** The basic procedure for CPR is the same for all people, with a few modifications for an infant, where the rescuer gives at least 100 chest compressions per minute.

A cardiac arrest is the ultimate medical emergency – the correct treatment must be given immediately if the patient is to have any chance of survival. The interventions that contribute to a successful outcome after a cardiac arrest can be conceptualized as a chain – the Chain of Survival.



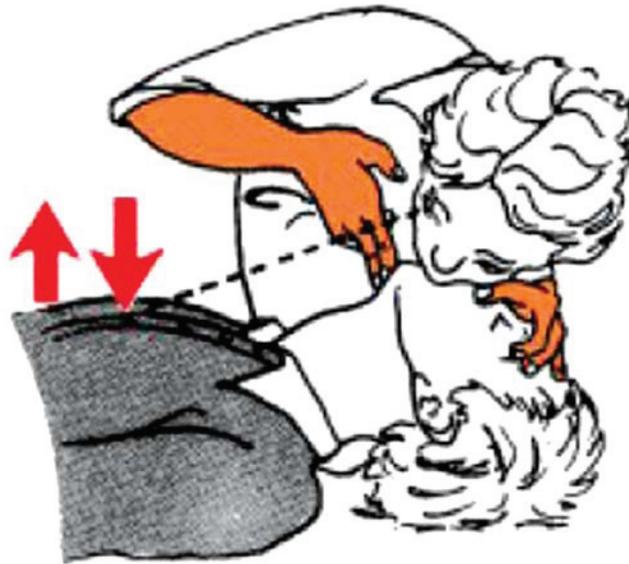
The steps followed in CPR are as follows:

1. If the victim appears to be unconscious with either no breathing or no pulse, the person should be shaken or tapped gently to check for any movement. The victim is spoken to loudly, asking if he or she is OK. If there is no response, emergency help must be called and CPR begun immediately.
2. The victim is placed on his or her back on a level surface such as the ground or the floor. The victim's back should be in a straight line with the head and neck supported slightly by a rolled up cloth, small towel, or piece of clothing under the neck. A pillow should not be used to support the head. The victim's clothing should be loosened to expose the chest.

3. The rescuer kneels next to the victim, tilts the victim's head back, lifts the jaw forward, and moves the tongue forward or to the side, making sure it does not block the opening to the windpipe. The victim's mouth must be kept open at all times, reopening when necessary.
4. The rescuer listens by putting himself close to the victim's mouth for any sign of breathing, and watches the chest for movement. If the victim is found to be breathing, and has perhaps fainted, he or she then can be placed in the recovery position until medical assistance arrives.
5. This is done by straightening the victim's legs and pulling the closest arm out away from the body with the elbow at a right angle or 3 o'clock position, and the other arm across the chest.
6. The far leg should be pulled up over the victim's body with the hip and knee bent. This allows the victim's body to be rolled onto its side. The head should be tilted back slightly to keep the windpipe open. The head should not be propped up.
7. If the victim is not breathing, rescue breathing begins, closing the victim's nostrils between a thumb and index finger, and covering the victim's mouth with the rescuer's mouth. Two slow breaths, about two seconds each, are breathed into the victim's mouth with a pause in between. This is repeated until the chest begins to rise.
8. The victim's head should be repositioned as often as necessary during the procedure. The mouth must remain open and the tongue kept away from the windpipe.
9. When the chest begins to rise, or the victim begins to breathe on his or her own, the rescuer looks for signs of circulation, such as coughing or movement. If a healthcare professional has arrived by this time, the pulse will be checked before resuming resuscitation.
10. If chest compressions are needed to restart breathing, the rescuer will place the heel of a hand above the lowest part of the victim's ribcage where it meets the middle-abdomen. The other hand will be placed over the heel of the first hand, with fingers interlocked.
11. Keeping the elbows straight, the rescuer will lean his or her shoulders over the hands and press down firmly about 15 times. It is best to develop an up-and-down rhythm, keeping the hands firmly on the victim's chest.
12. After the compressions, the rescuer will give the victim two long breaths. The sequence of 15 compressions and two breaths will be repeated until there are signs of spontaneous breathing and circulation or until professional medical help arrives.



2.5.1 CPR ON ADULTS

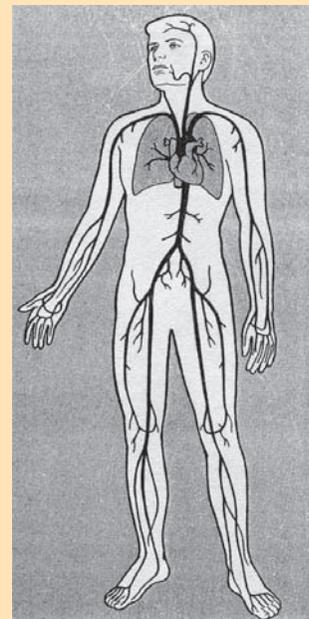


A Look at the Heart

The heart is a tough muscular organ about the size of your fist. It is located roughly in the center of your body between the lungs and under the lower half of the breastbone. The heart is protected in the front by the ribs and breastbone and in the back by the backbone.

The heart pumps blood to all parts of your body through blood vessels. Blood vessels are the tubes that carry blood to the cells of the blood vessels and your heart .

For the average adult, the heart pumps about 70 times each minutes, or about 100.000 times each day. In the minute or so it takes you to read this section, your heart will pump more than a gallon of blood. If a person's heart should stop beating, the person would need help immediately to keep the oxygen-carrying blood flowing to the body's cells until EMS personnel arrives.



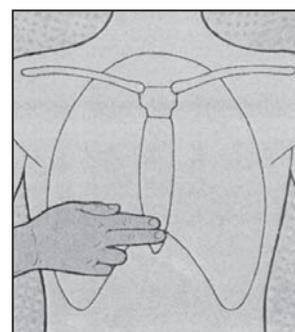
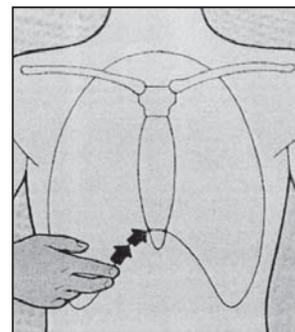
The Heart and Major Blood Vessels

Locating the Compression Position

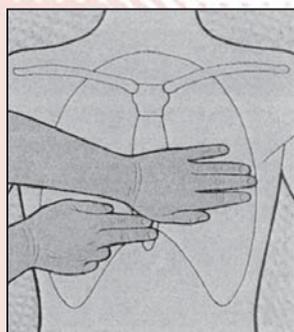
For chest compressions to work, the victim must be lying flat on his or her back on a firm, flat surface. The victim's head must be on the same level as the heart.

To give effective compressions, your hands and body must be in the correct position. Do the following:

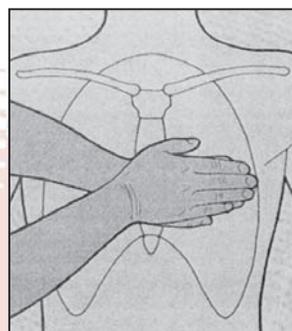
- Kneel facing the victim's chest with your knees against the victim's side.
- Use your hand—the one nearest the victim's legs—to find the lower edge of the rib cage on the side closest to you. Slide your middle and index fingers up the edge of the rib cage to the notch where the ribs meet the breastbone in the center of the lower part of the chest. With your middle finger on this notch, place the index finger of the same hand next to it on the lower end of the breastbone.
- Place the heel of your other hand on the breastbone right next to the index finger of the hand you used to find the notch. The heel of your hand should rest along the breastbone .
- Once the heel of your hand is in position on the chest, remove the other hand from the notch and place the heel of this hand directly on top of the heel of the hand already on the victim's breastbone.
- Keep your fingers off the victim's chest. To do this, you may interlace them or hold them upward.



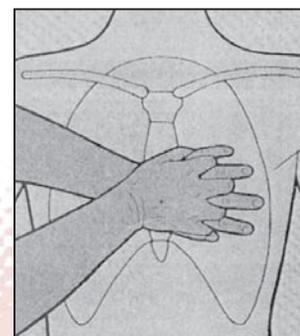
Find Correct Position



Place Heel of Hand on Breastbone

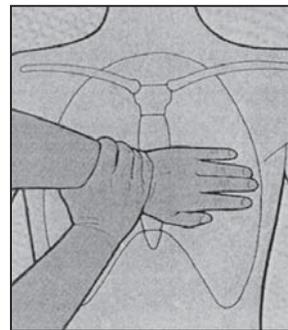


Place Second Hand Over Heel of First



Interlace Fingers

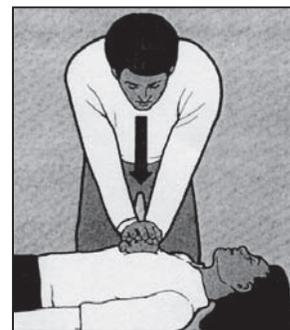
- Finding the correct hand position in this way allows you to compress right on the breastbone, and keeps hand pressure off the ribs and away from the tip of the breastbone. This will decrease the chance of fracturing the ribs, which are on either side of the breastbone. It will also keep you from pushing the tip of the breastbone into the delicate organs beneath it.
- Another acceptable hand position, useful for people with arthritic conditions, is made by grasping the wrist of the hand on the chest with the other hand.



Alternate Hand Placement

Body Position of the First Aider

The position of your body is very important when you are giving compressions. You should be kneeling facing the victim's chest and have your hands in the correct position. Straighten your arms and lock your elbows so that your shoulders are directly over your hands. In this position when you push down, you will be pushing straight down onto the breastbone. The weight of your upper body creates the pressure necessary to compress the chest.

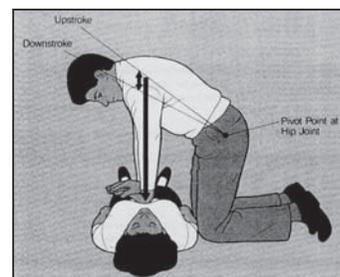


Correct Position of First Aider

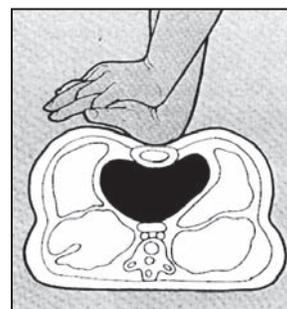
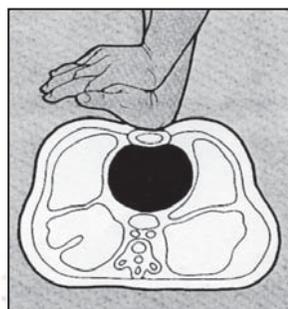
Compression Technique

This is how you give chest compressions to an adult:

1. When you compress, push with the weight of your body, not with the muscles of your arms. Push straight down. If you rock back and forth and don't push straight down, your compressions will not be effective.
2. Each compression should push the breastbone down from 1½ to 2 inches (3.8 to 5 centimeters).



Giving Chest Compressions



Compress Chest 1½ to 2 Inches

The downward and upward movement should be smooth, not jerky. Maintain a steady down-and-up rhythm and do not pause between compressions. Half the time should be spent pushing down, and half the time should be spent coming up. When you are coming up, release pressure on the chest completely, but don't let your hands lose contact with the chest or lose their correct position on the breastbone.

3. Give compressions at the rate of at least 100 compressions per minute.
4. If your hands lose contact with the chest, find the compression position again before you start compressing. Find the notch as you did before, in order to position your hands correctly.

Compression / Breathing Cycles

When you give CPR, do cycles of 30 compressions and 2 breaths. In each cycle, give 30 compressions and then open the airway and give 2 full breaths .

Each time you begin a new cycle of compressions and breaths, locate the correct hand position for compressions by finding the notch at the lower end of the breastbone.



**15 Compressions,
Then 2 Breaths**

5. The first aider should then check the adequacy of the second first aider's breaths and chest compressions. This is done by watching the victim's chest rise and fall during first aider breathing and by feeling the carotid pulse for an artificial pulse during chest compression. This artificial pulse will tell you that blood is moving through the body.

Practice Session: CPR for an Adult

During this practice session, you and a partner will practice only on a manikin.

Before you practice on the manikin, clean its face and the inside of its mouth. Clean the manikin's face and mouth before each person in your group practices.

Skill Sheet: CPR for an Adult

You find a person lying on the ground, not moving. You should survey the scene to see if it is safe and to get some idea of what happened. Then do a primary survey by checking the ABCs.

- **Check for Unresponsiveness**

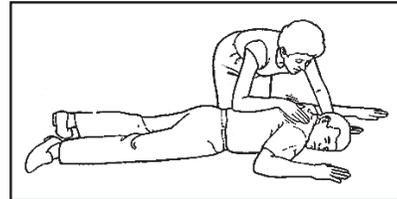
Tap or gently shake victim.

First Aider shouts, "Are you OK?"

Partner/Instructor says, "Unconscious."

First Aider repeats, "Unconscious."

First Aider shouts, "Help!"



- **Position the Victim**

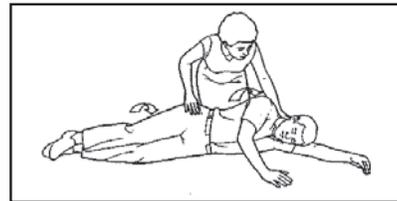
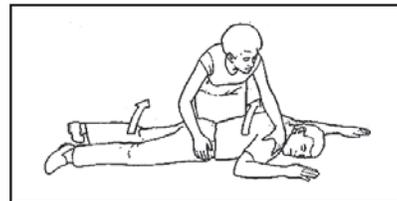
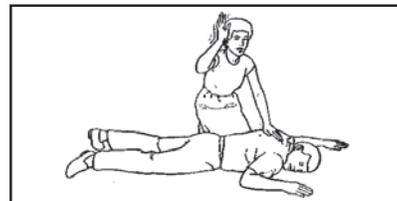
Roll victim onto back, if necessary.

Kneel facing victim, midway between victim's hips and shoulders.

Straighten victim's legs, if necessary, and move victim's arm closest to you above victim's head.

Lean over victim, and place one hand on victim's shoulder and other hand on victim's hip.

Roll victim toward you as a single unit. As you roll victim, move your hand from victim's shoulder to support back of the head and neck.



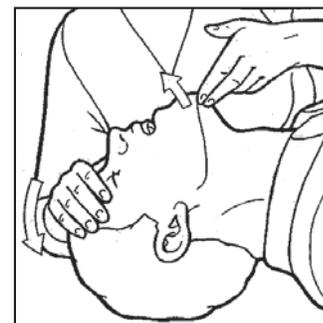
Place victim's arm closest to you alongside victim's body.

- **Open the Airway (Use head-tilt/chin-lift)**

Place your hand – the one nearest the victim's head – on victim's forehead.

Place fingers of other hand under bony part of lower jaw near chin.

Tilt head and lift jaw. Avoid closing victim's mouth. Avoid pushing on the soft parts under the chin.



- **Check for Breathlessness**

Maintain open airway with head-tilt/chin-lift.

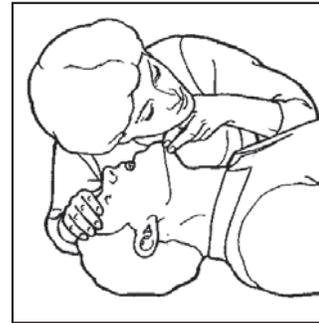
Place your ear over victim's mouth and nose.

Look at chest; listen and feel for breathing for no more than 3 to 5 seconds.

Partner / Instructor says, "No breathing"

First Aider repeats, "No breathing"

Note : This step is omitted in recent guidelines. However recommended for training purpose only.



- **Give 2 Full Breaths**

Maintain open airway with head-tilt/chin-lift. Pinch nose shut.

Open your mouth wide, take a deep breath, and seal your lips tightly around outside of victim's mouth.

Give 2 full breaths at the rate of 1 to 1½ seconds per breath. Pause between each breath for you to take a breath.

Look for the chest to rise and fall, listen and feel for escaping air.



- **Check for Pulse**

Maintain head-tilt with one hand on forehead.

Locate Adam's apple with middle and index fingers of hand nearest victim's feet.

Slide fingers down into groove of neck on side closest to you.

Feel for carotid pulse for no more than 5 seconds. Partner/Instructor says, "No breathing and no pulse." First Aider repeats, "No breathing and no pulse."



- **Phone the EMS System for Help**

Tell someone to call for an ambulance.

First Aider says, “No breathing, no pulse, call local emergency number.

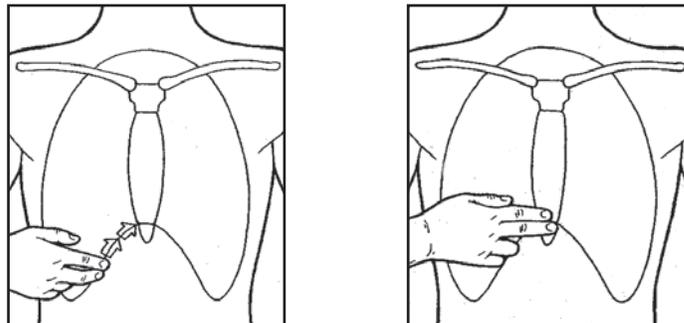
- **Locate Compression Position**

Kneel facing victim’s chest.

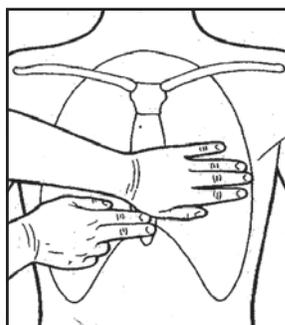
With middle and index fingers of hand nearest victim’s legs, locate lower edge of victim’s rib cage on side closest to you.

Slide fingers up the edge of rib cage to notch at the lower end of breastbone.

Place middle finger in notch, and index finger next to it on the lower end of breastbone.



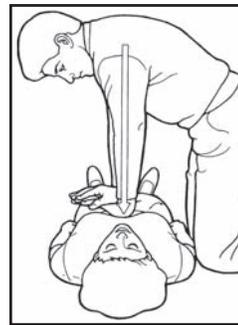
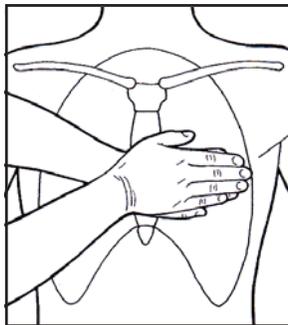
Place heel of hand nearest victim’s head on breastbone next to index finger of hand used to find notch.



Place heel of hand used to locate notch directly on top of heel of other hand.

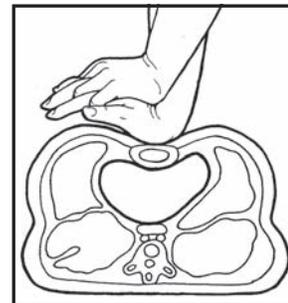
Keep fingers off victim's chest.

Position shoulders over hands with elbows locked and arms straight.

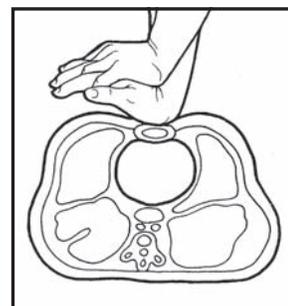


- **Give 30 Compressions**

Compress breastbone 1½ to 2 inches (3.8 to 5 centimeters) at a rate of at least 100 compressions per minute. (30 compressions should take 15-17 seconds.)



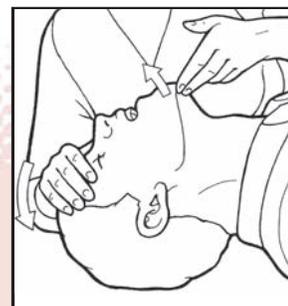
Compress down and up smoothly, keeping hand contact with chest at all times.



- **Give 2 Full Breaths**

Open airway with head-tilt/chin-lift.

Not required to be performed by a lay rescuer.



Pinch nose shut.

Open your mouth wide, take a deep breath, and seal your lips tightly around outside of victim's mouth.

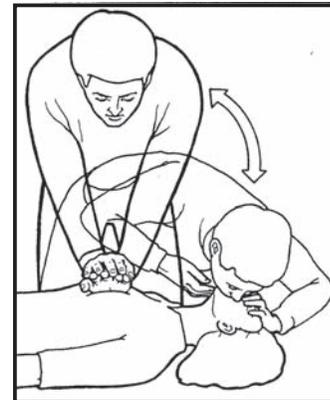
Give 2 full breaths at the rate of 1 of 1½ seconds per breath. Pause between each breath for you to take a breath.

Look for chest to rise and fall; listen and feel for escaping air.



- **Do Compression/Breathing Cycles**

Do 4 cycles of 30 compressions and 2 breaths.



- **Recheck Pulse**

Tilt head.



Locate carotid pulse and feel for 5 seconds.

Partner/Instructor says, "No pulse."

First Aider repeats, "No pulse."



- **Give 2 Full Breaths**

Open airway with head-tilt/chin-lift.

Pinch nose shut.

Open your mouth wide, take a deep breath, and seal your lips tightly around outside of victim's mouth.

Give 2 full breaths at the rate of 1 to 1½ seconds per breath.

Look for the chest to rise and fall; listen and feel for escaping air.



- **Continue Compression/Breathing Cycles**

Locate correct hand position.

Continue cycles of 30 compression and 2 breaths.

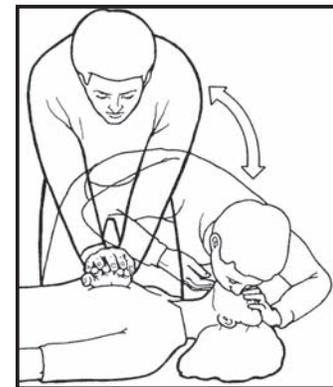
Recheck pulse every few minutes.

- **What to Do Next**

When the first aider stops to check pulse, the partner should read one of the following statements.

1. Victim has a pulse.
2. Victim does not have a pulse.

Based on this information, the first aider should decide what to do next and continue giving the right care.



Put the Steps Together

We need to emphasize the need of high quality CPR

Here are the steps you should follow when you give CPR to an adult:

1. Check for unresponsiveness. Tap or gently shake the person and shout, "Are you OK?"
2. Shout for help.
3. Position the victim.
4. Open the airway.
5. Look, listen, and feel for breathing (3 to 5 seconds)
6. If the victim is not breathing, give 2 full breaths.
7. Check the victim's carotid pulse for heartbeat (do this in not more than 5 second).
8. Tell someone to phone the EMS system for help.
9. If there is no pulse, find the correct hand position and position your body to give compressions.
10. Give 100 compressions without stopping, at the rate of at least 100 per minute. A compression depth of at least 2 inches (5 cm) in adults and a compression depth of at least one third of the anterior- posterior diameter of the chest in infants and children (approximately 1.5 inches [4 cm] in infants and 2 inches [5 cm] in children).
11. Quickly tilt the victim's head back and lift the jaw. Give 2 full breaths to the victim the same way you gave the first 2 breaths.
12. Recheck pulse. After doing 4-5 cycles (or about 100 compressions / minute) of continuous CPR, check to see if the victim has a pulse. If there is no pulse, give 2 breaths and continue CPR (compressions and first aider breaths). Repeat these pulse checks every few minutes.
13. If you do find a pulse, then check for breathing for 3 to 5 seconds. If breathing is present, keep the airway open and monitor breathing and pulse closely. This means that you should look, listen, and feel for breathing while you keep checking the pulse. If there is no breathing, do first aider breathing and keep checking the pulse.
14. Continue CPR until one of the following things happen;
 - The heart starts beating again.
 - A second first aider trained in CPR takes over from you.
 - EMS personnel arrive and take over.
 - You are too exhausted to continue.



More about CPR for an Adult

If No One Comes When You Shout for Help

One of the first things you do when you find an unresponsive victim is to shout for help. You do this to attract the attention of someone nearby who can phone the EMS system for help. But what if no one responds to your shouts for help? You should do CPR for at least 2-3 minute. During this minute you should continue to shout for help whenever you can. You should also use this minute to plan how to make the call yourself.

If no one answers your shouts for help by the end of 1 minute of CPR, you should get to a phone as quickly as you can and phone the EMPS system. Then return to the victim and begin CPR again.

If a Second Trained First Aider Is at the Scene

If another first aider trained in CPR is at the scene, this person should do two things: first, phone the EMS system for help if it has not been done; second, take over CPR when the first first aider is tired. Here are the steps for entry of the second first aider.

- The second person should first identify himself or herself as a CPR trained first aider who is willing to help.
- If the EMS system has been called and if the first first aider is tired and asks for help, then–
 1. The first first aider should stop CPR after the next set of 2 breaths.
 2. The second first aider should kneel next to the victim opposite the first first aider, tilt the head back and feel for the carotid pulse for 5 seconds.
 3. If there is no pulse, the second first aider should give 2 breaths and continue CPR.



2.5.2 CPR ON A CHILD



Cardiac Emergencies in Children

Children's hearts are usually healthy. Unlike adults, children do not often initially suffer a cardiac emergency. In most cases, the child first suffers a respiratory emergency. Then a cardiac emergency develops.

The most common cause of cardiac emergencies in children is injury resulting from motor vehicle accidents. Other common causes include injuries resulting from near-drowning, smoke inhalation, burns, poisoning, airway obstruction, firearms, and falls. Rarely, a cardiac emergency can result from a medical condition or illness such as severe croup, severe asthma, or respiratory infections such as epiglottitis.

Most cardiac emergencies in children are preventable. One way to prevent cardiac emergencies is to prevent children from being injured. Second, it is important to make sure children receive proper medical care. A third preventive measure is learning to recognize the early signals of a respiratory emergency. These signals may include any of the following:

- Agitation
- Drowsiness
- Change in skin color (to pale, blue, or gray)
- Increased difficulty in breathing
- Increased heart and breathing rates

In this section, you will learn how to give first aid to a child who has suffered a cardiac arrest. When a cardiac emergency does happen, you should immediately begin first aid as described.

How to Give CPR to a Child

To find out if a child needs CPR, begin with a primary survey to check the ABCs. You should—

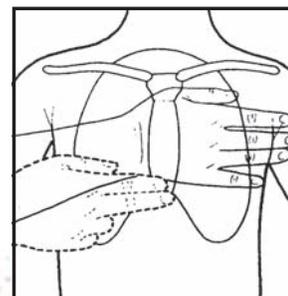
1. Check for unresponsiveness.
2. Shout for help.
3. Position the child on his or her back.
4. Open the airway.
5. Look, listen, and feel for breathing.
6. If the child is not breathing, give 2 slow breaths.
7. Check the carotid pulse.
8. Have someone phone the EMS system for help.

If the child has no pulse, begin CPR. It is important to check the child's carotid pulse for 5 to 10 seconds before you start CPR because it is dangerous to do chest compressions if the child's heart is beating.

- **Pay attention to where you put your index finger.**

Lift your fingers off the breastbone, and put the heel of the same hand on the breastbone immediately above where you had your index finger. Keep your fingers off the child's chest.

Only the heel of your hand should rest on the breastbone. Use this method to find the correct hand position before you begin compressions.



Place Heel of Hand on Breastbone

Having your hands in the correct position will lessen the chance of fracturing the ribs on either side of the child's breastbone into the delicate organs beneath it.

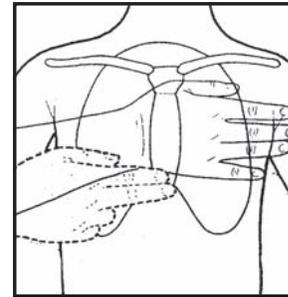
To give CPR, kneel beside the child/, lean over the chest, and find the correct position to give chest compressions. Give chest compressions and first aider breaths. These two steps keep oxygen-carrying blood flowing through the blood vessels.

Locating the Compression Position

For chest compressions to work, the child must be lying flat on his or her back on a firm, flat surface. The child's head must be on the same level as the heart.

To give effective compressions, your hands and body must be in the correct position. Do the following:

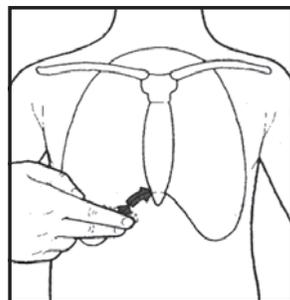
- Kneel beside the child's chest with your knees against the child's side.
- Use your hand-the one nearest the child's head-to keep the child's head in the neutral plus position.
- Use your other hand-the one nearest the child's legs-to find the lower edge of the rib cage on the child's side closest to you Slide your middle finger up the edge of the rib cage to the notch where the ribs meet the breastbone in the center of the lower part of the chest. Your middle finger in this notch, with the index finger beside it. The two fingers should be resting on the lower end of the breastbone.



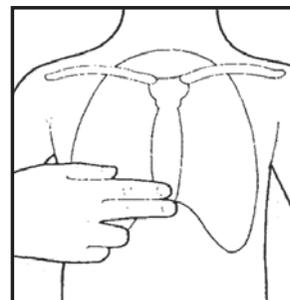
Lift Fingers off Breastbone



Slide Finger up Edge of Rib Cage



Find Correct Position



Position Fingers on Breastbone

Compression/Breathing/Cycles

When you give CPR, do cycles of 5 compressions and 1 breath. In each cycle, give 5 compressions with one hand. Keep your other hand on the child's forehead, tilting the head so that it is in the neutral-plus position. Then remove your hand from the chest, lift the chin, and give 1 breath. Always stop compressions to lift the chin and give 1 breath. After you give the breath, put your hand back on the chest in the correct position.



*5 Compressions,
Then 1 Breath*

Body Position of First Aider

The position of your body is very important when you are giving compressions.

You should be kneeling beside the child. After you have placed your hand in the correct position to give compressions, move your body until your shoulder is directly over your hand. In this position, when you push down, you will be pushing straight down onto the breastbone. Your other hand should be on the child's forehead, keeping the child's head in the neutral-plus position.

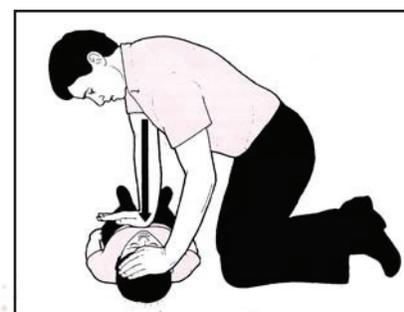


*Correct Position of
First Aider*

Compression Technique

This is how you give chest compressions to a child.

1. When you compress, use only the hand that is on the child's breastbone. You will not use both hands to give chest compressions to a child as you practiced for an adult. Push straight down. If you rock back and forth and don't push straight down, your compressions will not be effective.
2. Each compression should push the breastbone down from 1 to 1½ inches (2.5 to 3.8 centimeters) . The down-and-up movement should be smooth, not jerky. Keep a steady down-and-up rhythm, and do not pause



Giving Chest Compressions

between compressions. Half the time should be spent pushing down, and half the time should be spent coming up. When you are coming up, release pressure on the chest completely, but don't lift your hand off the child's chest. Keep your hand in the compression position.

3. Give compression at the rate of 80 to 100 compressions per minute.
4. Take note of the position your hand is in. When you take your hand off the child's chest, put it back in the same position before you start compressions again.

- **Open the Airway** (Use head-tilt/chin-lift)

Place your hand - the one nearest child's head - on child's forehead.

Place fingers of other hand under bony part of lower jaw at the chin.

Tilt head gently back into the neutral-pulse position and lift chin. Avoid closing child's mouth completely. Avoid pushing on the soft parts under the chin.

- **Check for Breathlessness**

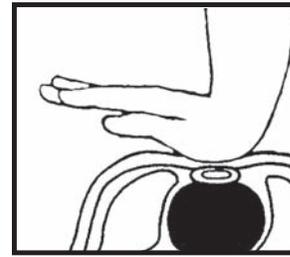
Maintain open airway with head-tilt/chin-lift.

Place your ear over child's mouth and nose.

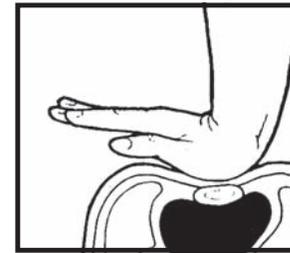
Look at chest and abdomen; listen and feel for breathing for 3 to 5 seconds.

Partner/Instructor says, "No breathing."

First Aider repeats, "No breathing."



Compress Chest 1 to 1½ Inches



Compress Chest 1 to 1½ Inches



- **Give 2 Slow Breaths**

Maintain Open airway with head-tilt/chin-lift. Pinch nose shut.

Open your mouth wide, take a breath, and seal your lips tightly around outside of child's mouth.

Give 2 slow breaths at the rate of 1 to 1½ seconds per breath. Pause in between each breath for you to take a breath.

Look for the chest to rise and fall; listen and feel for escaping air.

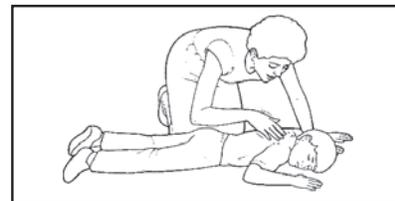


Skill Sheet: CPR for a Child

You find a child lying on the ground, not moving. You should survey the scene to see if it is safe and to get some idea of what happened. Then do a primary survey by checking the ABCs.

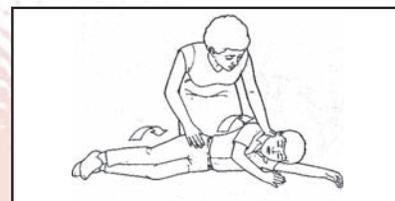
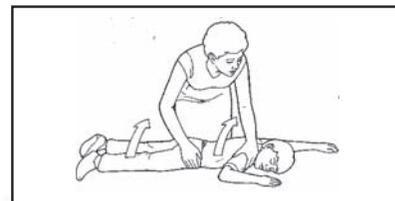
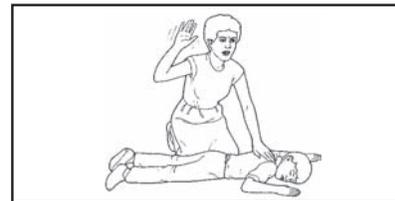
Check for Unresponsiveness

- Tap or gently shake child's shoulder.
- First Aider shouts, "Are you OK?"
- Partner/Instructor say, "Unconscious"
- First Aider repeats, "Unconscious."
- First Aider shouts, "Help!"



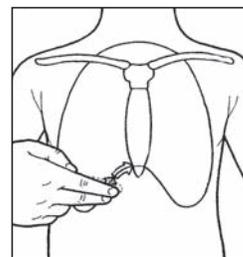
Position the Child

- Roll child on his back, if necessary.
- Kneel facing child, midway between child's hips and shoulders.
- Straighten child's legs, if necessary, and move child's arm closest to you above child's head.
- Lean over child and place one hand on child's shoulder and other hand on child's hip.
- Roll child toward you as a single unit. As you roll child, move your hand from child's shoulder to support back of head and neck.
- Place child's arm closest to you alongside child's body.



Locate Compression Position

- Kneel facing child's chest.
- Maintain head tilt with hand on forehead.
- With middle finger of hand nearest child's legs, locate lower edge of child's rib cage on side closest to you.
- Slide middle finger up the edge of rib cage to notch at the lower end of breastbone.



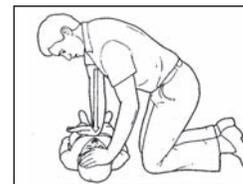
Check for Pulse

- Maintain head-tilt with one hand on forehead.
- Locate Adam's apple with middle and index fingers of your hand nearest child's feet.
- Slide fingers toward you into groove of neck on side closest to you
- Feel for carotid pulse for no more than 5 seconds.
- Partner/Instructor say, "No breathing and no pulse."
- First Aider repeats, "No breathing and no pulse."



Phone the EMS System for Help

- Tell someone to call for an ambulance.
- First Aider says, "Child not breathing has no pulse, Call *local emergency number or operator*"
- Position shoulder over hand



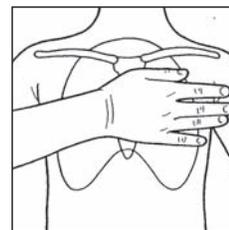
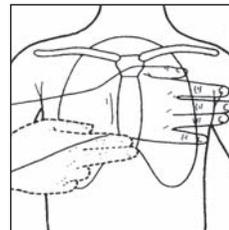
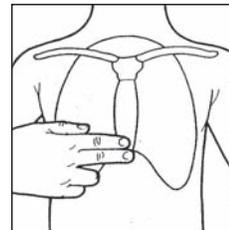
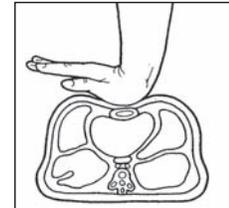
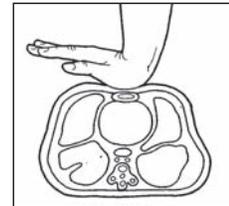
Give 5 Compressions

- The adult sternum should be depressed at least 2 inches (5 cm) at a rate of 80 to 100 compression should take 3 to 4 seconds.
- Count aloud, “One and two and three and four and five and”. (Push down as you say the number and come up as you say “and’.)
- Compress down and up smoothly, keeping hand contact with chest at all times.
- Maintain head –tilt with hand on forehead .
- Place middle finger in notch and index finger next to it on lower end of breastbone.
- Look at where your index finger is placed on child’s breastbone.
- Lift fingers off breastbone.
- Place heel of same hand on breastbone immediately above where index finger was placed.
- Keep finger off child’s chest.

Do compression/Breathing Cycles

- Maintain head –tilt with hand on forehead.
- Return hand doing chin-lift directly to compression position.
- Do 5 cycle of 30 compressions and 1 breath.

IMP : Compressions generate critical blood flow and oxygen and energy delivery to heart and brain compression of at least 2 inches are more effective than $1\frac{1}{2}$ inches.



Give 1 Slow breath

- Maintain head-tilt with hand on forehead.
- Place fingers of other hand under bony part of lower jaw at the chin. Lift chin.
- Pinch nose shut.
- Open your mouth wide, take a breath, and seal your lips tightly around outside of child's mouth.
- Give 1 slow breath (lasting 1 to 1 ½ seconds).
- Look for chest to rise and fall ; listen and feel for escaping air.



Give 1 slow Breath

- Maintain head-tilt with hand on forehead .
- Pinch nose shut.
- Place fingers of other hand under bony part of lower jaw at the chin. Lift chin.
- Open your mouth wide, take a breath, and seal your lips tightly around outside of child's mouth .
- Give 1 slow breath (lasting 1 to 1 ½ seconds).
- Look for the chest to rise and fall; listen and feel for escaping air.



Continue Compression/Breathing Cycles

- Return hand to compression position.
- Continue cycles of 30 compression and 2 breath.
- Recheck pulse every few minutes.



What to do Next

- When the rescuer stops to check pluse, the partner should read one of the following statements:
 1. Child has a pulse.
 2. Child does not have a pulse.
- Based on this information, the rescuer should decided what to do next and continue giving the right care.

Recheck Pulse

- Maintain head tilt with one hand on forehead.
- Feel for carotid pulse for 5 seconds.
- Partner/Instructor says, “No pulse.”
- First Aider repeats, “No pulse.”



Practice Session: CPR for a Child

- During this practice session, you and a partner will practice only on a manikin.
- Before you practice on the manikin, clean its face and the inside of its mouth. Clean the manikin’s face and mouth before each person in your group practices.



Put the steps together

Here are the steps you should follow when you give CRP to a child:

1. Check for unresponsiveness.
2. Shout for help.
3. Make sure that the child is on his or her back on a firm, flat surface.
4. Open the airway.
5. Look, listen, and feel for breathing (3 to 5 seconds).
6. If the child is not breathing, give 2 slow breaths.
7. Check the child’s carotid pulse for heartbeat (5 to 10 seconds).
8. Tell someone to phone the EMS system for help.
9. If there is no pulse, locate the correct hand position and position yourself to give chest compressions.
10. Give 5 compressions without stopping at the rate of 80 to 100 compressions per minute, counting out loud, “One and two and three and four and five and.” Push down as you say the number and come up as you say the “and.” Remember to keep your other hand on the child’s forehead keeping the head in the neutral-pulse position.

11. Next, lift the chin, and give 1 slow breath. The breath should take about 1 to 1 1/2 seconds.
12. Keep repeating-5 compressions, 1 breath, 5 compressions, 1 breath, and so on. The complete cycle of 5 compressions and 1 breath should take from 4 to 6 seconds.
13. Recheck pulse. After you do 10 cycles (or about 1 minute) of continuous CPR, check to see if the child has a pulse. Do this after you give the breath at the end of the 10th cycle of 30 compressions and 2 breath. Check the carotid pulse at the neck for 5 seconds. If there is no pulse, give 1 breath and continue CPR. Repeat the pulse check every few minutes. If you do find a pulse, then check for breathing for 3 to 5 seconds. If the child is breathing, keep the airway open and monitor breathing and pulse closely. This means that you should look, listen, and feel for breathing. Check the pulse once every minute. Cover the child, and keep the child warm and as quiet as possible. If the child is not breathing, give rescue breathing and keep checking the pulse.
14. Continue CPR until one of these things happens:
 - The heart starts beating again.
 - A second rescuer trained in CPR takes over for you.
 - EMS personnel arrive and take over.
 - You are too exhausted to continue.

More About CPR on a Child

If No One Comes When You Shout for Help

When you determine that a child is unconscious, always shout for help immediately. Your shout may attract someone who can phone the EMS system for help. But what if no one responds to your shouts for help? You should do CPR for 1 minute. During this minute you should continue to shout for help. You should also use this minute to plan how to make the call yourself. If no one has responded to your shouts for help by the end of 1 minute of CPR, you should get to a phone as quickly as you can and call the EMS system. If possible, you should bring the phone to the area where the child is or carry the child with you to the phone. Then begin CPR again.



If a Second Trained Rescuer Is at the Scene

If another rescuer trained in CPR is at the scene, this person should do two things: first, phone the EMS system for help if this has not been done; second, take over CPR when the first rescuer is tired.

Here are the steps for entry of the second rescuer:

- The second person should identify himself or herself as a CPR. trained rescuer who is willing to help.
- If the EMS system has been called and if the first rescuer is tired and asks for help, then-
 1. The first rescuer should stop CPR after the next breath.
 2. The second rescuer should kneel next to the child opposite the first rescuer, tilt the head into the neutral-plus position, and feel for the carotid pulse for 5 seconds.
 3. If there is no pulse, the second rescuer should give 1 breath and continue CPR.
 4. The first rescuer should then check the adequacy of the second rescuer's breaths and chest compressions. This is done by watching the child's chest rise and fall during rescue breathing, and by feeling the carotid pulse for an artificial pulse during chest compressions. This artificial pulse will tell you that blood is moving through the body.

2.6 Precautions

There are certain important precautions for rescuers to remember in order to protect the victim and get the best result from CPR.

These include:

- Do not leave the victim alone.
- Do not give chest compressions if the victim has a pulse. Chest compression when there is normal circulation could cause the heart to stop beating.



- Do not give the victim anything to eat or drink.
- Avoid moving the victim's head or neck if spinal injury is a possibility.

The person should be left as found if breathing freely. To check for breathing when spinal injury is suspected, the rescuer should only listen for breath by the victim's mouth and watch the chest for movement.

2.7 Prevention

- Loss of consciousness is an emergency that is potentially life threatening. To avoid loss of consciousness and protect themselves from emergency situations, people at risk can follow these general guidelines:
 1. People with known conditions or diseases, such as diabetes or epilepsy, should wear a medical alert tag or bracelet.
 2. People with diabetes should avoid situations that will lower their blood sugar level.
 3. People who feel weak, become dizzy or light-headed, or have ever fainted, should avoid standing in one place too long without moving.
 4. People who feel faint, can lie down or sit with their head lowered between their knees.
 5. Risk factors that contribute to heart disease should be reduced or eliminated. People can reduce risks if they stop smoking, lower blood pressure and cholesterol, lose weight, and reduce stress.
 6. Illegal recreational drugs should never be used.
 7. Seeing a doctor regularly and being aware of any disease conditions or risk factors can help prevent or complicate illness, as can seeking and following the doctor's advice about diet and exercise.
 8. Using seat belts and driving carefully can help avoid accidental injury.
 9. People with poor eyesight or those who have difficulty in walking because of disability, injury, or recovery from illness, can use a cane or other assisting device to help them avoid falls and injury.



2.8 New Developments in CPR

This chapter contains the guidelines for out-of-hospital, single rescuer, adult basic life support (BLS). Basic life support refers to maintaining airway patency and supporting breathing and the circulation without the use of equipment other than a protective device.

It is important that those who may be present at the scene of a cardiac arrest, particularly lay bystanders, should have learnt the appropriate resuscitation skills and be able to put them into practice. Simplification of the BLS sequence continues to be a feature of CPR guidelines, but, in addition, there is now advice on who should be taught what skills, particularly chest-compression-only or chest compression and ventilation.

Within this advice, allowance has been made for the rescuer who is unable or unwilling to perform rescue breathing, and for those who are untrained and receive telephonic advice from the ambulance service.

This change was made because of the evidence that relying on a check of the carotid pulse to diagnose cardiac arrest is unreliable and time-consuming, mainly, but not exclusively, when attempted by non-healthcare professionals. Subsequent studies have shown that checking for breathing is also prone to error, particularly as agonal gasps are often misdiagnosed as normal breathing.

Presently the absence of normal breathing continues to be the main sign of cardiac arrest in a non-responsive victim. Once cardiopulmonary resuscitation (CPR) has started, it is now recommended that the rescuer should only stop CPR if the victim shows signs of regaining consciousness, such as coughing, opening his eyes, speaking, or moving purposefully, as well as breathing normally.

For more than 40 years, CPR training has emphasized the ABCs of CPR, which instructed people to open a victim's airway by tilting their head back, pinching the nose and breathing into the victim's mouth, and only then giving chest compressions," According to the new research from the year 2010, Chest compressions should be the first step in addressing cardiac arrest and should be started immediately on anyone who is unresponsive and is not breathing normally. Oxygen will be present in the lungs and bloodstream within the first few minutes, so initiating chest compressions first will facilitate distribution of that oxygen into the brain and heart sooner.

Previously, starting with "A" (airway) rather than "C" (compressions) caused significant delays of approximately 30 seconds. Presently it is recommended that the A-B-Cs (Airway-Breathing-Compressions) of cardiopulmonary resuscitation (CPR) be changed to C-A-B (Compressions-Airway-Breathing).

It is also recommended that during CPR, rescuers increase the speed of chest compressions to a rate of at least 100 times a minute. In addition, compressions should be made more deeply into the chest, to a depth of at least 2 inches in adults and children and 1.5 inches in infants.

Persons performing CPR should also avoid leaning on the chest so that it can return to its starting position, and compression should be continued as long as possible without the use of excessive ventilation.

Increased emphasis has been placed on high quality-CPR (compression of adequate rate and depth, allowing complete chest recoil between compressions, minimizing interruptions in compressions and avoiding excessive ventilation).

Rescuer should initiate chest compression before giving rescue breaths CAB rather than ABC.



In recent years, the CPR guidance has been revised to place more emphasis on chest compressions for a sudden cardiac arrest. In 2008, the group said viewers untrained heart or those unwilling to do rescue breaths could do hands-only CPR until paramedics arrive, or a defibrillator used to restore normal heart rhythm.

Now, the group says all professionals passersby using standard CPR should begin chest compressions instead of opening the victim's airway and breathing into the mouth first.

Trenches change the old ABC training-breathing airway compressions. They called rescuers to give two breaths first, then alternate with 30 presses.

Trenches change the old ABC training-breathing airway compressions. They called rescuers to give two breaths first, then alternate with 30 presses.

CPR guidelines are changing as a result of a conference that meets every five years: "The International Consensus on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care with Treatment Recommendations Conference." The goal of the conference is to discuss global resuscitation-science and come up with treatment recommendations. The 2010 conference has concluded and so changes are coming in 2011 in the way the American Heart Association teaches their CPR classes. The most notable change is that the old acronym ABC (Airway, Breathing, Circulation) for CPR is being replaced with a new one: CAB (Circulation, Airway, Breathing).

A-B-C is for babies; now it's C-A-B!

It used to be follow your ABC's: airway, breathing and chest compressions. Now, Compressions come first, only then do you focus on Airway and Breathing. The only exception to the rule will be newborn babies, but everyone else - whether it's infant CPR, child CPR or adult CPR - will get chest compressions before you worry about the airway.

No more looking, listening and feeling.

The key to saving a cardiac arrest victim is action, not assessment. Call 911 the moment you realize the victim won't wake up and doesn't seem to be breathing right.



Trust your gut. If you have to hold your cheek over the victim's mouth and carefully try to detect a puff of air, it's a pretty good bet she's not breathing very well, if at all.

Push a little harder.

How deep you should push on the chest has changed for adult CPR. It was 1 1/2 to 2 inches, but now the Heart Association wants you to push at least 2 inches deep on the chest.

Push a little faster

AHA changed the wording here, too. Instead of pushing all the chest at about 100 compressions per minute, AHA wants you to push at least 100 compressions per minute. At that rate, 30 compressions should take you 18 seconds.

Source: About.com and AHA website

My thoughts -

As a mother of 2 little girls (1½ yrs and 3 1/2 yrs old), I would definitely go for the A-B-C method which is still recommended by the American Red Cross. I've talked to nurses, firefighters and CPR Instructors and it is clear that the new American Heart Association guidelines were created because they felt that most people refrain from helping a victim that is not breathing for fear of having to do mouth-to-mouth. It is better to do something, rather than nothing and if they promote chest-only compressions, then the thought is that more people will take action immediately when someone isn't breathing.

Guidelines have changed a few times since the early 1900's. All in all - whichever guidelines you choose to follow - doing something is better than nothing.



References.

1. Resuscitation Council (UK) www.resus.org.uk
2. American heart association. www.heart.org
3. ERC European Resuscitation Council www.erc.edu

Check out new website about :

[CPR Certification Training](#)

[CPR Guidelines 2011](#)

[Recent CPR Guidelines](#)

[Rules of CPR](#)

