

CPR and AED

Although much is being done to prevent death from heart problems, sudden cardiac arrest is still one of the leading causes of death in the United States. About 70% of the arrests that occur outside of the hospital happen at home.

In this part, you will learn skills that will help you to recognize cardiac arrest, get emergency care on the way quickly, and help the person until more advanced care arrives to take over.

Life Is Why



High-Quality CPR Is Why

Early recognition and CPR are crucial for survival from cardiac arrest. By learning high-quality CPR, you'll have the knowledge and skills that may help save a life.

CPR AED Course Objectives

At the end of the CPR AED portion of this course, you will be able to

- Describe how high-quality CPR improves survival
- Explain the concepts of the Chain of Survival
- Recognize when someone needs CPR
- Perform high-quality CPR for an adult
- Describe how to perform CPR with help from others
- Give effective breaths by using mouth-to-mouth or a mask for all age groups
- Demonstrate how to use an AED on an adult
- Perform high-quality CPR for a child
- Demonstrate how to use an AED on a child
- Perform high-quality CPR for an infant
- Describe when and how to help a choking adult or child
- Demonstrate how to help a choking infant

CPR and AED Use for Adults

What You Will Learn In this section, you will learn when CPR is needed, how to give CPR to an adult, and how to use an AED.

Adult Chain of Survival

The AHA adult Chain of Survival (Figure 31) shows the most important actions needed to treat adults who have cardiac arrests outside of a hospital.

In this part, you will learn about the first 3 links of the chain. The fourth and fifth links are advanced care provided by emergency responders and hospital providers who will take over care.

First link 	Immediately recognize the emergency and phone 9-1-1.
Second link 	Perform early CPR with an emphasis on chest compressions.
Third link 	Use an AED immediately (as soon as it is available).

Remember that seconds count when someone has a cardiac arrest. Wherever you are, take action. The adult Chain of Survival starts with you!



Figure 31. The AHA adult Chain of Survival for cardiac arrests that occur outside of a hospital.

Topics Covered

- Assess and Phone 9-1-1
- Perform High-Quality CPR
- Use an AED
- Putting It All Together: Adult High-Quality CPR AED Summary

Assess and Phone 9-1-1

When you encounter an adult who may have had a cardiac arrest, take the following steps to assess the emergency and get help:

- Make sure the scene is safe.
- Tap and shout (check for responsiveness).
- Shout for help.
- Phone 9-1-1 and get an AED.
- Check for normal breathing.

Depending on the particular circumstance and the resources you have available, you may be able to perform some of these actions at the same time. You might, for example, phone 9-1-1 with your cell phone on speaker mode while checking for breathing.

Make Sure the Scene Is Safe

Before you assess the person, make sure the scene is safe. Look for anything nearby that might hurt you. You can't help if you get hurt too.

Some places that may be unsafe are

- A busy street or parking lot
- An area where power lines are down
- A room with poisonous fumes

As you give care, be aware if anything changes and makes it unsafe for you or the person needing help.

Tap and Shout (Check for Responsiveness)

Tap and shout to check if the person is responsive or unresponsive (Figure 32).

Lean over the person or kneel at his side. Tap his shoulders and ask if he is OK.

If	Then
The person moves, speaks, blinks, or otherwise reacts when you tap him.	He is <i>responsive</i> . Ask the person if he needs help.
The person doesn't move, speak, blink, or otherwise react when you tap him.	He is <i>unresponsive</i> . Shout for help so that if others are nearby, they can help you.



Figure 32. Tap and shout (check for responsiveness).

Shout for Help

In an emergency, the sooner you realize that there's a problem and get additional help, the better it is for the person with a cardiac arrest. When more people are helping, you are able to provide better care to the person.

If the person is unresponsive, shout for help (Figure 33).



Figure 33. Shout for help.

Phone 9-1-1 and Get an AED

If someone comes to help and a cell phone is available

Ask the person to phone 9-1-1 and get an AED. Say, "You—phone 9-1-1 and get an AED." Ask that the phone be placed on speaker mode so that you can hear the dispatcher's instructions.

If someone comes to help and a cell phone is not available

Ask the person to go phone 9-1-1 and get an AED while you continue providing emergency care.

If you are alone and have a cell phone or nearby phone

If no one comes to help, phone 9-1-1. Put the phone on speaker mode so that you can hear the dispatcher's instructions while you continue providing emergency care. If an AED is needed, you will have to go get it yourself.

If you are alone and don't have a cell phone

Leave the person to go phone 9-1-1 and get an AED. Return and continue providing emergency care.

Follow the Dispatcher's Instructions

Stay on the phone until the 9-1-1 dispatcher tells you to hang up. Answering the dispatcher's questions will not delay the arrival of help.

The dispatcher will ask you about the emergency—where you are and what has happened. Dispatchers can provide instructions that will help you, such as telling you how to provide CPR, use an AED, or give first aid.

That's why it's important to put the phone on speaker mode after phoning 9-1-1 so that the dispatcher and the person providing CPR can speak to each other.

Check for Normal Breathing

If the person is unresponsive, check for normal breathing (Figure 34).

Scan the chest from head to waist repeatedly for at least 5 seconds (but no more than 10 seconds) looking for chest rise and fall. If the person is not breathing normally or is only gasping, he needs CPR. (See "Heartsaver First Aid CPR AED Terms and Concepts" for more information on gasping.)

If	Then
The person is unresponsive and is breathing normally.	<ul style="list-style-type: none">• This person does not need CPR.• Roll him onto his side (if you don't think he has a neck or back injury). This will help keep the airway clear in the event the person vomits.• Stay with the person until advanced help arrives.
The person is unresponsive and not breathing normally or is only gasping.	<ul style="list-style-type: none">• This person needs CPR.• Make sure the person is lying on his back on a firm, flat surface.• Begin CPR.

Remember

Unresponsive
+
No normal breathing
or only gasping
= Provide
CPR

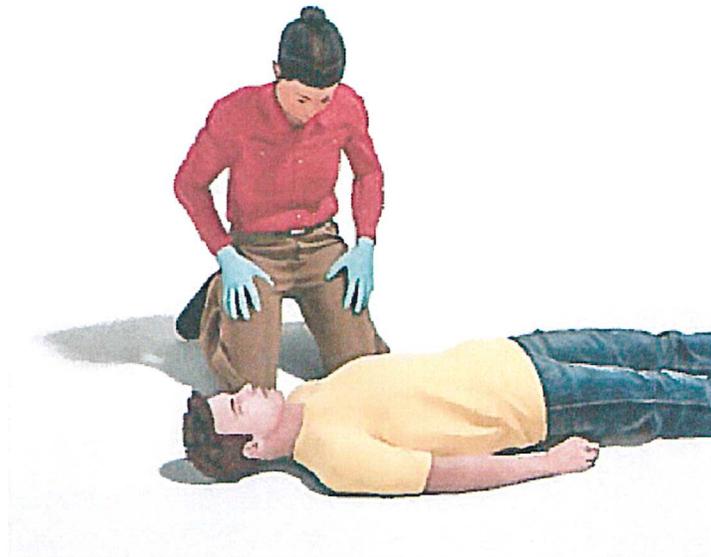


Figure 34. Check for normal breathing.

What to Do If You Are Not Sure

If you think someone needs CPR but you aren't sure, provide CPR because you may save a life. CPR is not likely to cause harm if the person is not in cardiac arrest.

It's better to give CPR to someone who doesn't need it than not to give it to someone who does need it.

Summary

Here is a summary of how to assess the emergency and get help when you encounter an ill or injured adult:

Assess and Phone 9-1-1

- Make sure the scene is safe.
 - Tap and shout (check for responsiveness).
 - If the person is *responsive*, ask him if he needs help.
 - If the person is *unresponsive*, go to the next step.
- Shout for help.

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- Phone 9-1-1 and get an AED.
 - Phone or send someone to phone 9-1-1 and get an AED.
 - If you're alone and have a cell phone or a nearby phone, put it on speaker mode and phone 9-1-1.
- Check for breathing.
 - If the person is breathing normally, stay with the person until advanced help arrives.
 - If the person is *not* breathing normally or only gasping, begin CPR and use an AED. See "Perform High-Quality CPR."

Perform High-Quality CPR

Learning how to perform high-quality CPR is important. The better the CPR skills are performed, the better the chances of survival.

Life Is Why



Saving Lives Is Why

Sudden cardiac arrest remains a leading cause of death, so the American Heart Association trains millions of people each year to help save lives both in and out of the hospital.

CPR Skills

CPR has 2 main skills:

- Providing compressions
- Giving breaths

You will learn how to perform these skills for an adult in cardiac arrest in this section.

Provide Compressions

A compression is the act of pushing hard and fast on the chest. When you push on the chest, you pump blood to the brain and heart.

To provide high-quality compressions, make sure that you

- Provide compressions that are deep enough
- Provide compressions that are fast enough
- Let the chest come back up to its normal position after each compression
- Try not to interrupt compressions for more than 10 seconds, even when you give breaths

Compression depth is an important part of providing high-quality compressions. You need to push hard enough to pump blood through the body. It's better to push too hard than not hard enough. People are often afraid of causing a person injury by providing compressions, but injury is unlikely.

Compression Technique

Here is how to provide compressions for an adult during CPR (Figure 35):

How to Provide Compressions for an Adult During CPR

- Make sure the person is lying on his back on a firm, flat surface.
- Quickly move clothes out of the way.
- Put the heel of one hand on the center of the chest (over the lower half of the breastbone). Put your other hand on top of the first hand (Figure 35).
- Push straight down at least 2 inches.
- Push at a rate of 100 to 120 compressions per minute. Count the compressions out loud.
- Let the chest come back up to its normal position after each compression.
- Try not to interrupt compressions for more than 10 seconds, even when you give breaths.

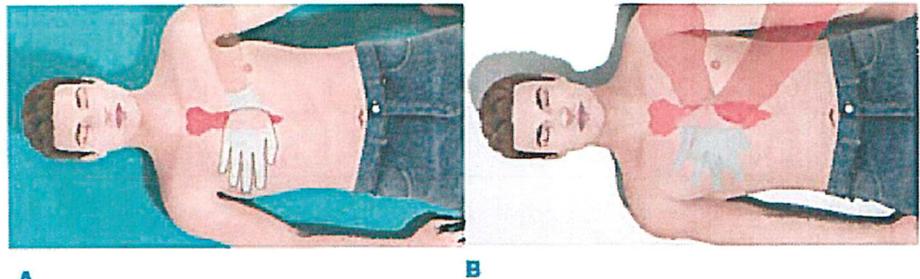


Figure 35. Compressions. **A**, Put the heel of one hand on the center of the chest (lower half of the breastbone). **B**, Put the other hand on top of the first hand.

Switch Rescuers to Avoid Fatigue

Performing chest compressions correctly is hard work. The more tired you become, the less effective your compressions will be.

If someone else knows CPR, you can take turns providing CPR (Figure 36). Switch rescuers about every 2 minutes, or sooner if you get tired. Move quickly to keep any pauses in compressions as short as possible.

Remind other rescuers to perform high-quality CPR as described in the box labeled "How to Provide Compressions for an Adult During CPR."

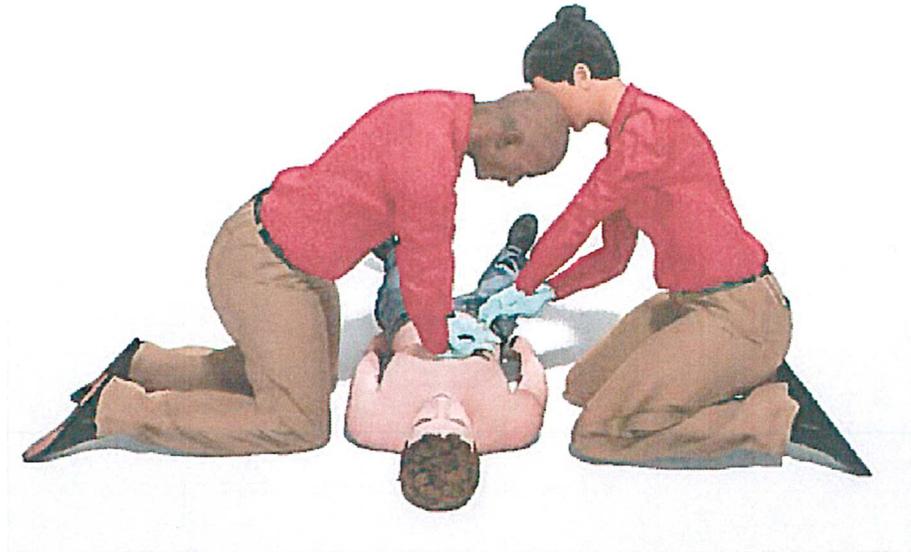


Figure 36. Switch rescuers about every 2 minutes to avoid fatigue.

Give Breaths

The second skill of CPR is giving breaths. After each set of 30 compressions, you will need to give 2 breaths. Breaths may be given with or without a barrier device, such as a pocket mask or face shield.

When you give breaths, the breaths need to make the chest rise visibly. When you can see the chest rise, you know you have delivered an effective breath.

Open the Airway

Before giving breaths, open the airway (Figure 37). This lifts the tongue from the back of the throat to make sure your breaths get air into the lungs.

Follow these steps to open the airway:

How to Open the Airway

- Put one hand on the forehead and the fingers of your other hand on the bony part of the chin (Figure 37).
- Tilt the head back and lift the chin.

Avoid pressing into the soft part of the neck or under the chin because this might block the airway.



Figure 37. Open the airway by tilting the head back and lifting the chin.

Give Breaths Without a Pocket Mask

If you choose to give someone breaths without a barrier device, it is usually quite safe because there is very little chance that you will catch a disease.

Follow these steps to give breaths without a pocket mask or face shield (Figure 38).

How to Give Breaths (Without a Pocket Mask)

- While holding the airway open, pinch the nose closed with your thumb and forefinger.
- Take a normal breath. Cover the person's mouth with your mouth.
- Give 2 breaths (blow for 1 second for each). Watch for the chest to begin to rise as you give each breath.
- Try not to interrupt compressions for more than 10 seconds.



Figure 38. Give breaths.

What to Do if the Chest Doesn't Rise

It takes a little practice to give breaths correctly. If you give someone a breath and the chest doesn't rise, do the following:

- Allow the head to go back to its normal position.
- Open the airway again by tilting the head back and lifting the chin.
- Then, give another breath. Make sure the chest rises.

Minimize Interruptions in Chest Compressions

If you have been unable to give 2 effective breaths in 10 seconds, go back to pushing hard and fast on the chest. Try to give breaths again after every 30 compressions.

Don't interrupt compressions for more than 10 seconds.

Use a Pocket Mask

You may give breaths with or without a barrier device, such as a pocket mask. Barrier devices are made of plastic and fit over the person's mouth and nose (Figure 39). They protect the rescuer from blood, vomit, or disease. Your instructor may discuss other types of barrier devices, like face shields, which can be used when giving breaths.

If you're in the workplace, your employer may provide personal protective equipment, including pocket masks or face shields, for use during CPR.

There are many different kinds of pocket masks as well as different sizes for adults, children, and infants. So, make sure you're using the right size. You may need to put a pocket mask together before you use it.

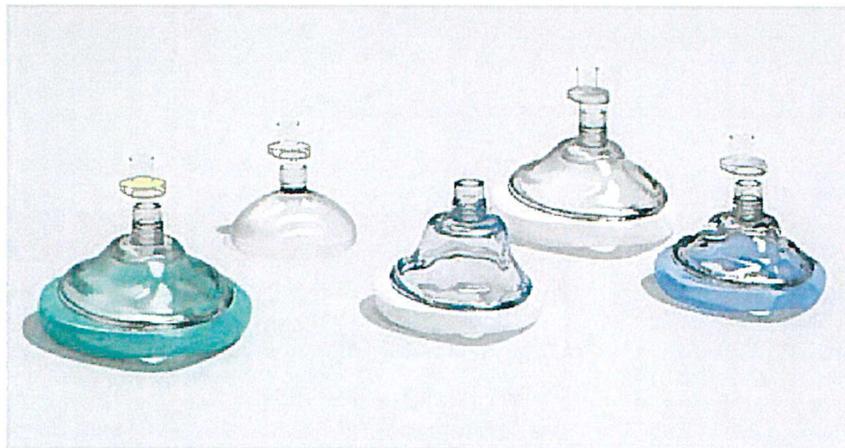


Figure 39. Some people use a pocket mask when giving breaths.

Give Breaths With a Pocket Mask

Follow these steps to give breaths with a pocket mask (Figure 40):

How to Give Breaths With a Pocket Mask

- Put the mask over the person's mouth and nose.
 - If the mask has a pointed end, put the narrow end of the mask on the bridge of the nose; position the wide end so that it covers the mouth.
- Tilt the head and lift the chin while pressing the mask against the person's face. It is important to make an airtight seal between the person's face and the mask while you lift the chin to keep the airway open.
- Give 2 breaths (blow for 1 second for each). Watch for the chest to begin to rise as you give each breath.
- Try not to interrupt compressions for more than 10 seconds.



Figure 40. Giving breaths with a pocket mask.

Give Sets of 30 Compressions and 2 Breaths

When providing CPR, give sets of 30 compressions and 2 breaths.

How to Give Sets of Compressions and Breaths to an Adult

- Make sure the person is lying on his back on a firm, flat surface.
- Quickly move clothes out of the way.
- Give 30 chest compressions.
 - Put the heel of one hand on the center of the chest (over the lower half of the breastbone). Put your other hand on top of the first hand.
 - Push straight down at least 2 inches.
 - Push at a rate of 100 to 120 compressions per minute. Count the compressions out loud.
 - Let the chest come back up to its normal position after each compression.

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- After 30 compressions, give 2 breaths.
 - Open the airway and give 2 breaths (blow for 1 second for each). Watch for the chest to begin to rise as you give each breath.
 - Try not to interrupt compressions for more than 10 seconds.

Use an AED

CPR combined with using an AED provides the best chance of saving a life. If possible, use an AED every time you provide CPR.

AEDs are safe, accurate, and easy to use. Once you turn on the AED, follow the prompts. The AED will analyze if the person needs a shock and will automatically give one or tell you when to give one.

Turn on the AED

To use an AED, turn it on by either pushing the “on” button or lifting the lid (Figure 41). Once you turn on the AED, you will hear prompts, which will tell you everything you need to do.



Figure 41. Turning on the AED.

Attach the Pads

AEDs may have adult and child pads. Make sure you use the adult pads for anyone 8 years of age or older. Before you place the pads, quickly scan the person to see if there are any special situations that might require additional steps. See “Special Situations” below.

Peel away the backing from the pads. Following the pictures on the pads, attach them to the person’s bare chest (Figure 42).



Figure 42. Place pads on an adult by following the pictures on the pads.

Clear the Person if a Shock Is Advised

Let the AED analyze the heart rhythm. If the AED advises a shock, it will tell you to stay clear of the person. If so, then loudly state, "Clear." Make sure that no one is touching the person just before you push the "shock" button (Figure 43).



Figure 43. Make sure that no one is touching the person just before you push the "shock" button.

Steps for Using an AED for an Adult

Use the AED as soon as it is available. Here are the steps for using an AED for an adult:

How to Use an AED for an Adult

- Turn the AED on and follow the prompts.
 - Turn it on by pushing the "on" button or lifting the lid (Figure 41).
 - Follow the prompts, which will tell you everything you need to do.
- Attach the adult pads.
 - Use the adult pads for anyone 8 years of age and older.
 - Peel away the backing from the pads.
 - Following the pictures on the pads, attach them to the person's bare chest (Figure 42).
- Let the AED analyze.
 - Loudly state, "Clear," and make sure that no one is touching the person.
 - The AED will analyze the heart rhythm.
 - If a shock is not needed, resume CPR.
- Deliver a shock if needed (Figure 43).
 - Loudly state, "Clear," and make sure that no one is touching the person.
 - Push the "shock" button.
 - Immediately resume CPR.

Special Situations

There are some special situations that you may need to consider before placing AED pads. Quickly scan the person to see if he has any of the following *before* applying the pads:

If the victim...	Then
Has hair on the chest that may prevent pads from sticking	<ul style="list-style-type: none"> • Quickly shave the area where you will place the pads using the razor from the AED carrying case. <p><i>or</i></p> <ul style="list-style-type: none"> • Remove the hair by using a second set of AED pads (if available). <ul style="list-style-type: none"> – Apply the pads and press them down firmly. – Rip the pads off forcefully to remove the chest hair. – Reapply a new set of pads to the bare skin.
Is lying in water	<ul style="list-style-type: none"> • Quickly move the victim to a dry area.

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Is lying on snow or in a small puddle	<ul style="list-style-type: none">• You may use the AED (the chest doesn't have to be completely dry).• If the chest is covered with water or sweat, quickly wipe it before attaching the pads.
Has water on the chest	<ul style="list-style-type: none">• Quickly wipe the chest dry before attaching the pads.
Has an implanted defibrillator or pacemaker	<ul style="list-style-type: none">• Don't put the AED pad directly over the implanted device.• Follow the normal steps for operating an AED.
Has a medicine patch where you need to place an AED pad	<ul style="list-style-type: none">• Don't put the AED pad directly over a medicine patch.• Use protective gloves.• Remove the medicated patch.• Wipe the area clean.• Attach the AED pads.

Continue Providing CPR and Using the AED

As soon as the AED gives the shock, immediately resume chest compressions. Continue to follow the AED prompts, which will guide the rescue.

Provide CPR and use the AED until

- Someone else arrives who can take turns providing CPR with you
- The person begins to move, speak, blink, or otherwise react
- Someone with more advanced training arrives

Putting It All Together: Adult High-Quality CPR AED Summary

Compressions are very important to deliver blood flow and are the core of CPR. Try not to interrupt chest compressions for more than 10 seconds when you give breaths.

Assess and Phone 9-1-1

- Make sure the scene is safe.
- Tap and shout (check for responsiveness).
 - If the person is *responsive*, ask him if he needs help.
 - If the person is *unresponsive*, go to the next step.
- Shout for help.

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- Phone 9-1-1 and get an AED.
 - Phone or send someone to phone 9-1-1 and get an AED.
 - If you're alone and have a cell phone or nearby phone, put it on speaker mode and phone 9-1-1.
- Check for breathing.
 - If the person is breathing normally, stay with the person until advanced help arrives.
 - If the person is *not* breathing normally or only gasping, begin CPR and use the AED. See the next steps.

Provide High-Quality CPR

When providing CPR, you give sets of 30 compressions and 2 breaths.

- Make sure the person is lying on his back on a firm, flat surface.
- Quickly move clothes out of the way.
- Give 30 chest compressions.
 - Put the heel of one hand on the center of the chest (over the lower half of the breastbone). Put your other hand on top of the first hand.
 - Push straight down at least 2 inches.
 - Push at a rate of 100 to 120 compressions per minute. Count the compressions out loud.
 - Let the chest come back up to its normal position after each compression.
- After 30 compressions, give 2 breaths.
 - Open the airway and give 2 breaths (blow for 1 second for each). Watch for the chest to begin to rise as you give each breath.
 - Try not to interrupt compressions for more than 10 seconds, even when you give breaths.
- Use an AED as soon as it is available.
 - Turn the AED on and follow the prompts.
 - Attach the adult pads.
 - Let the AED analyze.
 - Make sure no one is touching the person, and deliver a shock if advised.
- Provide CPR and use the AED until
 - Someone else arrives who can take turns providing CPR with you
 - The person begins to move, speak, blink, or otherwise react
 - Someone with more advanced training arrives and takes over

How to Help an Adult With an Opioid-Associated Life-Threatening Emergency

In the United States, drug overdoses now kill more adults each year than motor vehicle crashes do. Many overdoses are from prescription drugs. Opioids are prescription drugs used for pain relief but are often abused. Common opioids are morphine and hydrocodone. Heroin is an example of an opioid that is illegal in the United States.

Naloxone Reverses Effects of Opioids

Naloxone is a drug that reverses the effects of opioids. It is safe and effective. Emergency responders have used naloxone for many years.

Family members or caregivers of known opioid users may have naloxone close by to use in case of an opioid overdose.

If you know someone who has a prescription for naloxone, you may have to use it. It is important to be familiar with how to use naloxone.

Facts About Naloxone

Here are some facts about naloxone:

How to get it	Naloxone is available by prescription and through substance abuse treatment programs.
How to use it	Naloxone comes in several forms. Common forms are an intranasal spray or autoinjector (similar to an epinephrine pen). Give naloxone by spraying it into the nose or by injecting it into a muscle with an autoinjector.
Who can give it	Naloxone should only be given by someone who has been trained and can identify an opioid overdose.
When to give it	Naloxone is used to reverse the effects of an opioid overdose. It won't work for other types of drug overdoses.

Actions to Help an Adult With Opioid-Associated Emergency

If you suspect that someone has had an opioid overdose and the person is still responsive, phone 9-1-1 and stay with the person until someone with more advanced training arrives.

If the person becomes unresponsive, follow these steps:

Actions to Help an Adult With Opioid-Associated Emergency

- Shout for help.
- If someone is nearby, have that person phone 9-1-1 and get the naloxone kit and AED. Use the naloxone as soon as it arrives.
- Check for breathing.
- If no one is nearby and the person isn't breathing normally or is only gasping, provide CPR. After 5 cycles of CPR, phone 9-1-1 and get the naloxone and AED.
- Return to the person and give the naloxone. Check for responsiveness and breathing.
 - If the person becomes responsive, stop CPR and wait for advanced help to arrive.
- If the person continues to be unresponsive, continue CPR and use the AED as soon as it is available.
- Continue CPR and using the AED until
 - Someone else arrives who can take turns providing CPR with you
 - The person begins to move, speak, blink, or otherwise react
 - Someone with more advanced training arrives

CPR and AED Use for Children

What You Will Learn In this section, you will learn when CPR is needed, how to give CPR to a child, and how to use an AED.

Definition of a Child For the purposes of this course, a child is from 1 year of age to puberty. Signs of puberty include chest or underarm hair in males and any breast development in females. If you are in doubt about whether someone is an adult or child, provide emergency care as if the person is an adult.

The definition of *child* is different when using an AED compared with providing CPR. See "Use an AED" later in this section.

Pediatric Chain of Survival

The AHA pediatric Chain of Survival (Figure 44) shows the most important actions needed to treat cardiac arrests in children that occur outside of a hospital.

During this course, you will learn about the first 3 links of the chain. The fourth and fifth links are advanced care provided by emergency responders and hospital providers who will take over care.

First link 	Preventing injury and sudden cardiac arrest is an important first step in saving children's lives.
Second link 	The sooner that high-quality CPR is started for someone in cardiac arrest, the better the chances of survival.
Third link 	Phoning 9-1-1 as soon as possible so that the child can have emergency care quickly improves outcome.

Remember that seconds count when a child has a cardiac arrest. Wherever you are, take action. The pediatric Chain of Survival starts with you!



Figure 44. The AHA pediatric Chain of Survival for cardiac arrests outside of a hospital.

Respiratory Problems Often Cause Cardiac Arrest in Children

Children usually have healthy hearts. Breathing trouble is often the cause of a child needing CPR. Some other causes are drowning, trauma, and electrical injury. In the pediatric Chain of Survival, preventing cardiac arrest is one of the most important things you can do. This includes prevention of drowning, choking, and other respiratory problems.

Since respiratory problems are often the cause of cardiac arrest in children, if you are alone and do not have a phone nearby, provide CPR for 2 minutes before leaving to phone 9-1-1.

Topics Covered

- Assess and Phone 9-1-1
- Perform High-Quality CPR
- Use an AED
- Putting It All Together: Child High-Quality CPR AED Summary

Assess and Phone 9-1-1

When you encounter a child who may have had a cardiac arrest, take the following steps to assess the emergency and get help:

- Make sure the scene is safe.
- Tap and shout (check for responsiveness).
- Shout for help.
- Check for breathing.
- Begin CPR, phone 9-1-1, and get an AED.

Depending on the particular circumstance and the resources you have available, you may be able to perform some of these actions at the same time. You might, for example, phone 9-1-1 with your cell phone on speaker mode while checking for breathing.

Make Sure the Scene Is Safe

Before you assess the child, make sure the scene is safe. Look for anything nearby that might hurt you. You can't help if you get hurt too.

As you give care, be aware if anything changes and makes it unsafe for you or the child.

Tap and Shout (Check for Responsiveness)

Tap and shout to check if the child is responsive or unresponsive (Figure 45).

Lean over the child or kneel at his side. Tap his shoulders and ask if he is OK.

If	Then
The child moves, speaks, blinks, or otherwise reacts when you tap him.	<ul style="list-style-type: none">• He is <i>responsive</i>.• Ask the child if he needs help.
The child doesn't move, speak, blink, or otherwise react when you tap him.	<ul style="list-style-type: none">• He is <i>unresponsive</i>.• Shout for help so that if others are nearby, they can help you.

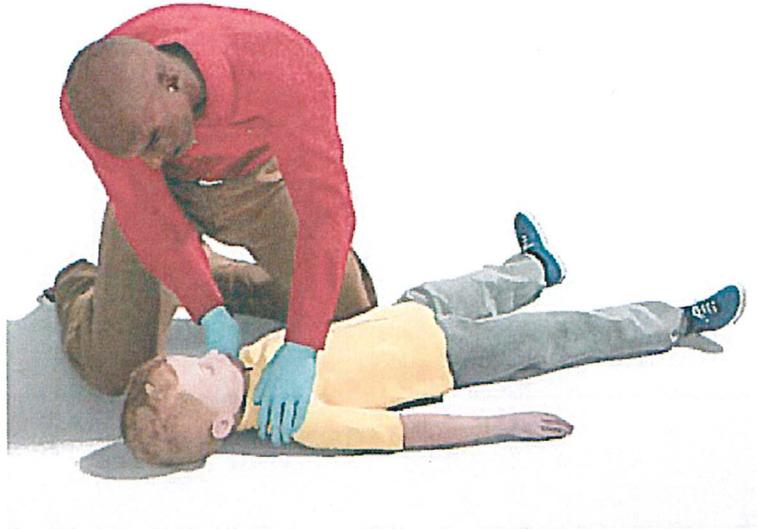


Figure 45. Tap and shout (check for responsiveness).

Shout for Help

In an emergency, the sooner you realize that there's a problem and get additional help, the better it is for the child with a cardiac arrest. When more people are helping, you are able to provide better care to the child.

If the child is unresponsive, shout for help (Figure 46).

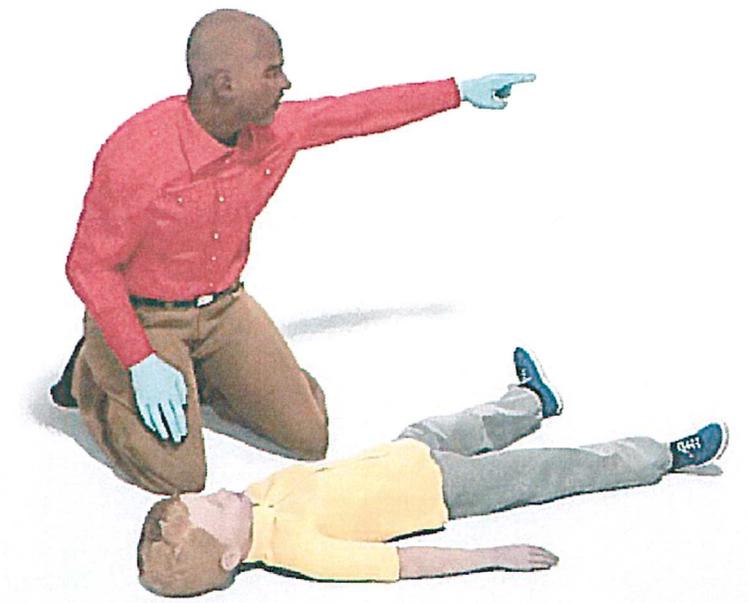


Figure 46. Shout for help.

Check for Breathing If the child is unresponsive, check for breathing (Figure 47).

Scan the chest from head to waist repeatedly for at least 5 seconds (but no more than 10 seconds) looking for chest rise and fall. If the child is not breathing or is only gasping, he needs CPR. (See "Heartsaver First Aid CPR AED Terms and Concepts" for more information on gasping.)

If	Then
The child is unresponsive and is breathing.	<ul style="list-style-type: none"> • This child does not need CPR. • Roll him onto his side (if you don't think he has a neck or back injury). This will help keep the airway clear in the event the child vomits. • Stay with the child until advanced help arrives.
The child is unresponsive and not breathing or is only gasping.	<ul style="list-style-type: none"> • This child needs CPR. • Make sure the child is lying on his back on a firm, flat surface. • Have someone phone 9-1-1, or use your cell phone (or nearby phone), put it on speaker mode, and phone 9-1-1. • Begin CPR. Give 5 sets of 30 compressions and 2 breaths. • After 5 sets of compressions and breaths, phone 9-1-1 and get an AED (if no one has done this yet). As soon as you have an AED, use it.

Remember

Unresponsive
+
No breathing
or only gasping
= Provide
CPR



Figure 47. Check for breathing.

Begin CPR, Phone 9-1-1, and Get an AED

If someone comes to help and a cell phone is available

- Ask the person to phone 9-1-1 on the cell phone, put it on speaker mode, and go get an AED while you begin CPR.

If someone comes to help and a cell phone is not available

- Ask the person to go phone 9-1-1 and get an AED while you begin CPR.

If you are alone and have a cell phone or nearby phone

- Phone 9-1-1 and put the phone on speaker mode while you begin CPR.
- Give 5 sets of 30 compressions and 2 breaths.
- Go get an AED.
- Return to the child and continue CPR.

If you are alone and don't have a cell phone

- Give 5 sets of 30 compressions and 2 breaths.
 - Go phone 9-1-1 and get an AED.
 - Return to the child and continue CPR.
-

Follow Dispatcher's Instructions

Stay on the phone until the 9-1-1 dispatcher tells you to hang up. Answering the dispatcher's questions will not delay the arrival of help.

The dispatcher will ask you about the emergency—where you are and what has happened. Dispatchers can provide instructions that will help you, such as telling you how to provide CPR, use an AED, or give first aid.

That's why it's important to put the phone on speaker mode after phoning 9-1-1 so that the dispatcher and the person providing CPR can speak to each other.

What to Do If You Are Not Sure

If you think a child needs CPR but you aren't sure, provide CPR because you may save a life. CPR is not likely to cause harm if the child is not in cardiac arrest.

It's better to give CPR to a child who doesn't need it than not to give it to a child who does need it.

Summary

Here is a summary of how to assess the emergency and get help when you encounter an ill or injured child:

Assess and Get Help

- Make sure the scene is safe.
- Tap and shout (check for responsiveness).
 - If the child is *responsive*, ask him if he needs help.
 - If the child is *unresponsive*, go to the next step.
- Shout for help.
- Check for breathing.
 - If the child is breathing, stay with the child until advanced help arrives.
 - If the child is *not* breathing or only gasping, begin CPR and use an AED. See the next steps.

Begin CPR, Phone 9-1-1, and Get an AED

- Make sure the child is lying on his back on a firm, flat surface.
- Quickly move clothes out of the way.
- Begin CPR, phone 9-1-1, and get an AED.

If someone comes to help and a cell phone is available

- Ask the person to phone 9-1-1 on the cell phone, put it on speaker mode, and go get an AED while you begin CPR.

If someone comes to help and a cell phone is not available

- Ask the person to go phone 9-1-1 and get an AED while you begin CPR.

If you are alone and have a cell phone or nearby phone

- Phone 9-1-1 and put the phone on speaker mode while you begin CPR.
- Give 5 sets of 30 compressions and 2 breaths.
- Go get an AED.
- Return to the child and continue CPR.

If you are alone and don't have a cell phone

- Give 5 sets of 30 compressions and 2 breaths.
- Go phone 9-1-1 and get an AED.
- Return to the child and continue CPR.

- Continue providing CPR and using the AED until
 - Someone else arrives who can take turns providing CPR with you
 - The child begins to move, speak, blink, or otherwise react
 - Someone with more advanced training arrives

Perform High-Quality CPR

Learning how to perform high-quality CPR is important. The better the CPR skills are performed, the better the chances of survival.

CPR Skills

CPR has 2 main skills:

- Providing compressions
- Giving breaths

You will learn how to perform these skills for a child in cardiac arrest in this section.

Provide Compressions

A compression is the act of pushing hard and fast on the chest. When a child's heart stops, blood stops flowing through the body. When you push on the chest, you pump blood to the brain and heart.

To perform high-quality compressions, make sure that you

- Provide compressions that are deep enough
- Provide compressions that are fast enough
- Let the chest come back up to its normal position after each compression
- Try not to interrupt compressions for more than 10 seconds, even when you give breaths

Compression depth is an important part of providing high-quality compressions. You need to push hard enough to pump blood through the body. It's better to push too hard than not hard enough. People are often afraid of causing a child injury by providing compressions, but injury is unlikely.

Compression Technique

When providing compressions for a child, use 1 hand (Figure 48). If you can't push down at least one third the depth of the child's chest (or about 2 inches) with 1 hand, use 2 hands to compress the chest (Figure 49).

Here is how to provide compressions for a child during CPR:

How to Provide Compressions for a Child During CPR

- Make sure the child is lying on his back on a firm, flat surface.
- Quickly move clothes out of the way.
- Use either 1 hand or 2 hands to give compressions.
 - **1 hand:** Put the heel of one hand on the center of the chest (over the lower half of the breastbone).
 - **2 hands:** Put the heel of one hand on the center of the chest (over the lower half of the breastbone). Put your other hand on top of the first hand.
- Push straight down at least one third the depth of the chest or about 2 inches.
- Push at a rate of 100 to 120 compressions per minute. Count the compressions out loud.
- Let the chest come back up to its normal position after each compression.



Figure 48. Using 1 hand to give compressions to a child.



Figure 49. Using 2 hands to give compressions to a child.

Switch Rescuers to Avoid Fatigue

Performing chest compressions correctly is hard work. The more tired you become, the less effective your compressions will be.

If someone else knows CPR, you can take turns providing CPR (Figure 50). Switch rescuers about every 2 minutes, or sooner if you get tired, moving quickly to keep any pauses in compressions as short as possible.

Remind other rescuers to perform high-quality CPR as described in the box labeled "How to Provide Compressions for a Child During CPR."



Figure 50. Switch rescuers about every 2 minutes to avoid fatigue.

Give Breaths

The second skill of CPR is giving breaths. After each set of 30 compressions, you will need to give 2 breaths. Breaths may be given with or without a barrier device, such as a pocket mask or face shield.

When you give breaths, the breaths need to make the chest rise visibly. When you can see the chest rise, you know you have delivered an effective breath.

Open the Airway

Before giving breaths, open the airway (Figure 51). This lifts the tongue from the back of the throat to make sure your breaths get air into the lungs.

Follow these steps to open the airway:

How to Open the Airway

- Put one hand on the forehead and the fingers of your other hand on the bony part of the chin (Figure 51).
- Tilt the head back and lift the chin.

Avoid pressing into the soft part of the neck or under the chin because this might block the airway.



Figure 51. Open the airway by tilting the head back and lifting the chin.

Give Breaths Without a Pocket Mask

If you choose to give someone breaths without a barrier device, it is usually quite safe because there is very little chance that you will catch a disease.

As you give each breath, look at the child's chest to see if it begins to rise. For small children, you will not need to blow as much as for larger children. Actually seeing the chest begin to rise is the best way to know that your breaths are effective.

Follow these steps to give breaths without a pocket mask or face shield (Figure 52):

How to Give Breaths (Without a Mask)

- While holding the airway open, pinch the nose closed with your thumb and forefinger.
- Take a normal breath. Cover the child's mouth with your mouth.
- Give 2 breaths (blow for 1 second for each). Watch for the chest to begin to rise as you give each breath.
- Try not to interrupt compressions for more than 10 seconds.



Figure 52. Cover the child's mouth with your mouth.

What to Do If the Chest Doesn't Rise

It takes a little practice to give breaths correctly. If you give someone a breath and the chest doesn't rise, do the following:

- Allow the head to go back to its normal position.
- Open the airway again by tilting the head back and lifting the chin.
- Then, give another breath. Make sure the chest rises.

Minimize Interruptions in Chest Compressions

If you have been unable to give 2 effective breaths in 10 seconds, go back to pushing hard and fast on the chest. Try to give breaths again after every 30 compressions.

Don't interrupt compressions for more than 10 seconds.

Use a Pocket Mask

You may give breaths with or without a barrier device, such as a pocket mask. Barrier devices are made of plastic and fit over the person's mouth and nose (Figure 53). They protect the rescuer from blood, vomit, or disease. Your instructor may discuss other types of barrier devices, like face shields, which can be used when giving breaths.

If you're in the workplace, your employer may provide personal protective equipment, including pocket masks or face shields, for use during CPR.

There are many different kinds of pocket masks as well as different sizes for adults, children, and infants. So, make sure you're using the right size. You may need to put a pocket mask together before you use it.

Give Breaths With a Pocket Mask

Follow these steps to give breaths with a pocket mask (Figure 53):

How to Give Breaths With a Pocket Mask

- Put the mask over the child's mouth and nose.
 - If the mask has a pointed end, put the narrow end of the mask on the bridge of the nose; position the wide end so that it covers the mouth.
- Tilt the head and lift the chin while pressing the mask against the child's face. It is important to make an airtight seal between the child's face and the mask while you lift the chin to keep the airway open.
- Give 2 breaths (blow for 1 second for each). Watch for the chest to begin to rise as you give each breath.
- Try not to interrupt compressions for more than 10 seconds.



Figure 53. Giving breaths with a pocket mask.

Give Sets of 30 Compressions and 2 Breaths

When providing CPR, give sets of 30 compressions and 2 breaths.

How to Give Sets of Compressions and Breaths to a Child

- Make sure the child is lying on his back on a firm, flat surface.
- Quickly move clothes out of the way.
- Give 30 chest compressions.
 - Use either 1 hand or 2 hands to give compressions.
 - **1 hand:** Put the heel of one hand on the center of the chest (over the lower half of the breastbone).
 - **2 hands:** Put the heel of one hand on the center of the chest (over the lower half of the breastbone). Put your other hand on top of the first hand.
 - Push straight down at least one third the depth of the chest or about 2 inches.
 - Push at a rate of 100 to 120 compressions per minute. Count the compressions out loud.
 - Let the chest come back up to its normal position after each compression.
- After 30 compressions, give 2 breaths.
 - Open the airway and give 2 breaths (blow for 1 second for each). Watch for the chest to begin to rise as you give each breath.
 - Try not to interrupt compressions for more than 10 seconds.

Use an AED

CPR combined with using an AED provides the best chance of saving a life. If possible, use an AED every time you provide CPR.

AEDs can be used for children and infants, as well as adults.

- Some AEDs can deliver a smaller shock dose for children and infants if you use child pads or a child-cable key or switch.
- If the AED can deliver the smaller shock dose, use it for infants and children less than 8 years of age.
- If the AED cannot deliver a child shock dose, you can use the adult pads and give an adult shock dose for infants and children less than 8 years of age.

AEDs are safe, accurate, and easy to use. Once you turn on the AED, follow the prompts. The AED will analyze if the child needs a shock and will automatically give one or tell you when to give one.

Turn on the AED

To use an AED, turn it on by either pushing the “on” button or lifting the lid (Figure 54). Once you turn on the AED, you will hear prompts, which will tell you everything you need to do.



Figure 54. Turning on the AED.

Attach the Pads

Many AEDs have pads for adults and a child pad-cable system or key for children and infants.

- Use child pads if the child or infant is less than 8 years old. If child pads are not available, use adult pads.
- Use adult pads if the child is 8 years old or older.

Before you place the pads, quickly scan the child to see if there are any special situations that might require additional steps. See “Special Situations” below.

Peel away the backing from the pads. Follow the pad placement as shown on the images on the pads or package. Attach the pads to the child’s bare chest (Figure 55).

When you put the pads on the chest, make sure they don't touch each other. If the child's chest is small, the pads may overlap. In this case you may need to put one pad on the child's chest and the other on the child's back.

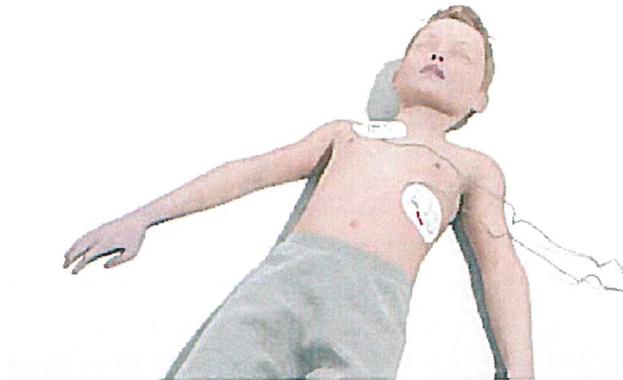


Figure 55. Place pads on a child by following the pictures on the pads.

Clear the Child if a Shock Is Advised

Let the AED analyze the heart rhythm. If the AED advises a shock, it will tell you to stay clear of the child. If so, then loudly state, "Clear." Make sure that no one is touching the child just before you push the "shock" button (Figure 56).



Figure 56. Make sure that no one is touching the child just before you push the "shock" button.

Steps for Using the AED for a Child

Use the AED as soon as it is available. Here are the steps for using the AED for a child:

How to Use an AED for a Child

- ❑ Turn the AED on and follow the prompts.
 - Turn it on by pushing the “on” button or lifting the lid (Figure 54).
 - Follow the prompts, which will tell you everything you need to do.
- ❑ Attach the pads.
 - Use child pads if the child is less than 8 years old. If child pads are not available, use adult pads.
 - Use adult pads if the child is 8 years old or older.
 - Peel away the backing from the pads.
 - Following the pictures on the pads, attach them to the child's bare chest (Figure 55). Make sure the pads don't touch each other.
- ❑ Let the AED analyze.
 - Loudly state, “Clear,” and make sure that no one is touching the child.
 - The AED will analyze the heart rhythm.
 - If a shock is not needed, resume CPR.
- ❑ Deliver a shock if needed (Figure 56).
 - Loudly state, “Clear,” and make sure that no one is touching the child.
 - Push the “shock” button.
 - Immediately resume CPR.

Special Situations

There are some special situations that you may need to consider before placing AED pads. Although it is not very common, you may encounter a medicine patch or a device on a child, which may interfere with the AED pad placement.

Quickly scan the child to see if he has any of the following *before* applying the pads:

If the victim...	Then
Is lying in water	<ul style="list-style-type: none"> • Quickly move the victim to a dry area.
Is lying on snow or in a small puddle	<ul style="list-style-type: none"> • You may use the AED (the chest doesn't have to be completely dry). • If the chest is covered with water or sweat, quickly wipe it before attaching the pads.
Has water on the chest	<ul style="list-style-type: none"> • Quickly wipe the chest dry before attaching the pads.
Has an implanted defibrillator or pacemaker	<ul style="list-style-type: none"> • Don't put the AED pad directly over the implanted device. • Follow the normal steps for operating an AED.

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Has a medicine patch where you need to place an AED pad

- Don't put the AED pad directly over a medicine patch.
- Use protective gloves.
- Remove the medicated patch.
- Wipe the area clean.
- Attach the AED pads.

Continue Providing CPR and Using the AED

As soon as the AED gives the shock, immediately resume chest compressions. Continue to follow the AED prompts, which will guide the rescue.

Provide CPR and use the AED until

- Someone else arrives who can take turns providing CPR with you
- The child begins to move, speak, blink, or otherwise react
- Someone with more advanced training arrives

Putting It All Together: Child High-Quality CPR AED Summary

Children usually have healthy hearts. Often, a child's heart stops because the child can't breathe or is having trouble breathing. As a result, it's very important to give breaths as well as compressions to a child.

Compressions are still very important to deliver blood flow and are the core of CPR. Try not to interrupt chest compressions for more than 10 seconds when you give breaths.

Assess and Get Help

- Make sure the scene is safe.
- Tap and shout (check for responsiveness).
 - If the child is *responsive*, ask him if he needs help.
 - If the child is *unresponsive*, go to the next step.
- Shout for help.
- Check for breathing.
 - If the child is breathing, stay with the child until advanced help arrives.
 - If the child is *not* breathing or only gasping, begin CPR and use the AED. See the next steps.

Begin CPR, Phone 9-1-1, and Get an AED

- Begin CPR, phone 9-1-1, and get an AED.

If someone comes to help and a cell phone is available

- Ask the person to phone 9-1-1 on the cell phone, put it on speaker mode, and go get an AED while you begin CPR.

If someone comes to help and a cell phone is not available

- Ask the person to go phone 9-1-1 and get an AED while you begin CPR.

If you are alone and have a cell phone or nearby phone

- Phone 9-1-1 and put the phone on speaker mode while you begin CPR.
- Give 5 sets of 30 compressions and 2 breaths.
- Go get an AED.
- Return to the child and continue CPR.

If you are alone and don't have a cell phone

- Give 5 sets of 30 compressions and 2 breaths.
- Then, go phone 9-1-1 and get an AED.
- Return to the child and continue CPR.

Provide High-Quality CPR

When providing CPR, you give sets of 30 compressions and 2 breaths.

- Make sure the child is lying on his back on a firm, flat surface.
- Quickly move clothes out of the way.
- Give 30 chest compressions.
 - Use either 1 hand or 2 hands to give compressions.
 - **1 hand:** Put the heel of one hand on the center of the chest (over the lower half of the breastbone).
 - **2 hands:** Put the heel of one hand on the center of the chest (over the lower half of the breastbone). Put your other hand on top of the first hand.
 - Push straight down at least one third the depth of the chest or about 2 inches.
 - Push at a rate of 100 to 120 compressions per minute. Count the compressions out loud.
 - Let the chest come back up to its normal position after each compression.
- After 30 compressions, give 2 breaths.
 - Open the airway and give 2 breaths (blow for 1 second for each). Watch for the chest to begin to rise as you give each breath.
 - Try not to interrupt compressions for more than 10 seconds.

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- Use an AED as soon as it is available.
 - Turn the AED on and follow the prompts.
 - Attach the pads.
 - Use child pads if the child is less than 8 years old. If child pads are not available, use adult pads.
 - Use adult pads if the child is 8 years old or older.
 - Let the AED analyze.
 - Make sure no one is touching the child, and deliver a shock if advised.
- Provide CPR and use the AED until
 - Someone else arrives who can take turns providing CPR with you
 - The child begins to move, speak, blink, or otherwise react
 - Someone with more advanced training arrives and takes over

CPR for Infants

What You Will Learn In this section, you will learn when CPR is needed, how to give CPR to an infant, and how to use an AED.

Definition of an Infant

For the purposes of this course, an infant is from 1 month to 1 year of age.

Differences in CPR Between an Infant and a Child

Because infants are so small, there are some differences between infants, children, and adults in how CPR is performed. When providing compressions on an infant, you use only 2 fingers of 1 hand—versus 1 or 2 hands for a child and 2 hands for an adult.

Also, for an infant, you should push down about 1½ inches at the rate of 100 to 120 compressions per minute.

Topics Covered

- Assess and Phone 9-1-1
- Perform High-Quality CPR
- Use an AED
- Putting It All Together: Infant High-Quality CPR Summary

Assess and Phone 9-1-1

When you encounter an infant who may have had a cardiac arrest, take the following steps to assess the emergency and get help:

- Make sure the scene is safe.
- Tap and shout (check for responsiveness).
- Shout for help.
- Check for breathing.
- Begin CPR, phone 9-1-1, and get an AED.

Depending on the particular circumstance and the resources you have available, you may be able to perform some of these actions at the same time. You might, for example, phone 9-1-1 with your cell phone on speaker mode while checking for breathing.

Make Sure the Scene Is Safe

Before you assess the infant, make sure the scene is safe. Look for anything nearby that might hurt you. You can't help if you get hurt too.

As you give care, be aware if anything changes and makes it unsafe for you or the infant.

Tap and Shout (Check for Responsiveness)

Tap and shout to check if the infant is responsive or unresponsive (Figure 57).

Tap the infant's foot and shout his name.

If	Then
The infant moves, cries, blinks, or otherwise reacts when you tap him.	<ul style="list-style-type: none">• He is <i>responsive</i>; continue first aid care.
The infant doesn't move, cry, blink, or otherwise react when you tap him.	<ul style="list-style-type: none">• He is <i>unresponsive</i>.• Shout for help so that if others are nearby, they can help you.



Figure 57. Tap and shout (check for responsiveness).

Shout for Help

In an emergency, the sooner you realize that there's a problem and get additional help, the better it is for the infant with a cardiac arrest. When more people are helping, you are able to provide better care to the infant.

If the infant is unresponsive, shout for help (Figure 58).



Figure 58. Shout for help.

Check for Breathing If the infant is unresponsive, check for breathing (Figure 59).

Scan the chest from head to waist repeatedly for at least 5 seconds (but no more than 10 seconds) looking for chest rise and fall. If the infant is not breathing or is only gasping, he needs CPR. (See “Heartsaver First Aid CPR AED Terms and Concepts” for more information on gasping.)

If	Then
<p>The infant is unresponsive and is breathing.</p>	<ul style="list-style-type: none"> • This infant does not need CPR. • Roll him onto his side (if you don't think he has a neck or back injury). This will help keep the airway clear in the event the infant vomits. • Stay with the infant until advanced help arrives.
<p>The infant is unresponsive and not breathing or is only gasping.</p>	<ul style="list-style-type: none"> • This infant needs CPR. • Make sure the infant is lying on his back on a firm, flat surface. • Have someone phone 9-1-1, or use your cell phone (or nearby phone), put it on speaker mode, and phone 9-1-1. • Begin CPR. Give 5 sets of 30 compressions and 2 breaths. • After 5 sets of compressions and breaths, phone 9-1-1 and get an AED (if no one has done this yet). As soon as you have an AED, use it.

Remember	<p>Unresponsive + No breathing or only gasping</p> <p>= Provide CPR</p>
-----------------	---



Figure 59. Check for breathing.

**Begin CPR,
Phone 9-1-1, and
Get an AED**

If someone comes to help and a cell phone is available

- Ask the person to phone 9-1-1 on the cell phone, put it on speaker mode, and go get an AED while you begin CPR.

If someone comes to help and a cell phone is not available

- Ask the person to go phone 9-1-1 and get an AED while you begin CPR.

If you are alone and have a cell phone or nearby phone

- Phone 9-1-1 and put the phone on speaker mode while you begin CPR.
- Give 5 sets of 30 compressions and 2 breaths.
- Go get an AED.*
- Return to the infant and continue CPR.

If you are alone and don't have a cell phone

- Give 5 sets of 30 compressions and 2 breaths.
- Go phone 9-1-1 and get an AED.*
- Return to the infant and continue CPR.

*If the infant isn't injured and you're alone, after 5 sets of 30 compressions and 2 breaths, you may carry the infant with you to phone 9-1-1 and get an AED (Figure 60).



Figure 60. You may carry the infant with you to phone 9-1-1 and get an AED.

Follow Dispatcher's Instructions

Stay on the phone until the 9-1-1 dispatcher tells you to hang up. Answering the dispatcher's questions will not delay the arrival of help.

The dispatcher will ask you about the emergency—where you are and what has happened. Dispatchers can provide instructions that will help you, such as telling you how to provide CPR, use an AED, or give first aid.

That's why it's important to put the phone on speaker mode after phoning 9-1-1 so that the dispatcher and the person providing CPR can speak to each other.

What to Do If You Are Not Sure

If you think an infant needs CPR but you aren't sure, provide CPR because you may save a life. CPR is not likely to cause harm if the infant is not in cardiac arrest.

It's better to give CPR to an infant who doesn't need it than not to give it to an infant who does need it.

Summary

Here is a summary of how to assess the emergency and get help when you encounter an ill or injured infant:

Assess and Get Help

- Make sure the scene is safe.
- Tap and shout (check for responsiveness).
 - If the infant is *responsive*, continue first aid care.
 - If the infant is *unresponsive*, go to the next step.
- Shout for help.
- Check for breathing.
 - If the infant is breathing, stay with the infant until advanced help arrives.
 - If the infant is *not* breathing or only gasping, begin CPR and use an AED. See the next steps.

Begin CPR, Phone 9-1-1, and Get an AED

When providing CPR, you give sets of 30 compressions and 2 breaths.

- Make sure the infant is lying on his back on a firm, flat surface.
- Quickly move clothes out of the way.
- Begin CPR, phone 9-1-1, and get an AED.

If someone comes to help and a cell phone is available

- Ask the person to phone 9-1-1 on the cell phone, put it on speaker mode, and go get an AED while you begin CPR.

If someone comes to help and a cell phone is not available

- Ask the person to go phone 9-1-1 and get an AED while you begin CPR.

If you are alone and have a cell phone or nearby phone

- Phone 9-1-1 and put the phone on speaker mode while you begin CPR.
- Give 5 sets of 30 compressions and 2 breaths.
- Go get an AED.*
- Return to the infant and continue CPR.

If you are alone and don't have a cell phone

- Give 5 sets of 30 compressions and 2 breaths.
- Go phone 9-1-1 and get an AED.*
- Return to the infant and continue CPR.

*If the infant isn't injured and you're alone, after 5 sets of 30 compressions and 2 breaths, you may carry the infant with you to phone 9-1-1 and get an AED.

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- Continue providing CPR and using the AED until
 - Someone else arrives who can take turns providing CPR with you
 - The infant begins to move, cry, blink, or otherwise react
 - Someone with more advanced training arrives

Perform High-Quality CPR

Learning how to perform high-quality CPR is important. The better the CPR skills are performed, the better the chances of survival.

CPR Skills

CPR has 2 main skills:

- Providing compressions
- Giving breaths

You will learn how to perform these skills for an infant in cardiac arrest in this section.

Provide Compressions

A compression is the act of pushing hard and fast on the chest. When an infant's heart stops, blood stops flowing through the body. When you push on the chest, you pump blood to the brain and heart.

Pushing hard and fast when providing compressions is just as important with infants as it is with children and adults.

Compressions are the most important part of CPR. To perform high-quality CPR, make sure that you

- Provide compressions that are deep enough
- Provide compressions that are fast enough
- Let the chest come back up to its normal position after each compression
- Try not to interrupt compressions for more than 10 seconds, even when you give breaths

Compression depth is an important part of providing high-quality compressions. You need to push hard enough to pump blood through the body. It's better to push too hard than not hard enough. People are often afraid of causing an infant injury by providing compressions, but injury is unlikely.

Compression Technique

One of the main differences in infant CPR is that you use just 2 fingers in providing compressions. Look at Figure 61 to see the correct placement of your fingers on the baby's chest. Place 2 fingers of 1 hand on the breastbone, just below the nipple line. Push straight down at least one third the depth of the chest or about 1½ inches.

Here is how to provide compressions for an infant during CPR:

How to Provide Compressions for an Infant During CPR

- Make sure the infant is lying on his back on a firm, flat surface.
- Quickly move clothes out of the way.
- Use 2 fingers of 1 hand to give compressions. Place them on the breastbone, just below the nipple line (Figure 61).
- Push straight down at least one third the depth of the chest or about 1½ inches.
- Push at a rate of 100 to 120 compressions per minute. Count the compressions out loud.
- Let the chest come back up to its normal position after each compression.



Figure 61. Use 2 fingers of 1 hand to give compressions. Place them on the breastbone, just below the nipple line. Avoid the tip of the breastbone.

Switch Rescuers to Avoid Fatigue

Performing chest compressions correctly is hard work. The more tired you become, the less effective your compressions will be.

If someone else knows CPR, you can take turns providing CPR. Switch rescuers about every 2 minutes, or sooner if you get tired, moving quickly to keep any pauses in compressions as short as possible.

Remind other rescuers to perform high-quality CPR as described in the box labeled "How to Provide Compressions for an Infant During CPR."

Give Breaths

The second skill of CPR is giving breaths. After each set of 30 compressions, you will need to give 2 breaths. Breaths may be given with or without a barrier device, such as a pocket mask or face shield.

Infants often have healthy hearts, but even an infant's heart can stop beating if he can't breathe or has trouble breathing. So, it's very important to give breaths as well as compressions to an infant who needs CPR.

When you give breaths, the breaths need to make the chest rise visibly. When you can see the chest rise, you know you have delivered an effective breath.

Open the Airway

Before giving breaths, open the airway. This lifts the tongue from the back of the throat to make sure your breaths get air into the lungs.

Opening the infant's airway too far can actually *close* the infant's airway, making it difficult to get air inside. Follow these steps to make sure you open the infant's airway correctly:

How to Open the Airway

- Put one hand on the forehead and the fingers of your other hand on the bony part of the chin.
- Tilt the head back and lift the chin.

Avoid pressing into the soft part of the neck or under the chin because this might block the airway. Also, don't push the head back too far. This might close the airway as well.

Give Breaths Without a Pocket Mask

If you choose to give someone breaths without a barrier device, it is usually quite safe because there is very little chance that you will catch a disease.

As you give each breath, look at the infant's chest to see if it begins to rise. You will not need to blow as much as for a larger child. Actually seeing the chest begin to rise is the best way to know that your breaths are effective.

Follow these steps to give breaths without a pocket mask or face shield (Figure 62):

How to Give Breaths (Without a Pocket Mask)

- While holding the airway open, take a normal breath. Cover the infant's mouth and nose with your mouth. If you have difficulty making an effective seal, try either a mouth-to-mouth or a mouth-to-nose breath.
 - If you use the mouth-to-mouth technique, pinch the nose closed.
 - If you use the mouth-to-nose technique, close the mouth.
- Give 2 breaths (blow for 1 second for each). Watch for the chest to begin to rise as you give each breath.
- Try not to interrupt compressions for more than 10 seconds.



Figure 62. Cover the infant's mouth and nose with your mouth.

What to Do If the Chest Doesn't Rise

It takes a little practice to give breaths correctly. If you give someone a breath and the chest doesn't rise, do the following:

- Allow the head to go back to its normal position.
- Open the airway again by tilting the head back and lifting the chin.
- Then, give another breath. Make sure the chest rises.

Minimize Interruptions in Chest Compressions

If you have been unable to give 2 effective breaths in 10 seconds, go back to pushing hard and fast on the chest. Try to give breaths again after every 30 compressions.

Don't interrupt compressions for more than 10 seconds.

Use a Pocket Mask

You may give breaths with or without a barrier device, such as a pocket mask. Barrier devices are made of plastic and fit over the person's mouth and nose (Figure 63). They protect the rescuer from blood, vomit, or disease. Your instructor may discuss other types of barrier devices, like face shields, which can be used when giving breaths.

If you're in the workplace, your employer may provide personal protective equipment, including pocket masks or face shields, for use during CPR.

There are many different kinds of pocket masks as well as different sizes for adults, children, and infants. So, make sure you're using the right size. You may need to put a pocket mask together before you use it.

Give Breaths With a Pocket Mask

Follow these steps to give breaths with a pocket mask (Figure 63):

How to Give Breaths With a Pocket Mask

- Put the mask over the infant's mouth and nose.
 - If the mask has a pointed end, put the narrow end of the mask on the bridge of the nose; position the wide end so that it covers the mouth.
- Tilt the head and lift the chin while pressing the mask against the infant's face. It is important to make an airtight seal between the infant's face and the mask while you lift the chin to keep the airway open.
- Give 2 breaths (blow for 1 second for each). Watch for the chest to begin to rise as you give each breath.
- Try not to interrupt compressions for more than 10 seconds.



Figure 63. Giving breaths with a pocket mask.

Give Sets of 30 Compressions and 2 Breaths

When providing CPR, give sets of 30 compressions and 2 breaths.

How to Give Sets of Compressions and Breaths to an Infant

- Make sure the infant is lying on his back on a firm, flat surface.
- Quickly move clothes out of the way.
- Give 30 chest compressions.
 - Use 2 fingers of 1 hand to give compressions. Place them on the breastbone, just below the nipple line.
 - Push straight down at least one third the depth of the chest or about 1½ inches.
 - Push at a rate of 100 to 120 compressions per minute. Count the compressions out loud.
 - Let the chest come back up to its normal position after each compression.
- After 30 compressions, give 2 breaths.
 - Open the airway and give 2 breaths (blow for 1 second for each). Watch for the chest to begin to rise as you give each breath.
 - Try not to interrupt compressions for more than 10 seconds.

Do Not Delay CPR to Get an AED for an Infant

CPR with both compressions and breaths is the most important thing you can do for an infant in cardiac arrest. Do not delay CPR to get an AED for an infant. If someone brings an AED to you, use it as soon as it arrives. See the “Use an AED” section in “CPR and AED Use for Children.”

Putting It All Together: Infant High-Quality CPR Summary

Infants usually have healthy hearts. Often, an infant's heart stops because the infant can't breathe or is having trouble breathing. As a result, it's very important to give breaths as well as compressions to an infant.

Compressions are still very important to deliver blood flow and are the core of CPR. Try not to interrupt chest compressions for more than 10 seconds when you give breaths.

Assess and Get Help

- Make sure the scene is safe.
- Tap and shout (check for responsiveness).
 - If the infant is *responsive*, continue first aid care.
 - If the infant is *unresponsive*, go to the next step.
- Shout for help.
- Check for breathing.
 - If the infant is breathing, stay with the infant until advanced help arrives.
 - If the infant is *not* breathing or only gasping, begin CPR and use the AED. See the next steps.

Begin CPR, Phone 9-1-1, and Get an AED

- Begin CPR, phone 9-1-1, and get an AED.
 - If someone comes to help and a cell phone is available*
 - Ask the person to phone 9-1-1 on the cell phone, put it on speaker mode, and go get an AED while you begin CPR.
 - If someone comes to help and a cell phone is not available*
 - Ask the person to go phone 9-1-1 and get an AED while you begin CPR.
 - If you are alone and have a cell phone or nearby phone*
 - Phone 9-1-1 and put the phone on speaker mode while you begin CPR.
 - Give 5 sets of 30 compressions and 2 breaths.
 - Go get an AED.*
 - Return to the infant and continue CPR.
 - If you are alone and don't have a cell phone*
 - Give 5 sets of 30 compressions and 2 breaths.
 - Then, go phone 9-1-1 and get an AED.*
 - Return to the infant and continue CPR.

*If the infant isn't injured and you're alone, after 5 sets of 30 compressions and 2 breaths, you may carry the infant with you to phone 9-1-1 and get an AED.

Provide High-Quality CPR

When providing CPR, you give sets of 30 compressions and 2 breaths.

- Make sure the infant is lying on his back on a firm, flat surface.
- Quickly move clothes out of the way.
- Give 30 chest compressions.
 - Use 2 fingers of 1 hand to give compressions. Place them on the breastbone, just below the nipple line.
 - Push straight down at least one third the depth of the chest or about 1½ inches.
 - Push at a rate of 100 to 120 compressions per minute. Count the compressions out loud.
 - Let the chest come back up to its normal position after each compression.
- After 30 compressions, give 2 breaths.
 - Open the airway and give 2 breaths (blow for 1 second for each). Watch for the chest to begin to rise as you give each breath.
 - Try not to interrupt compressions for more than 10 seconds.
- Use an AED as soon as it is available.
 - Turn the AED on and follow the prompts.
 - Attach the pads.
 - Use child pads for an infant if available.
 - If child pads are not available, use adult pads.
 - Let the AED analyze.
 - Make sure no one is touching the infant, and deliver a shock if advised.
- Provide CPR and use the AED until
 - Someone else arrives who can take turns providing CPR with you
 - The infant begins to move, cry, blink, or otherwise react
 - Someone with more advanced training arrives and takes over

Conclusion

Summary of High-Quality CPR Components

Component	Adults and Adolescents	Children (Age 1 Year to Puberty)	Infants (Age Less Than 1 Year, Excluding Newborns)
Make sure the scene is safe	Make sure the scene is safe for you and the person needing help		
Tap and shout (check for responsiveness)	Check to see if person is responsive or unresponsive If unresponsive, go to next step		
Shout for help			
Check for breathing	If breathing normally, stay with the person until advanced help arrives If <i>not</i> breathing normally or only gasping, begin CPR and use an AED	If breathing, stay with the child or infant until advanced help arrives If <i>not</i> breathing or only gasping, begin CPR and use the AED	
Begin CPR, phone 9-1-1, and get an AED	Phone or send someone to phone 9-1-1 and get an AED while you begin CPR If you are alone and have a phone, put it on speaker mode and phone 9-1-1 while you begin CPR	Phone or send someone to phone 9-1-1 and get an AED If you are alone and have a phone, put it on speaker mode and phone 9-1-1 while you begin CPR If you are alone and do not have a phone, give 5 sets of 30 compressions and 2 breaths. Then go phone 9-1-1 and get an AED. Return and continue CPR.	
Compressions and breaths	30 compressions to 2 breaths		
Compression rate	Push on the chest at a rate of 100 to 120 compressions per minute		
Compression depth	At least 2 inches	At least one third the depth of the chest, or about 2 inches	At least one third the depth of the chest, or about 1½ inches
Hand placement	2 hands on the lower half of the breastbone	2 hands or 1 hand (optional for very small child) on the lower half of the breastbone	2 fingers in the center of the chest, just below the nipple line
Let the chest come back up	Let the chest come back up to its normal position after each compression		
Interruptions in compressions	Try not to interrupt compressions for more than 10 seconds		

CONCLUSION