

# CPR and AED Use for Adults

Although much is being done to prevent death from heart problems, cardiac arrest is still a leading cause of death in the United States. And about 70% of the arrests that occur outside of the hospital happen at home. You will learn skills that will help you recognize cardiac arrest, get emergency care on the way quickly, and help the person until more advanced care arrives to take over.

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 9) shows the most important actions needed to treat adults who have cardiac arrests 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 take over care, and the sixth link is recovery.

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

- **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).
- **Fourth and fifth links:** Advanced care is provided.
- **Sixth link:** Additional treatment, observation, and rehabilitation may be needed to fully recover from a cardiac arrest.

**Figure 9.** The AHA adult Chain of Survival for cardiac arrests that occur outside of a hospital.



## Assess and Phone 9-1-1

When you see an adult who may have had a cardiac arrest, take the following 5 steps to assess the person and get help.

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

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

The following details about each of these steps will help you assess a medical emergency.

### Step 1: Make Sure the Scene Is Safe

Before you begin to help the person, look for anything nearby that might hurt you. You can't help if you get hurt too.

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

### Step 2: Tap and Shout (Check for Responsiveness)

#### Actions to Take: Check for Responsiveness

- Tap their shoulders and shout to check whether the person is responsive or unresponsive (Figure 10).
- If the person is responsive, ask if they need help.
- If the person is unresponsive, shout for help so that if others are nearby, they can help you.

Figure 10. Tap and shout (check for responsiveness).

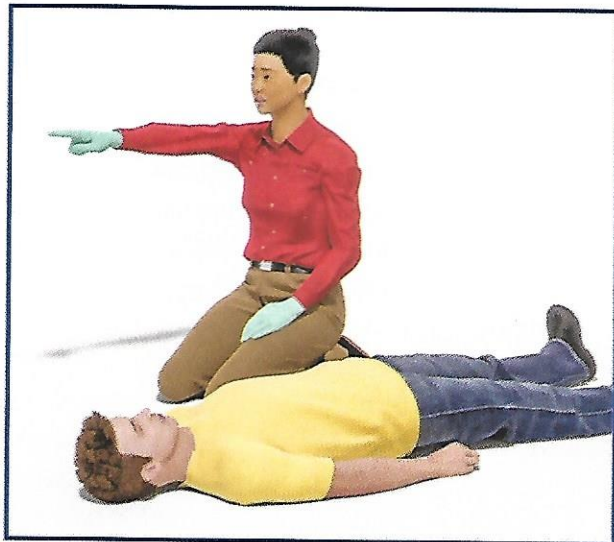


### Step 3: Shout for Help

In an emergency, the sooner you realize there's a problem and get help, the better the outcome for the person with a cardiac arrest. When other people are helping, you can provide better care.

If the person you are helping is unresponsive, shout for help (Figure 11).

**Figure 11.** Shout for help.



### Step 4: 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 the person to put the phone 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 provide emergency care. If you need an AED, you will have to go get it yourself.

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

Leave the person while you go to 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. It allows the dispatcher and the person providing CPR to speak to each other.

### Step 5: Check for Breathing

If the person is unresponsive, check for breathing (Figure 12). Scan the chest repeatedly for at least 5 seconds (but no more than 10 seconds), looking for the chest to rise and fall. If the person is not breathing normally or is only gasping, they need CPR.

#### **Actions to Take: Check for Breathing**

*If the person is unresponsive and is breathing*

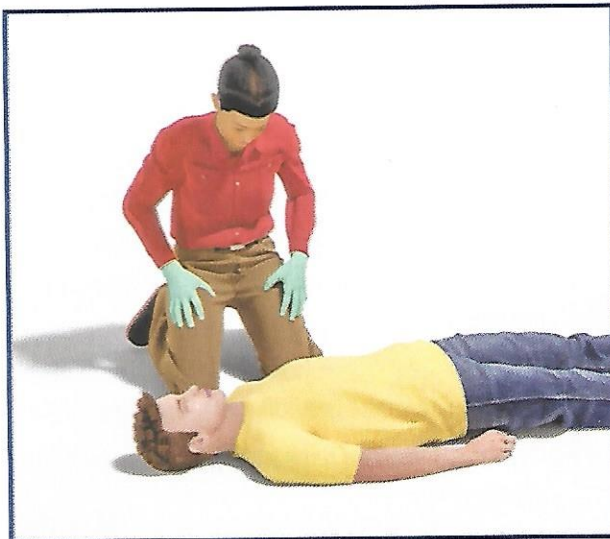
- This person does not need CPR.
- Roll them onto their side (if you don't suspect a neck or back injury). This will help keep the airway clear in case the person vomits.
- Stay with the person until advanced help arrives.

*If the person is unresponsive and not breathing or is only gasping*

- This person needs CPR.
- Make sure the person is lying faceup on a firm, flat surface.
- Begin CPR.

**Remember:** Unresponsive + No breathing or only gasping = Provide CPR

Figure 12. Check for breathing.



***What to Do if You Are Not Sure***

It's better to give CPR to someone who needs it than not to give it to someone who doesn't need it. CPR is not likely to harm someone who is not in cardiac arrest. But without CPR, someone who is in cardiac arrest may die.

So if you aren't sure, provide CPR. You may save a life.

## Summary

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

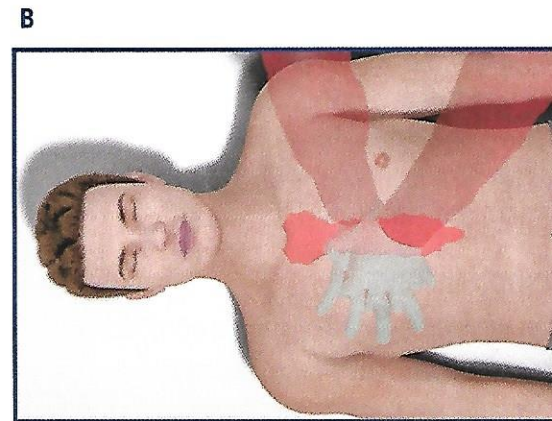
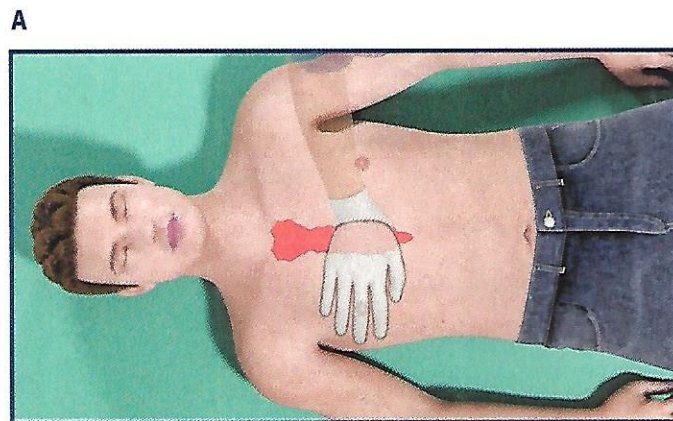
### Assess and Phone 9-1-1

- Make sure the scene is safe.
- Tap and shout (check for responsiveness).
  - If the person is responsive, ask, "Do you need help?"
  - If the person is unresponsive, go to the next step.
- Shout for help.
- Phone 9-1-1 and get an AED.
  - Phone or send someone else 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.
  - If you're alone and don't have a nearby phone, leave the person while you go phone 9-1-1 and get an AED.
- 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 is only gasping, begin CPR and use an AED.

## Compressions for a Pregnant Woman

- Do not delay providing chest compressions for a pregnant woman in cardiac arrest. High-quality compressions increase the mother's and the infant's chance of survival. If you do not perform CPR on a pregnant woman when needed, the lives of both the mother and the infant are at risk.
- Perform high-quality chest compressions for a pregnant woman in cardiac arrest the same way as for any victim of cardiac arrest. If the woman begins to move, speak, blink, or otherwise react, stop CPR and roll her onto her left side.

**Figure 13.** 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.



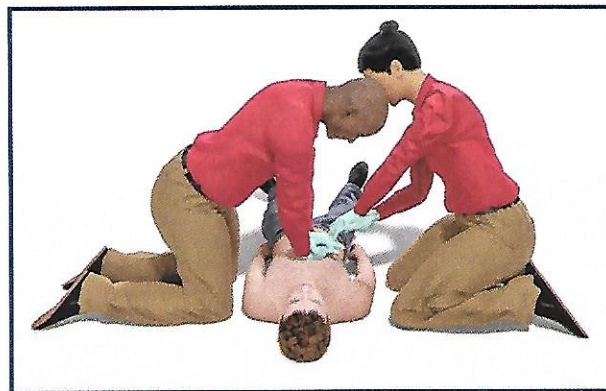
## Switch Rescuers to Avoid Fatigue

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 compressions (Figure 14). 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 **Actions to Take: Provide Compressions for an Adult**.

**Figure 14.** 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 give 2 breaths.

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

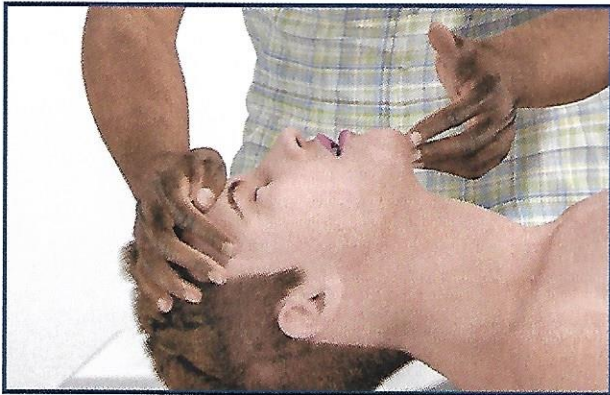
### *Open the Airway*

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

### Actions to Take: Open the Airway

- Put one hand on the forehead and the fingers of your other hand on the bony part of the chin (Figure 15). Avoid pressing into the soft part of the neck or under the chin because this might block the airway.
- Tilt the head back and lift the chin.

Figure 15. Open the airway by tilting the head back and lifting the chin.



### Give Sets of 30 Compressions and 2 Breaths

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

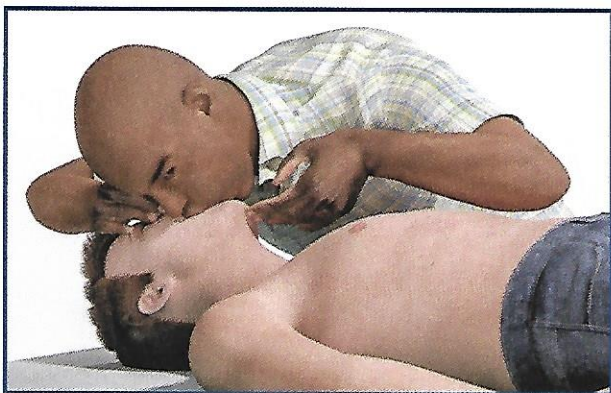
### Give Breaths Without a Pocket Mask

Giving someone breaths without a barrier device is usually quite safe. Use your best judgment on whether it is safe for you to give breaths.

### Actions to Take: 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 (Figure 16).
- 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 chest compressions for more than 10 seconds, even when you give breaths.

Figure 16. Giving breaths without a barrier device.



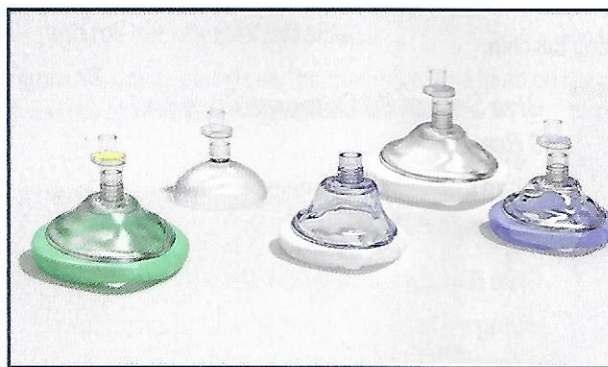
### Pocket Masks for Giving Breaths

You can give breaths with or without a barrier device, such as a pocket mask. These plastic devices fit over the person's mouth and nose (Figure 17). They protect the rescuer from blood, vomit, or disease. Your instructor may discuss other types of barrier devices, like face shields, that you can use when giving breaths.

If you're in the workplace, your employer may provide PPE that includes pocket masks or face shields to use during CPR.

There are different kinds of pocket masks as well as different sizes for adults, children, and infants. Be sure you're using the right size. Pocket masks are typically made of hard plastic with a 1-way valve on the part you breathe into. You may need to put a pocket mask together before you use it. To put it together, pop the plastic dome into place by using your thumbs to pop it out. Then, attach the 1-way valve.

**Figure 17.** Some people use a pocket mask when giving breaths.



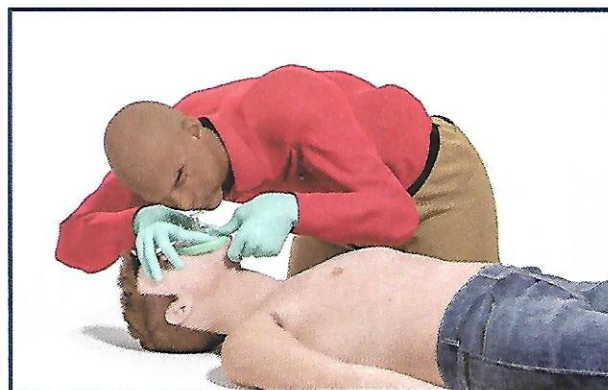
### ***Give Breaths With a Pocket Mask***

As you give each breath, look at the person's chest to see if it begins to rise. Seeing the chest rise is the best way to know that your breaths are effective.

### **Actions to Take: Give Breaths With a Pocket Mask**

- Put the mask over the person's mouth and nose.
  - If the mask has a narrow, pointed end, put that end on the bridge of the nose; position the mask so that it covers the mouth.
- Tilt the head and lift the chin while pressing the mask against the person's face (Figure 18). It's 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 chest compressions for more than 10 seconds, even when you give breaths.

**Figure 18.** Giving breaths with a pocket mask.



### ***What to Do if the Chest Doesn't Rise***

It takes a little practice to give breaths. 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.

### Actions to Take: Provide Adult CPR

- Make sure the person is lying faceup on a firm, flat surface.
- Quickly move bulky clothes out of the way. If a person's clothes are difficult to remove, you can still provide compressions over clothing.
  - If an AED becomes available, remove all clothes that cover the chest. AED pads must not be placed over any clothing.
- 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/min. 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

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 check to see if the person needs a shock and will automatically give one or tell you when to give one.

### AED Pads

AEDs may have 2 sets of pads: adult pads and child pads. For CPR, you learned that a child is anyone 1 year or older who has not gone through puberty. However, for defibrillation, make sure you use the adult pads for anyone 8 years or older. Before you place the pads, quickly scan the person to check for special situations that might require additional steps. See Special Situations later in this section.

### Actions to Take: 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 19).
  - Follow the prompts, which will tell you everything you need to do.
- Attach the adult pads.
  - Use the adult pads for anyone 8 years or older.
  - Peel away the backing from the pads.
  - Following the pictures on the pads, attach them to the person's bare chest (Figure 20).
  - Plug the pads connector into the AED, if necessary.

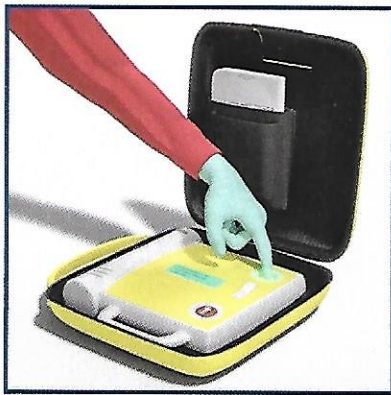
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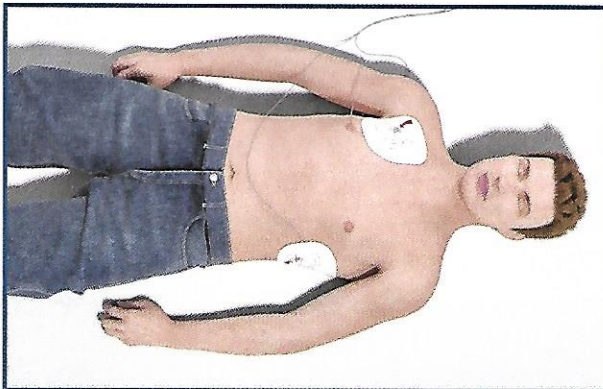
### Actions to Take: Use an AED for an Adult *(continued)*

- 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 the AED tells you that a shock is not needed, resume CPR.
- Deliver a shock if needed (Figure 21).
  - Loudly state, "Clear," and make sure that no one is touching the person.
  - Push the Shock button.
- Immediately resume CPR.

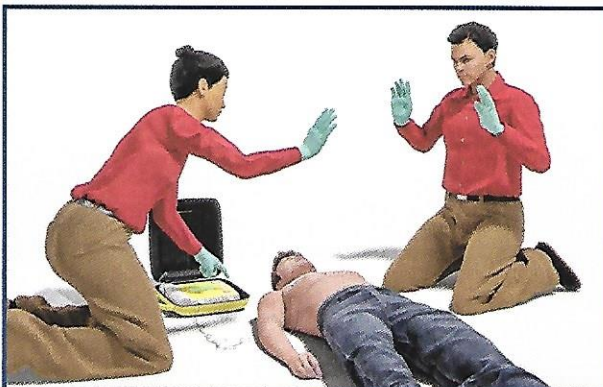
**Figure 19.** Turn on the AED.



**Figure 20.** Place pads on an adult by following the pictures on the pads.



**Figure 21.** Make sure that no one is touching the person just before you push the Shock button.



## Special Situations

Some special situations can affect how you should place the AED pads. So before you apply the pads, quickly scan the person and assess the situation to check for the following:

### Actions to Take: Special Situations

#### Hairy Chest

*If the person has hair on the chest that may prevent pads from sticking, remove the hair in one of these ways:*

- Quickly shave the area where you will place the pads by using the razor from the AED carrying case (Figure 22).
- Use a second set of AED pads (if available) to remove the hair (Figure 23).
  - 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.

#### Water on or Near Person

*If the person is lying in water*

- Quickly move the person to a dry area.

*If the person is lying on snow or in a small puddle*

- You can 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.

*If there is water on the person's chest*

- Quickly wipe the chest dry before attaching the pads (Figure 24).

#### Implanted Pacemaker

*If the person has an implanted defibrillator or pacemaker*

- Don't put the AED pad directly over the implanted device (Figure 25).
- Follow the normal steps for operating an AED.

#### Medicine Patch

*If there is a medicine patch where you need to place an AED pad*

- Don't put the AED pad directly over a medicine patch (Figure 26).
- Use protective gloves.
- Remove the medicated patch.
- Wipe the area clean.
- Attach the AED pads.

#### Jewelry or Bra/Undergarment

- You don't need to remove a person's jewelry as long as it does not interfere with the placement of the pads and is not in contact with the pads. It does not cause a shock hazard to either the person or rescuer.
- Undergarments should be removed, along with other clothes covering the chest, because they often interfere with proper pad placement.

*(continued)*

**Actions to Take: Special Situations** *(continued)*

**Pregnancy**

*If the person is pregnant*

- Use an AED for a pregnant woman in cardiac arrest as you would for any cardiac arrest victim. Shock from the AED will not harm the baby.

**Figure 22.** If the AED contains a razor, use it to shave a hairy chest.



**Figure 23.** If the AED contains 2 sets of pads, use 1 set to remove the hair on a hairy chest.



**Figure 24.** Wipe excess water off the chest.



**Figure 25.** Don't apply AED pad over implanted device.



**Figure 26.** Don't apply AED pad over medicine patch.



### **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 you.

Provide CPR and use the AED until

- Someone else arrives who can take turns providing CPR with you
  - If someone else arrives, you can take turns giving compressions. Switch rescuers about every 2 minutes, which is about 5 cycles of compressions or breaths, or sooner if you get tired.
- 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. They are the core of CPR. Try not to interrupt 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, “Do you need help?”
  - If the person is unresponsive, go to the next step.
- Shout for help.
- Phone 9-1-1 and get an AED.
  - Phone or send someone else 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.
  - If you’re alone and don’t have a nearby phone, leave the person while you go phone 9-1-1 and get an AED.
- Check for breathing.
  - If the person is breathing, stay with the person until advanced help arrives.
  - If the person is not breathing or is only gasping, begin CPR and use the AED. See the next section.

### Provide High-Quality CPR

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

- Make sure the person is lying faceup on a firm, flat surface.
- Quickly move bulky clothes out of the way. If a person’s clothes are difficult to remove, you can give compressions over clothing.
  - If an AED becomes available, remove all clothes that cover the chest. AED pads must not be placed over any clothing.
- Give 30 chest compressions.
  - Put the heel of one hand on the center of the chest (over the lower half of the breastbone) and the heel of the other hand on top of the first hand.
  - Push straight down at least 2 inches, or 5 cm.
  - Push at a rate of 100 to 120/min. 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). As you give each breath, watch the chest to begin to rise.
  - 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 that 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

# Drug Overdose Emergency

## How to Help an Adult With a Drug Overdose Emergency

Across the world, far too many people are dying from drug overdoses. These deaths are largely due to opioids. Common opioids are morphine, fentanyl, heroin, oxycodone, methadone, and hydrocodone.

*Naloxone* is a medication used to reverse the overdose effects of an opioid and help the person to survive. It is safe and effective. Emergency responders have used naloxone for many years.

Family members or caregivers of known opioid users may keep naloxone close by to use in case of an opioid overdose. An accidental overdose can happen to anyone. If you know someone who has access to naloxone, you may need to use it. It is important to be familiar with how to use naloxone.

### Facts About Naloxone

- Naloxone is available without a prescription in most states and through substance use disorder treatment programs.
- Naloxone comes in several forms. Common forms are an intranasal spray and an autoinjector (similar to an epinephrine pen).
- Give naloxone by spraying it into the nose or by injecting it with an autoinjector into a muscle.
- Naloxone is used only to reverse the effects of an opioid overdose. It won't work for other types of drug overdoses.

### Opioid-Associated Emergency

Common signs of opioid overdose include unresponsiveness with shallow or slow breathing, or even no breathing or only gasping. You may suspect a drug overdose if you see signs of drugs nearby or if there's other evidence of drug use. 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.

#### Actions to Take: Help an Adult With an Opioid-Associated Emergency

- Make sure the scene is safe.
- Tap and shout (check for responsiveness).
- Shout for help.
- Phone 9-1-1 and get the naloxone kit and an AED.
  - Phone or send someone else to phone 9-1-1 and get the naloxone kit and 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, give naloxone if available, and stay with the person until advanced help arrives.
  - If the person is not breathing normally or is only gasping, provide CPR, and use the AED as soon as it is available. Give the naloxone as soon as you can, but do not delay CPR to give naloxone.
- Continue giving 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

If you are not sure whether someone is an adult or a child, provide emergency care as if the person is an adult. But note that 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 27) shows the most important actions needed to treat children who have cardiac arrests 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, and the sixth link is recovery.

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

- **First link:** Preventing injury and cardiac arrest is an important first step in saving children's lives.
- **Second link:** Phoning 9-1-1 as soon as possible so that the child can have emergency care quickly improves outcome.
- **Third link:** The sooner that high-quality CPR is started for someone in cardiac arrest, the better the chances of survival.
- **Fourth and fifth links:** Advanced care is provided.
- **Sixth link:** A child may need continued care and support for months or years to fully recover after a cardiac arrest.

Figure 27. The AHA pediatric Chain of Survival for cardiac arrests that occur outside of a hospital.



### Cardiac Arrest in Children

Children usually have healthy hearts, but they can have respiratory problems that cause them to need CPR. Other emergencies that can lead to cardiac arrest in children 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 the prevention of drowning, choking, and other respiratory problems.

Because respiratory problems are often the cause of cardiac arrest in children, if a child is in cardiac arrest and you are alone and do not have a phone nearby, you will provide CPR for 2 minutes (5 sets of compressions and breaths) before leaving to phone 9-1-1.

## Assess and Phone 9-1-1

When you see a child who may have had a cardiac arrest, take the following 5 steps to assess and get help:

1. Make sure the scene is safe.
2. Tap and shout (check for responsiveness).
3. Shout for help.
4. Check for breathing.
5. Phone 9-1-1, begin CPR, and get an AED.

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

The following details about each of these steps will help you assess a medical emergency.

### Step 1: Make Sure the Scene Is Safe

Before you begin to help the child, look for anything nearby that might hurt you. You can't help if you get hurt.

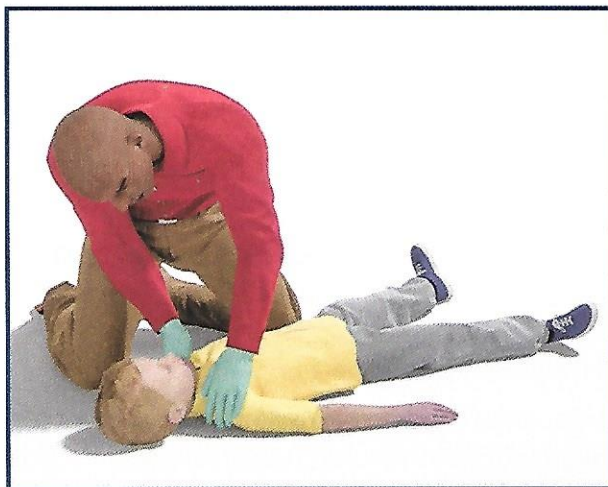
As you help, be aware if anything changes and makes it unsafe for you or the child.

### Step 2: Tap and Shout (Check for Responsiveness)

#### Actions to Take: Check for Responsiveness

- Tap their shoulders and shout to check whether the child is responsive or unresponsive.
  - If the child is responsive, ask if they need help.
  - If the child is unresponsive, shout for help so that if others are nearby, they can help.

Figure 28. Tap and shout (check for responsiveness).



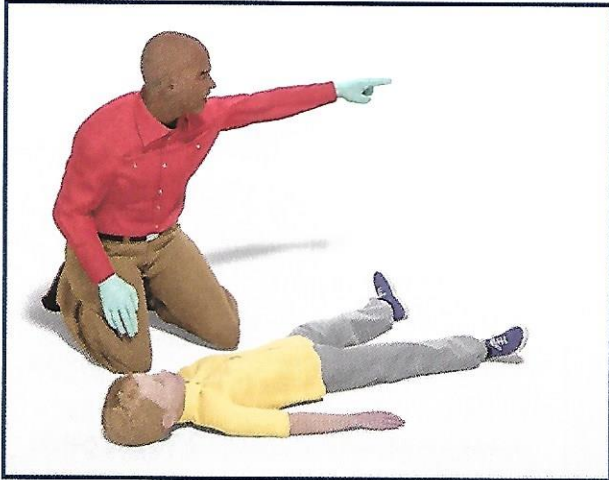
### Step 3: Shout for Help

In an emergency, the sooner you get help, the better. If there's a problem and get help, the sooner you get help, the better the child with a cardiac arrest. When you and others are helping, you can provide better care.

If the child is unresponsive, shout for help. If you are alone, shout for help (Figure 29). If someone comes, send them to phone 9-1-1 and get an AED. If you have a cell phone, phone 9-1-1 and put it on speaker.



Figure 29. Shout for help.



### Step 4: Check for Breathing

If the child is unresponsive, check for breathing (Figure 30). Scan the chest repeatedly for at least 5 seconds (but no more than 10 seconds), looking for the chest to rise and fall. If the child is not breathing or is only gasping, they need CPR.

#### Actions to Take: Check for Breathing

*If the child is unresponsive and is breathing*

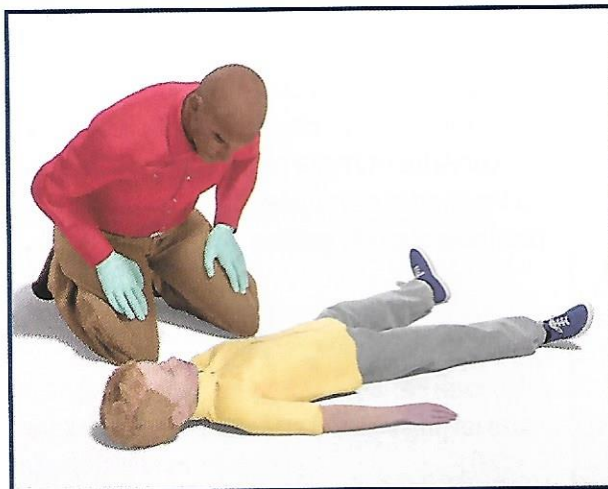
- This child does not need CPR.
- Roll them onto their side (if you don't suspect a neck or back injury). This will help keep the airway clear in case the child vomits.
- Stay with the child until advanced help arrives.

*If the child is unresponsive and is not breathing or is only gasping*

- This child needs CPR.
- Make sure the child is lying faceup 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). Use the AED as soon as it is available.
- Resume CPR and using the AED until advanced help arrives and takes over.

**Remember:** Unresponsive + No breathing or only gasping = Provide CPR

**Figure 30.** Check for breathing.



### **Step 5: Phone 9-1-1, Begin CPR, Get an AED**

*If someone comes to help and a cell phone is available*

- Ask the person to phone 9-1-1 on the phone, put it on speaker mode, and get an AED while you begin CPR.
- Use the AED as soon as it is available.

*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.
- Use the AED as soon as it is available.

*If you are alone and have a cell phone or a 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. Use it as soon as it is available.
- 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. Use the AED as soon as it is available.
- 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

### **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 will 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. It allows the dispatcher and the person providing CPR to speak to each other.

### **What to Do if You Are Not Sure**

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. CPR is unlikely to cause harm if the child is not in cardiac arrest. But without CPR, a child who is in cardiac arrest will die.

So if you aren't sure, provide CPR. You may save a child's life.

### Summary

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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, "Do you need 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 is only gasping, begin CPR and use an AED. See the next steps.

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

- Make sure the child is lying faceup on a firm, flat surface.
- Quickly move bulky clothes out of the way. If a child's clothes are difficult to remove, you can still provide compressions over clothing.
  - If an AED becomes available, remove all clothes that cover the chest. AED pads must not be placed over any clothing.

*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.
- Use the AED as soon as it is available.

*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.
- Use the AED as soon as it is available.

*If you are alone and have a cell phone or a 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, and use it as soon as it is available.
- 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, and use it as soon as it is available.
- 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 you can perform CPR skills, the person's chances of survival, whether you are helping an adult, a child, or an infant.

CPR has 2 main skills:

- Providing compressions
- Giving breaths

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

### Provide Compressions

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 enough to pump blood through the body. It's better to push too hard than not hard enough. People are afraid of injuring a child by providing compressions, but injury is unlikely.

#### *Compression Technique*

When providing compressions for a child, use 1 hand (Figure 31). If you can't push down at least one-third the depth of the child's chest (or approximately 2 inches) with 1 hand, use 2 hands to compress the chest (Figure 32).

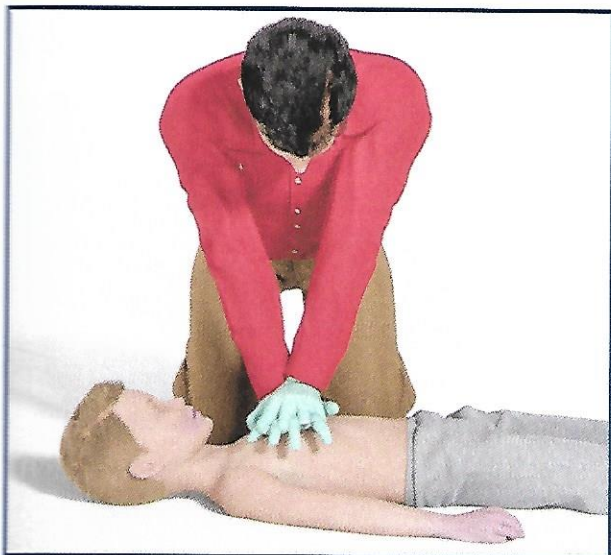
#### **Actions to Take: Provide Compressions for a Child**

- Make sure the child is lying faceup on a firm, flat surface.
- Quickly move bulky clothes out of the way. If a child's clothes are difficult to remove, you can provide compressions over clothing.
  - If an AED becomes available, remove all clothes that cover the chest. AED pads must not be placed over any clothing.
- Use 1 or 2 hands to give compressions.
  - **1 hand:** Put the heel of one hand on the center of the child's chest, over the lower half of the breastbone.
  - **2 hands:** Put the heel of one hand on the center of the child's 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 approximately 2 inches.
- Push at a rate of 100 to 120/min. Count the compressions out loud.
- Let the chest come back up to its normal position after each compression.
- Try not to interrupt chest compressions for more than 10 seconds, even when you give breaths.

**Figure 31.** Using 1 hand to give compressions to a child.



**Figure 32.** Using 2 hands to give compressions to a child.



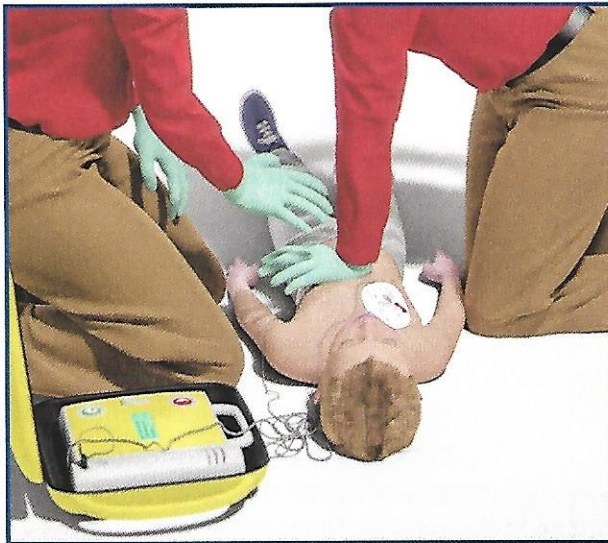
### ***Switch Rescuers to Avoid Fatigue***

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 compressions (Figure 33). 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 **Actions to Take: Provide Compressions for a Child.**

**Figure 33.** 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.

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

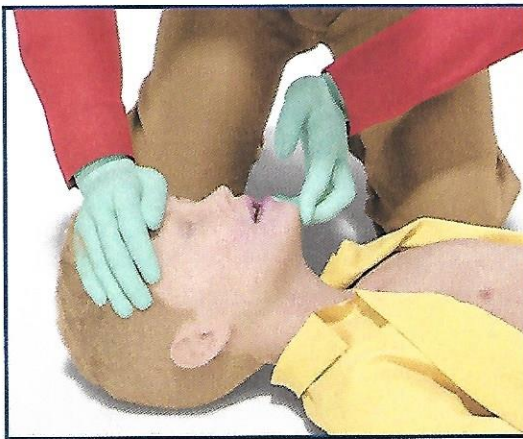
### *Open the Airway*

Before giving breaths, open the airway (Figure 34). This lifts the tongue from the back of the throat and makes sure your breaths get air into the lungs.

### **Actions to Take: Open the Airway**

- Put one hand on the forehead and the fingers of your other hand on the bony part of the chin (Figure 34). Avoid pressing into the soft part of the neck or under the chin because this might block the airway.
- Tilt the head back and lift the chin.

**Figure 34.** Open the airway by tilting the head back and lifting the chin.



### *Pocket Masks for Giving Breaths*

You can give breaths with or without a barrier device such as a pocket mask. These plastic devices fit over the mouth and nose. They protect the rescuer from blood, vomit, or disease. Your instructor may discuss other types of barrier devices, like face shields, that you can use when giving breaths.

There are different kinds of pocket masks as well as different sizes. So make sure you're using the right size for a child. Pocket masks are typically made of hard plastic with a 1-way valve, which is the part you breathe into. You may need to put a pocket mask together before you use it.

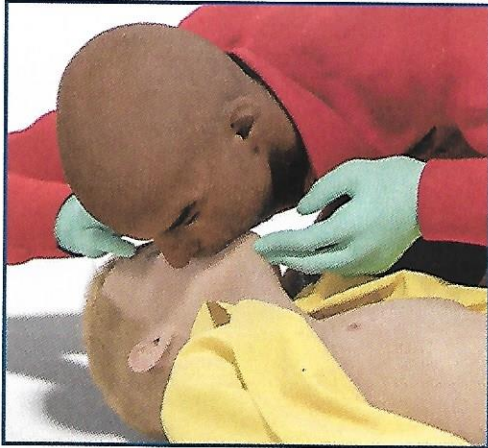
### *Give Breaths Without a Pocket Mask*

Giving someone breaths without a barrier device is usually quite safe. Use your best judgment on when it is safe for you to give breaths.

### Actions to Take: 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 (Figure 35).
- 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 chest compressions for more than 10 seconds, even when you give breaths.

Figure 35. Cover the child's mouth with your mouth.



### Give Breaths With a Pocket Mask

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. Seeing the chest begin to rise is the best way to know that your breaths are effective.

### Actions to Take: Give Breaths With a Pocket Mask

- Put the mask over the child's mouth and nose.
  - If the mask has a narrow, pointed end, put that 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 (Figure 36).
- Try not to interrupt chest compressions for more than 10 seconds, even when you give breaths.

Figure 36. Giving breaths with a pocket mask.



### 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.

#### **Actions to Take: Provide Child CPR**

- Make sure the child is lying faceup on a firm, flat surface.
- Quickly move bulky clothes out of the way. If a child's clothes are difficult to remove, you can provide compressions over clothing.
  - If an AED becomes available, remove all clothes that cover the chest. AED pads must not be placed over any clothing.
- Give 30 chest compressions.
  - Use 1 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 approximately 2 inches.
  - Push at a rate of 100 to 120/min. 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**

CPR combined with using an AED provides the best chance of saving a life. If possible, use an AED even if you provide CPR. AEDs can be used for children and infants as well as for adults.

- Some AEDs can deliver a smaller shock dose for children and infants if you use child pads or a child 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 to 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 tell you to see if the child needs a shock and will automatically give one or tell you when to give one.

### **AED Pads**

- AEDs may have 2 sets of pads: adult pads and child pads. For CPR, you learned that a child is anyone 18 years of age or older who has not gone through puberty. However, for defibrillation, make sure you use child pads for anyone 8 years 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 later in this section.



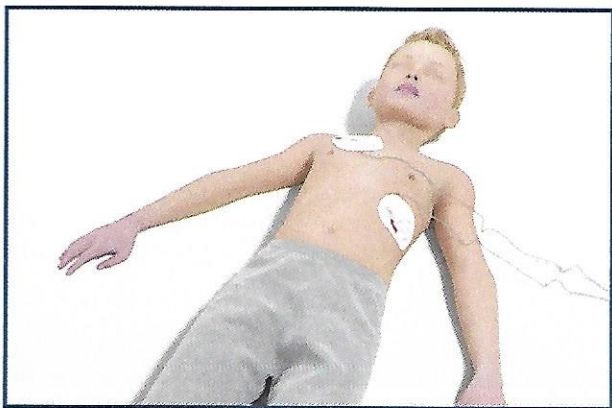
### Actions to Take: Use an AED for a Child

- Turn the AED on and follow the prompts.
  - Turn it on by pushing the On button or lifting the lid (Figure 37).
  - 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 of age. If child pads are not available, use adult pads.
  - Use adult pads if the child is 8 years or older.
  - Peel away the backing from the pads.
  - Following the pictures on the pads, attach them to the child's bare chest (Figure 38). Make sure the pads don't touch each other. If the pads will touch, put one pad on the child's chest and the other on the child's back.
  - Plug the pads connector into the AED, if necessary.
- 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 the AED tells you that a shock is not needed, resume CPR.
- Deliver a shock if needed (Figure 39).
  - Loudly state, "Clear," and make sure that no one is touching the child.
  - Push the Shock button.
  - Immediately resume CPR.

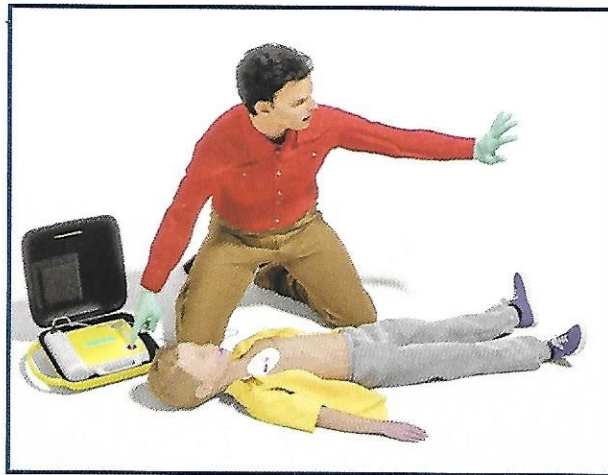
Figure 37. Turning on the AED.



Figure 38. Place pads on a child by following the pictures on the pads.



**Figure 39.** Make sure that no one is touching the child just before you push the Shock button.



## Special Situations

Some special situations can affect how you place the 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. So when you apply the pads, quickly scan the child and assess the situation to check for the following:

### Actions to Take: Special Situations

#### Water on or Near Child

*If the child is lying in water*

- Quickly move the child to a dry area.

*If the child is lying on snow or in a small puddle*

- You can 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.

*If there is water on the child's chest*

- Quickly wipe the chest dry before attaching the pads.

#### Implanted Pacemaker

*If the child has an implanted defibrillator or pacemaker*

- Don't put the AED pad directly over the implanted device.
- Follow the normal steps for operating an AED.

#### Medicine Patch

*If there is 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.

*(continued)*

### Actions to Take: Special Situations *(continued)*

#### Jewelry

- You don't need to remove a child's jewelry as long as it doesn't interfere with the placement of the pads or touch the pads. It does not cause a shock hazard to either the child or rescuer.

### 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 you.

Provide CPR and use the AED until

- Someone else arrives who can take turns providing CPR with you
  - If someone else arrives, you can take turns giving compressions. Switch rescuers about every 2 minutes, which is about 5 cycles of compressions or breaths, or sooner if you get tired.
- 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. For this reason, it's very important to give breaths as well as compressions to a child.

Compressions are still very important to deliver blood flow. They 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, "Do you need 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.

### Phone 9-1-1, Begin CPR, 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.
- Use the AED as soon as it is available.

*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.
- Use the AED as soon as it is available.

*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, and use it as soon as it is available.
- 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; use the AED as soon as it is available.
- Return to the child and continue CPR.

## **Provide High-Quality CPR**

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

- Make sure the child is lying faceup on a firm, flat surface.
- Quickly move bulky clothes out of the way. If a child's clothes are difficult to remove, you can still provide compressions over clothing.
  - If an AED becomes available, remove all clothes that cover the chest. AED pads must not be placed over any clothing.
- Give 30 chest compressions.
  - Use 1 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 approximately 2 inches.
  - Push at a rate of 100 to 120/min. 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 pads.
    - Use child pads if the child is less than 8 years of age. If child pads are not available, use adult pads.
    - Use adult pads if the child is 8 years or older.
  - Let the AED analyze.
  - Make sure that 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

# Water Safety

Drowning and related injuries are a huge problem, especially for children. However, there are several steps you can personally take to prevent or limit injuries. Any person responsible for children around bodies of water needs to be water competent. *Water competency* is the ability to anticipate, avoid, and survive common drowning situations.

Evidence reveals that many children older than 1 year will benefit from swimming lessons. In contrast, infants, who are younger than 1 year, are developmentally unable to learn the complex movements necessary to swim. But swimming lessons and swimming skills alone cannot prevent all water-related emergencies. Learning to swim needs to be seen as a component of water competency that includes

- Knowing about local hazards and the risks of one's own limitations
- Understanding how to wear a life jacket
- Being able to recognize and respond to a swimmer in distress, shout for help, and perform safe rescue and CPR

Experts generally recommend using multiple layers of protection to prevent drowning because it is unlikely that any single strategy will prevent drowning deaths and injuries. Their recommendations include 5 major evidence-based interventions: 4-sided pool fencing, life jackets, swimming lessons, supervision, and lifeguards.

- **4-sided pool fencing:** Installation of 4-sided fencing (at least 4 feet tall) with self-closing and self-latching gates that completely isolates the pool from the house and yard is the most studied and effective drowning-prevention strategy for young children, preventing more than 50% of swimming-pool drownings of young children.
- **Life jackets:** Life jackets are also well proven to prevent drowning fatalities.
- **Swimming lessons:** Some data reveal that swimming lessons may lower drowning rates among children.
- **Supervision:** Inadequate supervision is often cited as a contributing factor for childhood drowning, especially for younger children. However, adequate supervision, described as close, constant, and attentive supervision of young children in or around any water, is a primary and absolutely essential preventive strategy.
  - For beginning swimmers, adequate supervision is *touch supervision*, in which the supervising adult is within arm's reach of the child so they can pull the child out of the water if the child's head becomes submerged. For more advanced swimmers, supervision should include being capable of recognizing and responding appropriately to a child in distress.
- **Lifeguards:** Lifeguards and CPR training are additional effective preventive measures that can help prevent drowning.

Data about the value of other potential preventive strategies, such as pool covers and pool alarms, are lacking.

Remember, no single factor can eliminate a child's risk of drowning, and a combination of all of these interventions is the best method to minimize drowning. For more information on drowning prevention techniques, visit the American Academy of Pediatrics website at [www.aap.org](http://www.aap.org).

# CPR for Infants

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

## Differences in CPR for Infants vs CPR for Children and Adults

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Because infants are so small, there are some differences in how you perform CPR for them compared with what you do for children or adults. When giving chest compressions to an infant, you use only 2 fingers of 1 hand or 2 thumbs—vs 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/min.

For the purposes of this course, an infant is less than 1 year old.

## Assess and Phone 9-1-1

---

When you see an infant who may have had a cardiac arrest, take the following 5 steps to assess the emergency and get help:

1. Make sure the scene is safe.
2. Tap and shout (check for responsiveness).
3. Shout for help.
4. Check for breathing.
5. Phone 9-1-1, begin CPR, and get an AED.

Depending on the circumstance and 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.

### Step 1: Make Sure the Scene Is Safe

Before you assess the infant, look for anything nearby that might hurt you. You can't help if you get hurt too.

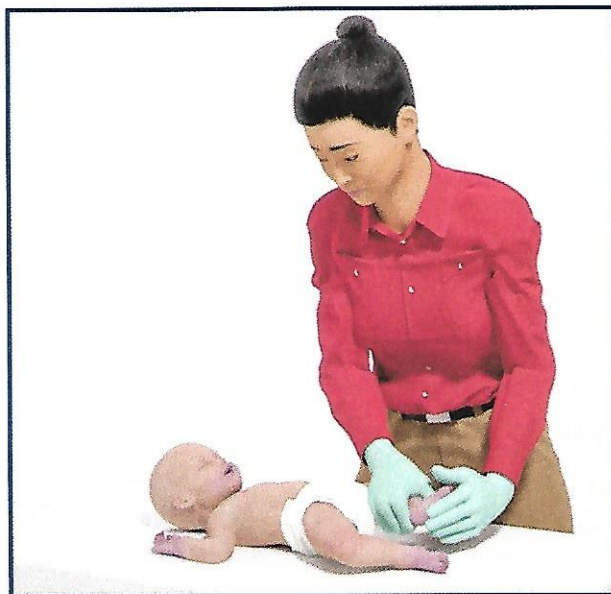
As you help, be aware if anything changes and makes it unsafe for you or the infant.

### Step 2: Tap and Shout (Check for Responsiveness)

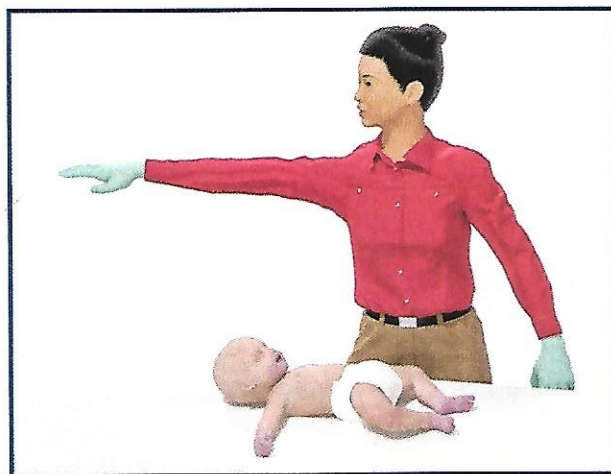
#### Actions to Take: Check for Responsiveness

- Tap the infant's foot and shout to check whether they are responsive (Figure 40).
  - If the infant is responsive, continue first aid care.
  - If the infant is unresponsive, shout for help so that if others are nearby, they can help you.

**Figure 40.** Tap and shout (check for responsiveness).



**Figure 41.** Shout for help.



### Step 3: Shout for Help

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

If the infant is unresponsive, shout for help (Figure 41). If someone comes, send that person to phone 9-1-1 and get an AED. If you have a cell phone, phone 9-1-1 and put it on speaker mode.

### Step 4: Check for Breathing

If the infant is unresponsive, check for breathing (Figure 42). Scan the chest repeatedly for at least 5 seconds (but no more than 10 seconds), looking for the chest to rise and fall. If the infant is not breathing or is only gasping, they need CPR.

#### **Actions to Take: Check for Breathing**

*If the infant is unresponsive and is breathing*

- This infant does not need CPR.
- Roll them onto their side (if you don't suspect a neck or back injury). This will help keep the airway clear in case the infant vomits.
- Stay with the infant until advanced help arrives.

*(continued)*

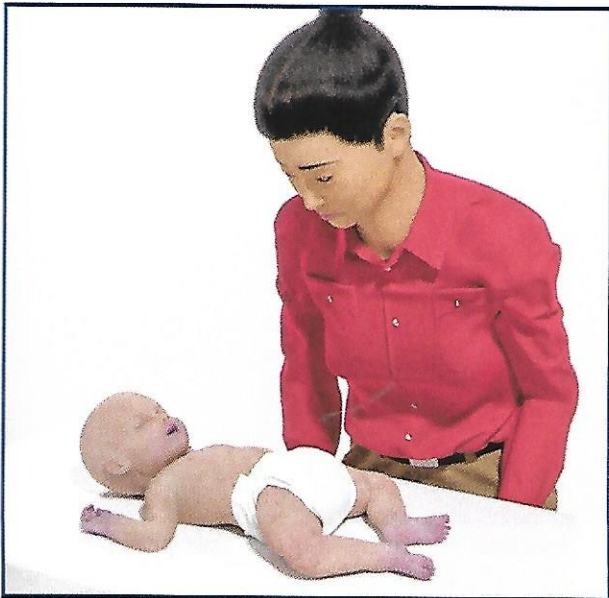
## Actions to Take: Check for Breathing (continued)

*If the infant is unresponsive and not breathing or is only gasping*

- This infant needs CPR.
- Make sure the infant is lying faceup 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). Use the AED as soon as it is available.

**Remember:** Unresponsive + No breathing or only gasping = Provide CPR

Figure 42. Check for breathing.



## Step 5: Phone 9-1-1, Begin CPR, 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.
- Use the AED as soon as it is available.

*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.
- Use the AED as soon as it is available.

*If you are alone and have a cell phone or a 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. If the infant isn't injured and you're alone, take the infant with you while you go to phone 9-1-1 and get an AED (Figure 43). Use the AED as soon as it is available.
- 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. If the infant isn't injured and you're alone, you can carry the infant with you while you go to phone 9-1-1 and get an AED. Use the AED as soon as it is available.
- Return to the infant and continue CPR.



**Figure 43.** Take the infant with you while you go to phone 9-1-1 and get an AED.



### **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. It allows the dispatcher and the person providing CPR to speak to each other.

### **What to Do if You Are Not Sure**

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. CPR is not likely to cause harm if the infant is not in cardiac arrest. But without CPR, an infant who is in cardiac arrest may die.

So if you aren't sure, provide CPR. You may save an infant's life.

## **Perform High-Quality CPR**

Learning how to perform high-quality CPR is important. The better you can perform CPR skills, the better the chances of survival, whether you are helping an adult, a child, or an infant.

### **CPR Skills**

CPR has 2 main skills:

- Providing compressions
- Giving breaths

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

### **Provide Compressions**

You already learned that compressions are the most important part of CPR because they help pump blood to the brain and other organs. Pushing hard and fast when giving compressions is just as important for infants as it is for children and adults.

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 injuring an infant by providing compressions, but injury is unlikely.

### **Compression Techniques**

Because infants are so much smaller than adults or children, you can use just 2 fingers to provide compressions. Figure 44 shows the correct placement of your fingers on the infant's chest.

**Another technique for providing infant chest compressions is to use 2 thumbs.** Figure 45 shows the correct placement of your thumbs on the infant's chest.

If you can't provide compressions that are at least one third the depth of the infant's chest, or about 1½ inches, you can use the heel of 1 hand.

### **Actions to Take: Provide Compressions for an Infant**

- Make sure the infant is lying faceup on a firm, flat surface.
- Quickly move bulky clothes out of the way. If an infant's clothes are difficult to remove, you can still provide compressions over clothing.
  - If an AED becomes available, remove all clothes that cover the chest. AED pads must not be placed over any clothing.
- Use 2 fingers, 2 thumbs, or 1 hand to give compressions.
  - **2 fingers:** Place your fingers on the breastbone, just below the nipple line (Figure 44).
  - **2 thumbs:** Place both thumbs side by side on the breastbone, just below the nipple line. Encircle the infant's chest and support the infant's back with the fingers of both hands (Figure 45).
  - **1 hand:** Use the heel of 1 hand to give compressions. Place your 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.
- Push at a rate of 100 to 120/min. Count the compressions out loud.
- Let the chest come back up to its normal position after each compression.

**Figure 44.** Use 2 fingers of 1 hand to give compressions. Place your fingers on the breastbone, just below the nipple line. Avoid the tip of the breastbone.



**Figure 45.** Use 2 thumbs side by side on the breastbone, just below the nipple line. Encircle the infant's chest and support the infant's back with the fingers of both hands.



### ***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 giving compressions. 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 this section.

## **Give Breaths**

The second skill of CPR is giving breaths. After each set of 30 compressions, you will need to give 2 breaths. Infants often have healthy hearts, but even an infant's heart can stop beating if they can't breathe or if they have trouble breathing. So it's very important to give breaths as well as compressions to an infant who needs CPR.

### ***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:

#### **Actions to Take: Open the Airway**

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

### ***Pocket Masks for Giving Breaths***

You may give breaths with or without a barrier device, such as a pocket mask. These plastic devices fit over an infant's mouth and nose. They protect the rescuer from blood, vomit, or disease. Your instructor may discuss other types of barrier devices, like face shields, that you can use when giving breaths.

There are different kinds of pocket masks as well as different sizes. So make sure you use the right size for an infant. Pocket masks are typically made of hard plastic with a 1-way valve, which is the part you breathe into. You may need to put a pocket mask together before using it.

### ***Give Breaths Without a Pocket Mask***

Giving someone breaths without a barrier device is usually quite safe. Use your best judgment on whether it is safe for you to give breaths.

#### **Actions to Take: 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 (Figure 46).
  - 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 chest compressions for more than 10 seconds, even when you give breaths.

**Figure 46.** Cover the infant's mouth and nose with your mouth.



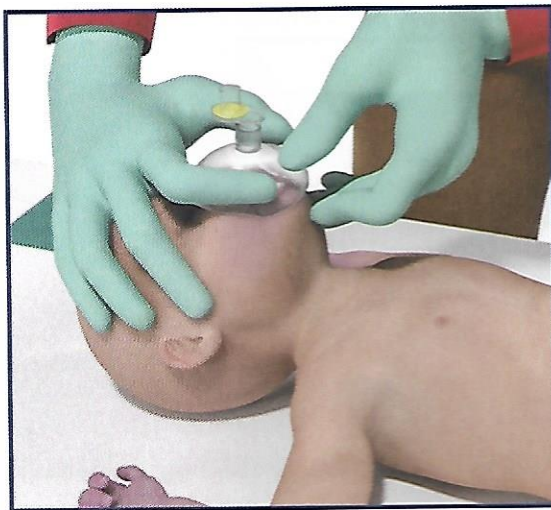
### ***Give Breaths With a Pocket Mask***

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

#### **Actions to Take: Give Breaths With a Pocket Mask**

- Put the mask over the infant's mouth and nose.
  - If the mask has a narrow, pointed end, put that 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's important to make an airtight seal between the infant's face and the mask while you lift the chin to keep the airway open (Figure 47).
- 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 chest compressions for more than 10 seconds, even when you give breaths.

**Figure 47.** Giving breaths with a pocket mask.



### ***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 30 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.

### **Actions to Take: Provide Infant CPR**

- Make sure the infant is lying faceup on a firm, flat surface.
- Quickly move bulky clothes out of the way. If an infant's clothes are difficult to remove, you can provide compressions over clothing.
  - If an AED becomes available, remove all clothes that cover the chest. AED pads must not be placed over any clothing.
- Give 30 chest compressions.
  - Use 2 fingers or 2 thumbs 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. If you cannot push down this far, you can use the heel of 1 hand to give compressions.
  - Push at a rate of 100 to 120/min. 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.

### ***Do Not Delay CPR to Get an AED for an Infant***

Doing 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

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

Compressions are still very important to deliver blood flow, and they 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 is only gasping, begin CPR and use the AED. See the next steps.

### Phone 9-1-1, Begin CPR, 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.
- Use the AED as soon as it is available.

*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.
- Use the AED as soon as it is available.

*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. If the infant isn't injured and you're alone, you can carry the infant with you while you go to phone 9-1-1 and get an AED. Use the AED as soon as it is available.
- 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. If the infant isn't injured and you're alone, after 5 sets of 30 compressions and 2 breaths, you can carry the infant with you while you go to phone 9-1-1 and get an AED. Use the AED as soon as it is available.
- Return to the infant and continue CPR.

## Provide High-Quality CPR

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

- Make sure the infant is lying faceup on a firm, flat surface.
- Quickly move bulky clothes out of the way. If an infant's clothes are difficult to remove, you can still provide compressions over clothing.
  - If an AED becomes available, remove all clothes that cover the chest. AED pads must not be placed over any clothing.
- Give 30 chest compressions.
  - Use 2 fingers of 1 hand or 2 thumbs 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. If you are unable to push down this far, you can use the heel of 1 hand to give compressions.
  - Push at a rate of 100 to 120/min. 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 pads.
    - Use child pads for an infant if available.
    - If child pads are not available, use adult pads.
  - Let the AED analyze.
  - Make sure that 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

# Summary of High-Quality CPR Components

Table 3 shows the components of high-quality CPR for each age group.

**Table 3. Summary of High-Quality CPR Components**

Component	Adult	Children (age 1 year to puberty)	Infants (age less than 1 year)
<b>Make sure the scene is safe</b>	Make sure the scene is safe for you and the person needing help.		
<b>Tap and shout (check for responsiveness)</b>	Check to see if the person is responsive or unresponsive. If unresponsive, go to the next step.		
<b>Shout for help</b>	Shout for help so that if others are nearby, they can help you.		
<b>Check for breathing</b>	If breathing normally, stay with the person until advanced help arrives. If not breathing normally or only gasping, begin CPR and use an AED.	If breathing, stay with the child or infant until advanced help arrives. If not breathing or only gasping, begin CPR and use the AED.	
<b>Phone 9-1-1, begin CPR, and get an AED</b>	Phone or send someone else 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 else 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.	
<b>Compressions and breaths</b>	30 compressions to 2 breaths		
<b>Compression rate</b>	Push on the chest at a rate of 100 to 120/min		
<b>Compression depth</b>	At least 2 inches	At least one third the depth of the chest, or approximately 2 inches	At least one third the depth of the chest, or about 1½ inches
<b>Hand placement</b>	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 or 2 thumbs in the center of the chest, just below the nipple line; 1 hand if necessary for compression depth
<b>Let the chest come back up</b>	Let the chest come back up to its normal position after each compression		
<b>Minimize interruptions in compressions</b>	Try not to interrupt compressions for more than 10 seconds, even when you give breaths		



Table 4 summarizes the differences in CPR by age group.

**Table 4. Differences in CPR for Adults, Infants, and Children**

<b>Component</b>	<b>Adult</b>	<b>Children (age 1 year to puberty)</b>	<b>Infants (age less than 1 year)</b>
<b>Compression depth</b>	At least 2 inches	At least one third the depth of the chest, or approximately 2 inches	At least one third the depth of the chest, or about 1½ inches
<b>Hand placement</b>	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 or 2 thumbs in the center of the chest, just below the nipple line; 1 hand if necessary for compression depth
<b>When to phone 9-1-1 if you are alone and without a phone</b>	After you check breathing, before starting chest compressions	After 5 sets of 30 compressions and 2 breaths	After 5 sets of 30 compressions and 2 breaths; if the infant is uninjured, take the infant with you