



NationalCPRFoundation™

Standard – CPR / AED Certification Course

In this CPR Certification Course you'll learn how to perform CPR and how to use an Automated External Defibrillator (AED).





Introduction

The leading cause of death in the United States according to the Centers for Disease Control and Prevention (CDC) is cardiovascular disease. You can administer Cardiopulmonary Resuscitation (CPR) in many different situations. If a person has drowned, had a heart attack, experienced a stroke, gone into cardiac arrest, or is choking, proper training could mean the difference between life and death. If the patient isn't breathing, is unconscious or has no pulse, CPR should be applied immediately. Proper CPR begins with chest compressions and no longer requires mouth-to-mouth breathing techniques.

It's important to note: Death is likely to occur after **10 minutes** of loss of oxygen to the brain. From **6 to 10 minutes**, brain damage is expected. From **4 to 6 minutes**, brain damage is very possible, and from **0 to 4 minutes**, permanent or serious brain damage isn't likely to occur.

Understanding CPR

When the heart stops beating, blood stops flowing throughout the rest of the body and the brain no longer receives a steady supply of oxygen. **Cardiopulmonary Resuscitation** involves the application of chest compressions applied to a person who has no pulse or isn't breathing. Chest compressions will allow the heart to carry oxygenated blood throughout the body and to the brain. CPR essentially acts like an artificial heart moving the blood rich in oxygen to the brain.

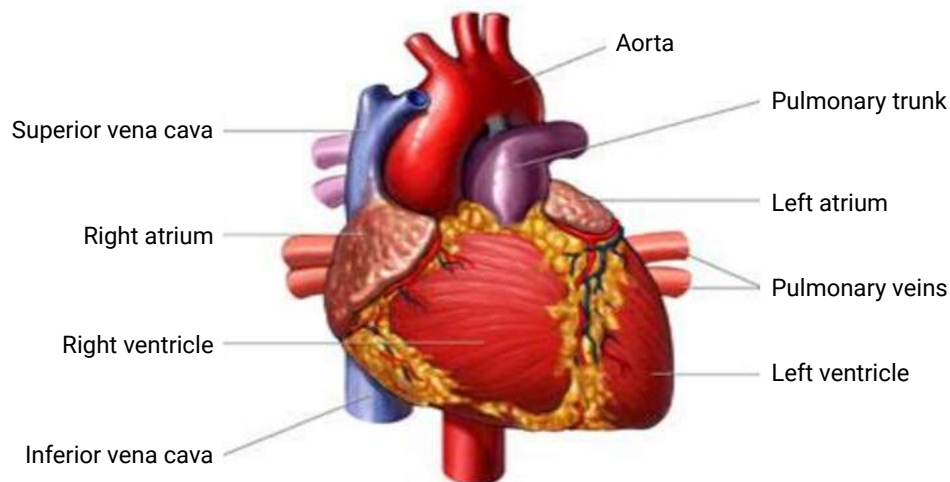
The patient's survival rate increases as they receive manual CPR, controlled stimulation from an **Automated External Defibrillator (AED)**, and if trained emergency medical technicians (EMT) arrive as quickly as possible to provide further assistance.

Recommendation

Untrained rescuers should provide Compression-only CPR since it's easy for an operator (dispatcher) to provide instructions and guidance over the phone.

Remember, it is a priority to activate the Emergency Response System (automatically done by the operator when calling 911 for assistance) **immediately and to start and continue chest compressions as directed.**

Human Heart





The Good Samaritan

The Good Samaritan Law protects individuals who assist those who are injured, ill, or in peril. As long as someone is acting voluntary and without expectation of reimbursement or compensation while performing such aid on-site, they will have legal protection. When performing CPR, every second counts, so unless unique circumstances apply, don't hesitate to call 911 and perform CPR immediately.

Before attempting CPR on someone in need of assistance

There are several things you must do. Make sure you and the patient aren't in any danger. If possible, resolve the risk or move the patient out of harm's way. If unable to do so for whatever reason, immediately call 911.

Check the patient to determine if they are conscious or not. Do not check for a pulse because time is of the essence and finding a pulse can take too long. Call out to the patient asking, "Are you okay?" Repeat if necessary. If the patient doesn't respond, immediately call 911 and then perform CPR—initiating Circulation, Airway and Breathing tasks (the C-A-B's). Also, if possible, have someone nearby call 911 and begin CPR, immediately.

It's important to note: American Heart Association (AHA) guidelines recommend in-confident performers should, at least, perform chest compressions upon the patient. Studies show chest compressions can be as effective as the combination of CPR.





Adult and Adolescent – CPR

When to Activate Emergency Response System

If possible, send someone to activate the Emergency Response System (call 911) and begin CPR immediately. Use an AED if there is one available at the scene. If you're not with someone and you do not have a mobile phone, leave the patient to activate the Emergency Response System while also retrieving an AED.

Adult and Adolescent CPR

Scene Safety and Recognition of Cardiac Arrest: Check for safety (for rescuers and victims) and responsiveness, breathing, and gasping. Check the pulse for more than 5 seconds but within 10 seconds (breathing and pulse check can occur simultaneously).

Check Pulse: Test the pulse by placing two fingers on the carotid artery. Press your index and 3rd finger on the side of the neck, against the windpipe. You can also check the wrist by placing the same two fingers on the inside of the wrist below the thumb.

C is for Circulation – Adult and Adolescent Compressions

Circulation: Chest compressions circulate the blood within the patient. It's important to place your hands correctly upon the patient's chest. Chest Compression Tempo: Perform CPR while matching the tempo of the song "Staying Alive" while making sure to push hard and fast.

Compression-ventilation ratio *without Advanced Airway*

Make sure the adult or adolescent is resting upon a firm, solid surface. Perform chest compressions on the lower half of the breastbone (sternum). Once in position, lock your elbows and use your body's weight to compress at least 2 inches (5 cm) upon the patient's chest. **Do not lean on the patient's chest in between compressions and make sure the chest ultimately recoils.** Limit all interruptions to less than 10 seconds while performing CPR.

It's important to note: When performing chest compressions on an adult or adolescent you should compress at least 2 inches (5 cm). The compression rate is 100-120/min. **Two Rescuers:** Perform tasks simultaneously. Administer compressions over breathing 30:2.

Chest Compression Fraction is the total percentage of resuscitation time when performed by the rescuer(s) during cardiac arrest. Try to minimize pauses in chest compressions. **Chest Compression Fraction Goal:** Target of at least 60 percent.

Compression-ventilation ratio with Advanced Airway

Perform continuous compressions at a rate of 100-120/min. Provide one breath every 6 seconds (10 breaths/min).

A is for Airway - Clear the airway

Airway: Make sure the patient is on a solid surface on their back. Kneel next to the patient's neck and shoulders. Open the patient's airway by tilting the head back with the palm of one hand while gently lifting the chin with your other hand. For no more than 10 seconds, check for life: listen for any sounds and put your cheek next to the patient's mouth to feel any breaths while also looking for any motion. Rescuers can check steps simultaneously. If the patient is assumed lifeless, begin mouth-to-mouth.





Adult and Adolescent – CPR

B is for Breathing - Mouth-to-Mouth

Rescue Breathing: Is widely known to be performed mouth-to-mouth. It can also be performed mouth-to-nose, but this form is only used in rare cases. While still performing the airway technique, pinch the patient's nose shut. With a complete seal over the patient's mouth with your mouth, breathe until you see the chest inflate. If the chest does not rise, repeat the airway technique. Once the chest swells, breathe into the patient a second time (30:2).

Once the breathing technique is applied, continue **Circulation, Airway, Breathing (C-A-B's)**.

Rescuers Should Never

- Compress slower than 100/min or faster than 120/min
- Compress in-depth less than 2 inches (5 cm) or more than 2.4 (6 cm)
- Lean on victim's chest during compressions
- Allow interruption during compressions for more than 10 seconds
- Provide excessive ventilation during breathing task (i.e., excessive breathing with force or too many breaths)





Child (Age 1 Year to Puberty) – CPR

When to Activate Emergency Response System

Witnessed Collapse: Follow the CPR steps for adults and adolescents.

Unwitnessed Collapse: Provide 2 minutes of CPR. Leave victim to activate the Emergency Response System and retrieve an AED (unless you can have someone else activate the response). Return and resume CPR and use an AED if it is available.

Child CPR (Age 1 Year to Puberty)

Scene Safety and Recognition of Cardiac Arrest: Check for safety and responsiveness, no breathing, and gasping. Check pulse for more than 5 seconds but within 10 seconds (breathing and pulse check can occur simultaneously).

Check Pulse: Check the pulse by placing two fingers on the carotid artery (press your index and 3rd finger on the side of the neck against the windpipe). You can also check the wrist by placing the same two fingers on the inside of the wrist below the thumb.

C is for Circulation – Child Compressions

Circulation: Chest compressions circulate the blood within the patient. It's important to place your hands correctly upon the patient's chest. Chest Compression Tempo: Perform CPR while matching the tempo of the song "Staying Alive" while making sure to push hard and fast.

Compression-ventilation ratio *without Advanced Airway*

Make sure the child is resting upon a firm, solid surface. Before you begin compressions, determine if one hand could be used instead of two. One hand should be used for smaller children for safety reasons. Perform on the lower half of the breastbone (sternum). **Do not lean on the child's chest in between compressions and make sure the chest ultimately recoils.** Limit all interruptions to less than 10 seconds while performing CPR.

It's important to note: When performing chest compressions on a child you should compress about 2 inches (5 cm) (at least one third AP diameter of the chest). Do not exceed 1/2 the depth of the child's circumference. It should be between a depth of 1/3 and 1/2. Make sure your hands are placed correctly upon the child's chest. Follow the same steps when performing CPR on an adult and adolescents: 30 compressions and two breaths equaling a ratio of 30:2. Two Rescuers: Perform tasks simultaneously. Administer compressions over breathing 15:2.

Compression-ventilation ratio *with Advanced Airway*

- Continuous compressions at a rate of 100-120/min
- One breath every 6 seconds (10 breaths/min)

A is for Airway – Clear the Airway

Airway: Kneel beside the child the same way you would kneel beside an adult. Perform the three steps as you would with an adult. Tilt the chin and open the mouth while listening and feeling for any breathing for less than 10 seconds. Make sure nothing is blocking the airway. **Proceed to the breathing technique if the child isn't showing signs of life.**





Child (Age 1 Year to Puberty) – CPR

B is for Breathing – Mouth-to-Mouth

Breathing: Make sure to perform the same breathing task upon the child as you would upon the adults and adolescents. Children's lungs are much smaller than adults, so make sure to give a lesser breath when performing this task upon a child. After tilting the head and chin, squeeze the nose shut. Seal your mouth over the child's mouth and perform the breathing task.

Remember, give one breath into the child's lungs while making sure the child's chest inflates. If the child's chest doesn't rise, repeat the airway technique. After the chest inflates, perform compressions.

Once the breathing technique is applied, continue **Circulation, Airway, Breathing (C-A-B's)**.

Rescuers Should Never

- Compress slower than 100/min or faster than 120/min
- Compress in-depths less than 2 inches (5 cm) or more than 2.4 (6 cm)
- Lean on the victim's chest during compressions
- Allow interruption during compressions more than 10 seconds
- Provide excessive ventilation during breathing task (i.e., excessive breathing with force or too many breaths)





Infant (Age Less than 1 Year, Excluding Newborns) – CPR

When to Activate Emergency Response System

Witnessed Collapse: Follow steps for Adults and Adolescents

Unwitnessed Collapse: Provide 2 minutes of CPR. Leave victim to activate the Emergency Response System and retrieve an AED (unless you can have someone else activate the response). Return and resume CPR and use an AED if it is available.

Infant CPR (Age Less than 1 Year, Excluding Newborns)

Scene Safety and Recognition of Cardiac Arrest: Check for safety and responsiveness, no breathing, and gasping. Check pulse for more than 5 seconds but within 10 seconds (breathing and pulse check can occur simultaneously).

Check Pulse: Check the infant's pulse by placing 2 fingers on the brachial artery. Press your index and 3rd finger on the inside of the infant's upper arm between the elbow and shoulders.



C is for Circulation – Infant Compressions

Circulation: Chest compressions circulate the blood within the patient. It's important to place your hands correctly upon the patient's chest. **Chest Compression Tempo:** The correct tempo that should be performed matches the song "Staying Alive." Make sure to push hard and fast to that song's tempo. Use **EXTREME** caution when providing CPR on infants.

One Rescuer: Just below the infant's nipples, in the center of the chest, and just below the middle horizontal line, place two fingers for compression. Remember, 100-120/min compressions while maintaining the same ratio 30:2 **Compression to Breathing:** Perform five reps of Compressions and breathing or about 2 minutes and then call 911 (or have someone else activate the emergency response system). Continue CPR until help arrives or until the infant breathes again. Press compressions at about 1/3 of the chest circumference (at least one-third AP diameter of chest or about 1.5 inches or 4 cm.)

Two Rescuers: One Rescuer should use two hands holding the infant facing up while positioning the fingers (encircling hands) in the middle of the infant's chest as the other rescuer uses a one-way valve—placing it over the infant's mouth and nose. One rescuer will perform compressions while the other uses the rescue valve. You can also apply a ratio of 15:2 compressions to breathing. Give one breath every 6 seconds (10 breaths/min) if an advanced airway technique is used.

Compression-ventilation ratio *without Advanced Airway*

- One Rescuer - 30:2
- Two or more Rescuers - 15:2

Compression-ventilation ratio *with Advanced Airway*

- Continuous compressions at a rate of 100-120/min
- One breath every 6 seconds (10 breaths/min)





Infant (Age Less than 1 Year, Excluding Newborns) – CPR

A is for Airway – Clear the Airway

Airway: Make sure to lay the infant on a firm, solid surface as you would with children and adults. Kneel beside the infant's shoulder while placing one hand on the infant's forehead as your other hand gently lifts the chin. Next, listen and feel for any breathing for 10 seconds. Place your cheek just in front of the infant's mouth while checking for a pulse under the upper arm. **If the infant isn't showing any signs of life, begin the breathing technique.**

B is for Breathing – Mouth-to-Mouth

Breathing into an infant is different than breathing into an adult or child.

Breathing: Place your entire mouth over the infant's mouth and nose when you breathe into the infant. Make sure to perform this task with less breath than you would with children or adults. If the chest fully recoils, complete the second breath (each for one second). Check for anything blocking the airway if the chest doesn't rise completely and repeat the process.

Once the breathing technique is applied, continue **Circulation, Airway, Breathing (C-A-B's)**.

Rescuers Should Never

- Compress slower than 100/min or faster than 120/min
- Compress in-depth less than 1 and 1/2 inches (4 cm)
- Lean on the victim's chest during compressions
- Allow interruption during compressions for more than 10 seconds
- Provide excessive ventilation during breathing task (i.e., excessive breathing with force or too many breaths)





Automated External Defibrillator (AED)

AED Guidelines (Procedure)

When should an AED be used?

CPR is a very important action for saving a patient's life. However, an AED is crucial towards regaining the natural rhythm of the heartbeat as well as restarting the patient's heart. After performing CPR and if the patient is still non-responsive an AED unit should be used. If the AED does not bring the patient back to consciousness, CPR should be re-administered. It's crucial to call 911 or any Emergency Medical Service (EMS) before performing CPR or using an AED.

How to use an AED

Turn on the AED. Usually there will be an "on" button. In some cases there might be a lever. Remove all clothing from the arms, chest and abdomen whether male or female. Attach pads to bare skin on the chest. Use the appropriate system for children or adults. Place the left pad under the left armpit to the left of the nipple. Place the right pad under the collarbone on the right side of the chest. Put the pads at least one inch away from any implanted devices.

AED for Infants

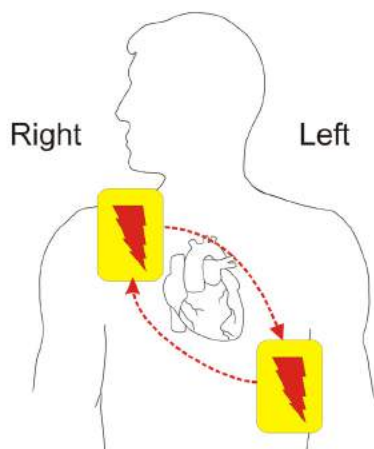
If the pads are able to touch, place one pad directly on the back of the infant.

Next, connect AED wiring

Analyze the patient's heart rhythm. **DO NOT** touch the patient during the defibrillator process. If the AED does not begin analyzing automatically, press the analyze button. Push the shock button if and when advised to do so. Clean the patient and area of any debris, significant amounts of water, etc., before using an AED.

Newer AED's only shock once. Some models do shock up to three times. If the patient is shocked but doesn't regain a pulse immediately, perform CPR for 2 minutes.

It's important to note: Before using an AED, physician or medical training is recommended.





Standard – CPR / AED Review

CPR Procedures (Adult, Child, Infant)

Ask the patient if he/she is okay before performing any tasks. The ratio of chest compressions over breathing is 30:2. Look, listen, and feel for breathing. Check for anything blocking the patient's airway. The rescuer may perform tasks simultaneously.

CPR for Infants (Age Less Than 1 Year, Excluding Newborns)

- Witnessed Collapse: Call 911 or have someone call
- Un-Witnessed Collapse: Perform CPR (for 2 minutes), call 911 or have someone call
- Chest compressions: 100-120/min
- Perform CPR - Circulate, Airway, Breathing (C-A-B's)
- Compressions at about 1½ inches (4 cm) to 1/3 AP diameter of chest
- 30:2 compressions over breaths and seal the infant's mouth and nose (two rescuers: 15:2)
- Two Rescuers: Perform compressions with 2 thumbs
- Use AED as soon as it's available

CPR for Children (Age 1 Year to Puberty)

- Witnessed Collapse: Call 911 or have someone call
- Un-Witnessed Collapse: Perform CPR (for 2 minutes), call 911 or have someone call
- Chest compressions: 100-120/min
- Perform CPR - Circulate, Airway, Breathing (C-A-B's)
- Compressions at about 2 inches (5 cm) to 1/3 AP diameter of chest
- 30:2 compressions over breaths (two rescuers 15:2)
- Two Rescuers: Perform tasks simultaneously
- Use AED as soon as it's available

CPR for Adults & Adolescents

- Check for life
- Before performing CPR call 911 or have someone else call
- Chest compressions: 100-120/min
- Two Rescuers: Perform tasks simultaneously
- Perform CPR – Circulate, Airway, Breathing (C-A-B's)
- Perform compressions at about 2 inches (5 cm) depth
- One or Two rescuers: 30:2 compressions over breaths
- Use AED as soon as it's available





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