STUDENT BOOK

DIGITAL STUDENT BOOK
ONLINE VERSION

CPR and AED

2015 GUIDELINES

AMERICAN SAFETY & HEALTH INSTITUTE

AMERICAN SAFETY & HEALTH INSTITUTE

CPR and AED

Student Book, *Version 8.0*

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ADDITIONAL INFORMATION

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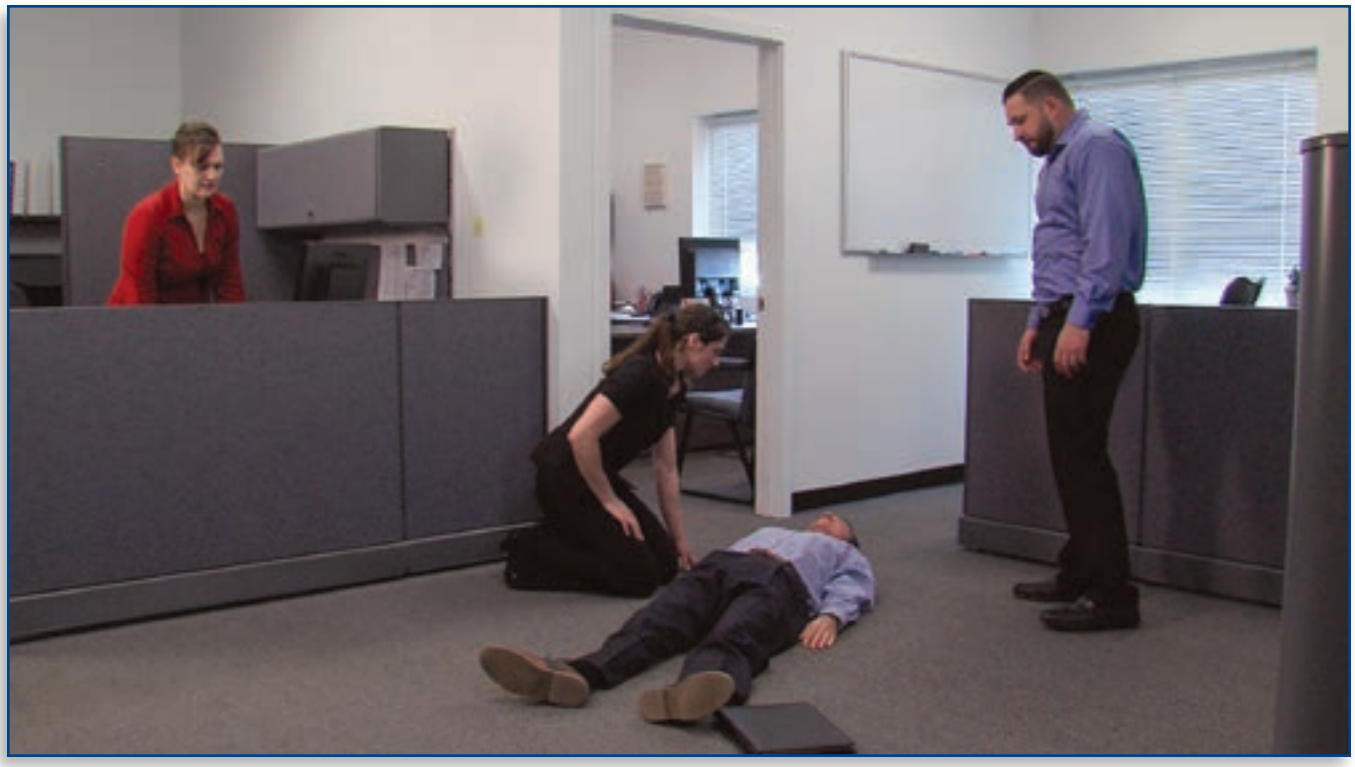
Cardiac Arrest



Because the human body cannot store oxygen, it must continually supply tissues and cells with oxygen through the combined actions of the respiratory and circulatory systems.

Oxygen and the Human Body

The respiratory system includes the lungs and the airway, the passage from the mouth and nose to the lungs. Expansion of the chest during breathing causes suction, which pulls outside air containing oxygen through the airway and into the lungs. Relaxation of the chest increases the pressure within and forces used air to be exhaled from the lungs.

The circulatory system includes the heart and a body-wide network of blood vessels. Electrical impulses stimulate contractions of the heart to create pressure that pushes blood throughout the body. Blood vessels in the lungs absorb oxygen from inhaled air. The oxygen-rich blood goes to the heart, then out to the rest of the body.

Large vessels called arteries carry oxygenated blood away from the heart. Arteries branch down into very small vessels that allow oxygen to be absorbed directly into body cells so it can be used for energy production. Veins return oxygen-poor blood back to the heart and lungs, where the cycle repeats.

The brain is especially sensitive to a lack of oxygen. When oxygen is cut off, brain cell damage and death can occur within a matter of minutes.

Sudden Cardiac Arrest (SCA)

Cardiac arrest is the loss of the heart's ability to pump blood to the body. The most dramatic occurrence, sudden cardiac arrest, can happen with little or no warning. Victims abruptly become unresponsive and collapse. Abnormal gasping can occur. Breathing may stop completely.

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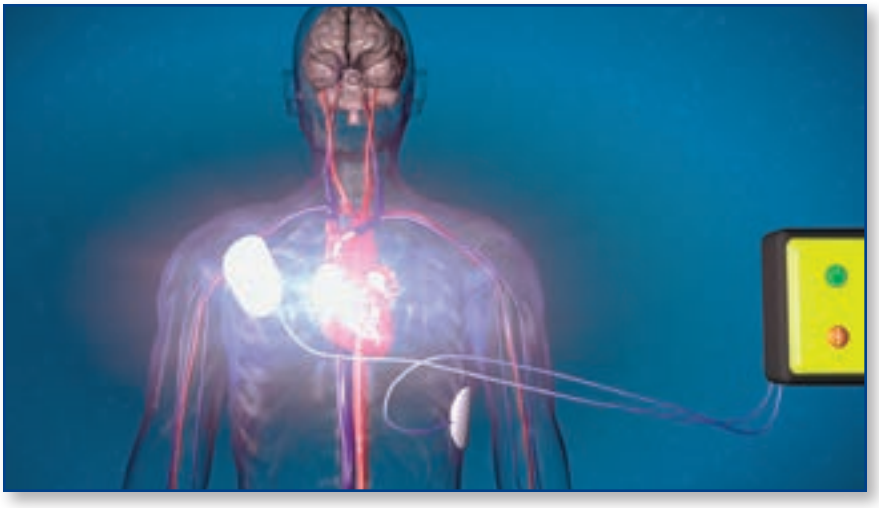
The most likely cause of sudden cardiac arrest is an unexpected disruption to the heart's electrical system, in which normally organized electrical pulses within the heart become disorganized and a chaotic quivering condition known as ventricular fibrillation occurs. Blood flow to the body, along with the oxygen it carries, stops. Without blood flow, brain damage occurs rapidly and quickly leads to death.

Cardiopulmonary Resuscitation (CPR)

Cardiopulmonary resuscitation (CPR) is the immediate treatment for a suspected cardiac arrest. CPR allows a bystander to restore limited oxygen to the brain through a combination of chest compressions and rescue breaths. However, CPR alone is not enough.

Early Defibrillation

The most effective way to end fibrillation is defibrillation, using a defibrillator and electrode pads applied to the chest. A controlled electrical shock is sent through the heart to stop ventricular fibrillation, allowing the heart's normal electrical activity to return and restore blood flow.



Successful defibrillation is highly dependent on how quickly defibrillation occurs. For each minute in cardiac arrest, the chance of survival goes down by about 10%. After as few as 10 minutes, survival is unlikely.

Simply activating EMS will not help. Even in the best EMS systems, the amount of time it takes from recognition of the arrest to EMS arriving at the side of the injured or ill person is usually longer than 10 minutes.

An automated external defibrillator (AED) is a small, portable, computerized device that is simple for anyone to operate. Bystander use of AEDs has been growing steadily, with common placements of the devices in public locations such as airports and hotels, and workplaces in general.

Turning on an AED is as simple as opening a lid or pushing a power button. Once it is on, an AED provides voice instructions to guide you through its attachment and use.

An AED automatically analyzes the heart rhythm, determines if a shock is needed, and charges itself to be ready to defibrillate. An operator simply pushes a button to deliver the shock when prompted by the AED.

Chain of Survival

Sudden cardiac arrest can strike at any age, but primarily affects adults. The chain of survival is often used to describe the best approach for treating sudden cardiac arrest. Each link in the chain is essential for a person to survive. If a single link is weak or missing, the chances for survival are greatly reduced. The greatest chance for survival exists when all the links are strong:

- Early recognition of cardiac arrest and activation of EMS
- Immediate CPR with high-quality chest compressions
- Rapid defibrillation, or electrical shock, to the heart
- Effective basic and advanced EMS care and transport
- Effective post-cardiac arrest care at a hospital

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Secondary Cardiac Arrest

Unlike sudden cardiac arrest, in which the heart is the primary problem, cardiac arrest can also be the end result of the loss of an airway or breathing. This is secondary cardiac arrest.

Problems such as hazardous breathing conditions in a confined space, drowning, and drug overdoses can result in secondary cardiac arrest. With no incoming oxygen, the heart progressively becomes weaker until signs of life become difficult or impossible to assess.

If the heart is simply too weak to create obvious signs of life, immediate CPR, with an emphasis on effective rescue breaths, may be the only chance to restore them.

Opioid Overdose

The abuse of opioid drugs to get a euphoric high is a serious and growing health problem. Increasing prescriptions for opioid pain relievers, such as hydrocodone and oxycodone, have made them more commonly available. The use of heroin, a highly addictive opioid, also contributes to the problem.

As a result, the number of overdoses and deaths from prescription opioids and heroin has increased dramatically. Opioids, taken in excess, can depress and stop breathing. Opioid overdose is a clear cause of secondary cardiac arrest.

Naloxone, also known as Narcan, is a medication that can temporarily reverse the life-threatening effects of opioids. It is easy to administer, either through an auto-injector device or through an aerosol that is sprayed into the nose. Naloxone is becoming more readily available to lay providers.

It is reasonable to provide education and training on responding to suspected opioid overdoses, including the administration of naloxone, to those most likely to be involved with this type of emergency. Laws regarding first aid administration of naloxone vary by city and state. As with Good Samaritan laws, know the laws in your area.

Children and Infants

Children are more likely to experience secondary cardiac arrest instead of a primary one. This is an important consideration in how you approach a child or infant you think may have arrested.

When describing age groups in relation to CPR, an infant is younger than 1 year of age. A child is 1 year of age until the onset of puberty. Puberty can be estimated by breast development in females and the presence of armpit hair in males. An adult is from the onset of puberty and older.

The chain of survival for children and infants includes the following links:

- Prevention of airway and breathing emergencies
- Early CPR, with an emphasis on effective rescue breaths, and, if needed, defibrillation with an AED
- Prompt activation of EMS
- Effective basic and advanced EMS care and transport
- Effective post-cardiac arrest care at a hospital

Knowledge Check

The chain of survival is often used to describe the best approach for treating sudden cardiac arrest. The first three links of the chain are typically the responsibility of a trained CPR provider. Describe those links.

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Heart Disease

Heart disease, resulting in heart attacks and strokes, is the leading cause of death in the U.S., attributing to about 1 in every four deaths. This affects women and men almost evenly. A healthy lifestyle can lower the risk of heart disease:

- Eat a healthy diet
- Maintain a healthy weight
- Get enough physical activity
- Don't smoke or use other forms of tobacco
- Limit alcohol use
- Manage your medical conditions:
  - Check your cholesterol
  - Control high blood pressure
  - Monitor your diabetes

Heart Attack

Someone experiencing a heart attack typically has pain, pressure, or discomfort in the chest. Women often do not experience pain, but may describe indigestion, weakness, or fatigue. Shortness of breath, nausea, and lightheadedness can also occur. Pain in the arms or back may be present. The skin may become pale, cool, and sweaty.

A person who has had previous heart problems is at risk for reoccurrence.

Do not try to transport someone you suspect may be having a heart attack to a hospital. Activate EMS immediately. While waiting for EMS, follow these guidelines:

- If an AED is available, have someone get it so that it's nearby.
- Allow the person to find the most comfortable position in which to breathe.
- Loosen tight clothing.
- Calm, comfort, and reassure the person.
- A person who is having a heart attack may deny it. This is a common occurrence. Accept it, but never let it alter your approach to care.
- Encourage the person to chew and swallow 1 adult (325 mg), or 2 to 4 low-dose (81 mg) "baby" aspirin.
- Do not encourage aspirin use if the person has an allergy to aspirin, evidence of a stroke, a recent bleeding problem, the pain does not appear to be related to the heart, or if you are uncertain or uncomfortable with giving the aspirin.
- Someone with a heart condition may carry a prescribed medication known as nitroglycerin. If so, assist the person in taking it.
- Be prepared for the possibility of sudden cardiac arrest, and the need for CPR and the use of an AED.

Stroke

A stroke, or brain attack, occurs when the blood supply to a portion of the brain is suddenly interrupted by a blocked or damaged blood vessel.

Signs of a stroke can vary and tend to show up quickly:

- Numbness or weakness on one side of the body
- Confusion
- Difficulty in speech
- Changes in sight and balance
- A severe, sudden headache

Medications are available at hospitals that can limit the severity of a stroke. The earlier they are given the better. Early bystander recognition, along with rapid transport to a hospital, is critical for limiting damage, or even for survival.

A simple stroke assessment, such as FAST, helps decrease the time it takes to get a person treated in a hospital.

- Face droop: Ask person to smile. Look to see if smile is uneven.
- Arm drift: Ask person to raise both arms. Look to see if one drifts back down.
- Speech difficulty: Ask person to speak a simple sentence. Listen for slurring or difficulty.
- Time to activate EMS: If person has trouble with any of these, activate EMS immediately.

Do not give anything to eat or drink. Be prepared for the possibility of sudden cardiac arrest, and the need for CPR and the use of an AED. Stay close. Calm, comfort, and reassure the person until EMS personnel take over.

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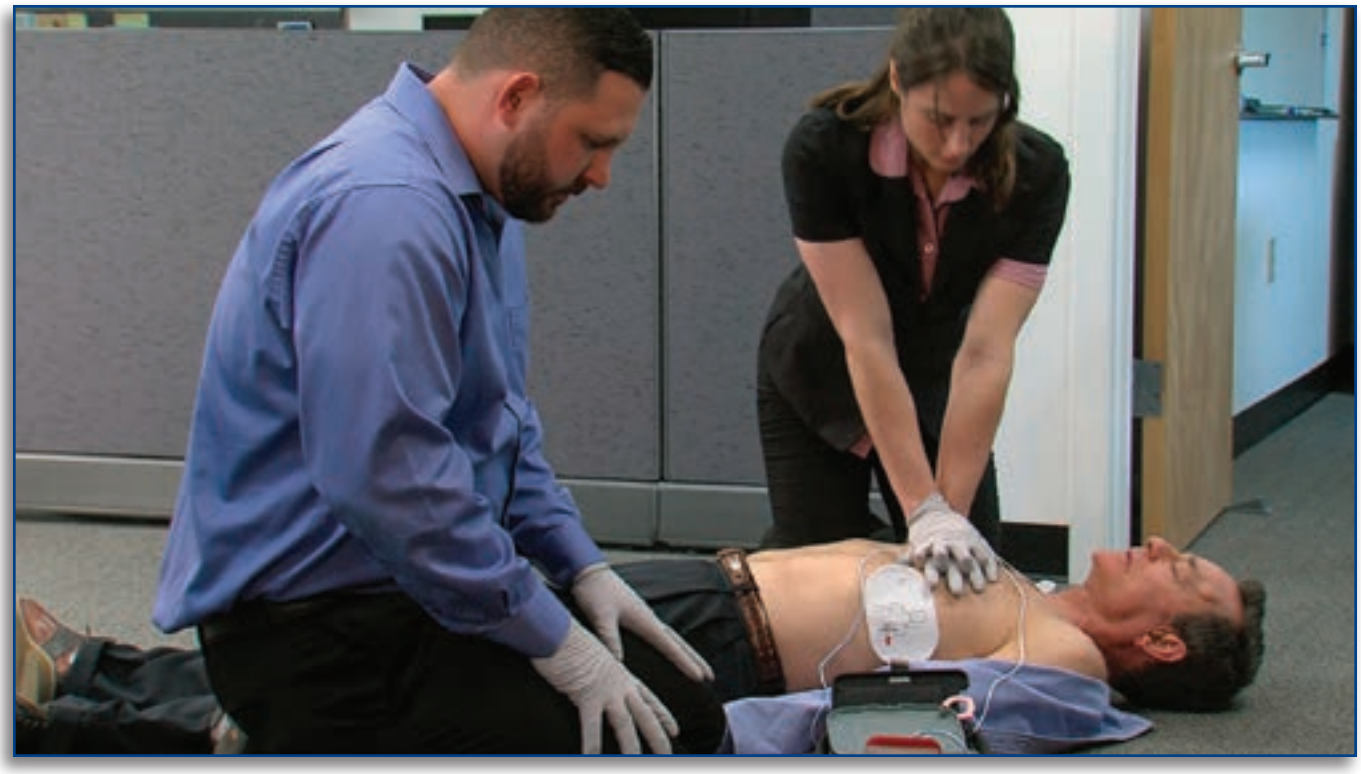
CPR and AED Provider



A CPR and AED provider is someone who has learned to perform CPR and use an AED for a suspected cardiac arrest.

A CPR and AED provider is someone trained to do the following:

- Recognize cardiac arrest
- Provide appropriate first aid care
- Make a decision to help
- Activate EMS
- Effectively perform high-quality CPR and use an AED

Recognizing an Emergency

Before helping as a trained provider, you must be able to recognize that a medical emergency exists. Often, emergency situations are unexpected events and can be confusing.

Does the person appear to be unconscious? A person who is not moving and appears to have collapsed could have experienced a sudden cardiac arrest. You could be the person's only chance for survival.

Setup

SETUP is a mnemonic device that can help you remember the important points of making sure it is safe to provide care:

- Stop — Pause to identify hazards
- Environment — Consider your surroundings
- Traffic — Be careful along roadways
- Unknown Hazards — Consider things that are not apparent
- Personal Safety — Use protective barriers

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Personal Safety

Emergency scenes can be unsafe. Your personal safety is the highest priority, even before the safety of an ill or injured person. Putting yourself in danger to help someone can make the situation worse.

Always pause for a moment before approaching. Look for obvious hazards. Consider the possibility of hidden dangers. If the scene is unsafe, do not approach. If your current location becomes unsafe, get out!

Deciding to Help

One of the most difficult decisions to make is whether or not to get involved when you think a medical emergency has occurred. It is normal to feel hesitant about your ability to help.

You might hesitate because you feel like the problem is too big for you to handle alone.

- You are only the first link in a progressive chain of emergency care. Your involvement lasts only until relieved by another provider or responding EMS personnel — in most cases, a very short period of time.

You might hesitate for fear of making things worse.

- Your training provides you with sound knowledge and skills designed only to help — and not harm — those in need.

You might hesitate because you think you don't have a lot of medical knowledge.

- Extensive medical knowledge is not necessary. CPR skills are based on common sense and simple procedures that are easy to learn and safely apply.

Finally, you might hesitate because there are others around who you think might take charge.

- In fact, others may feel the same way, resulting in no one stepping forward to help.

If it is safe to do so, take action. Put what you learn in this program to work. Your actions can help to protect or save a life.

Knowledge Check

You are on a busy street working with other employees to load a truck when one of them suddenly collapses. Another employee kneels next to her and tries to get her attention, but she does not respond. A crowd is starting to gather. You have been trained as a CPR and AED provider and think you can help, but you hesitate because you are unsure about your ability to help. What should you do?

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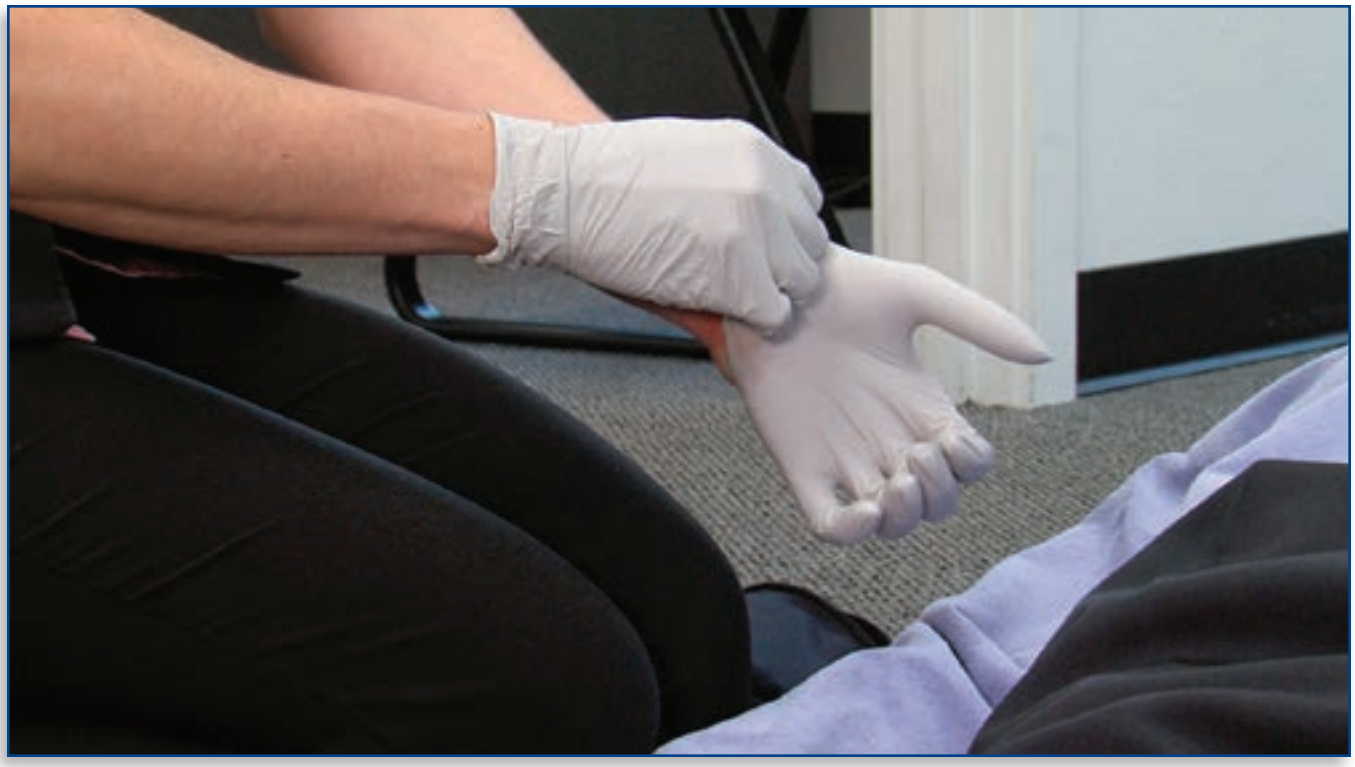
Protecting Yourself



When caring for someone, you can be exposed to blood or other potentially infectious body fluids. While the risk of contracting a disease is very low, it is wise to take simple measures to avoid exposure in the first place.

Infectious Bloodborne Diseases

Infectious bloodborne diseases and pathogens include hepatitis B, hepatitis C, and HIV, the virus that causes AIDS.

Exposure can occur through the direct contact of infectious material with an open wound or sore, or by absorption through the membranes of the mouth, nose, and eyes. Exposure can also occur through a skin puncture with a contaminated, sharp object. Immediately report any exposure to your supervisor. Follow your company's written exposure control plan for additional care and advice.

Standard Precautions

Reducing exposure lowers the chance of infection. Standard precautions is a set of protective practices used whether or not an infection is suspected. To be effective, your approach is the same for everyone, regardless of relationship or age.

OSHA Bloodborne Pathogens Standard

In 1991, the Occupational Safety and Health Administration (OSHA) released the Bloodborne Pathogens Standard to protect workers from the risk of exposure to bloodborne infectious diseases. The standard applies to anyone who has occupational exposure to blood or other potentially infectious materials and provides information on how to reduce the risk of exposure in the workplace.

Employees should review their company's exposure control plan for site-specific information on how to reduce exposure. More information can be found at www.osha.gov and www.cdc.gov.

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Personal Protective Equipment

Personal protective equipment (PPE) describes protective barriers worn to prevent exposure to infectious diseases.

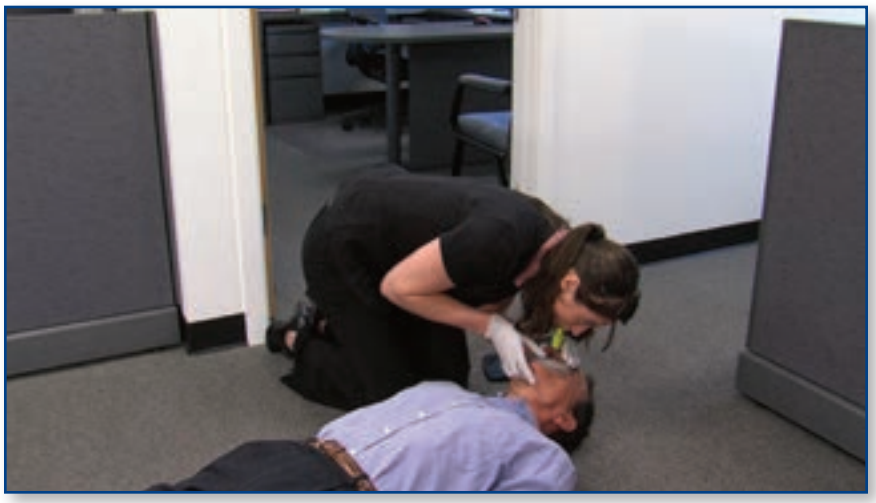
Disposable gloves are the most commonly used protective barrier. Make sure they are readily available, and always use them.

Inspect gloves for damage or tears when you put them on. If damaged, replace them immediately.

After providing care, always remove contaminated gloves carefully.

Even after using gloves, use soap and water to clean your hands and any exposed skin. Use an alcohol-based hand sanitizer if soap and water are not available.

When performing rescue breaths, use a CPR mask or overlay shield with a one-way valve as a barrier to prevent skin-to-skin contact.



Latex Allergy

Natural rubber latex allergy is a serious medical problem. Anyone who uses latex gloves frequently is at risk for developing it. Simple measures such as the use of nonpowdered latex gloves or nonlatex alternatives can stop the development of latex allergy and new cases of sensitization.[1]

Knowledge Check

True or false? You are caring for a coworker who has collapsed and is not breathing. Since she is a close friend it is not important to use personal protective equipment when doing CPR to protect yourself from possible exposure to an infectious disease.

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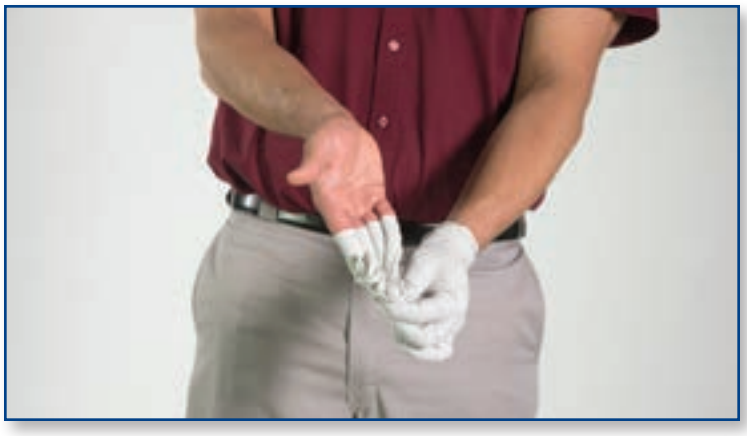
Removing Contaminated Gloves

Grasp First Glove

- After providing care, always remove contaminated gloves carefully.
- Avoiding bare skin, pinch the glove at either palm with the gloved fingers of the opposite hand.

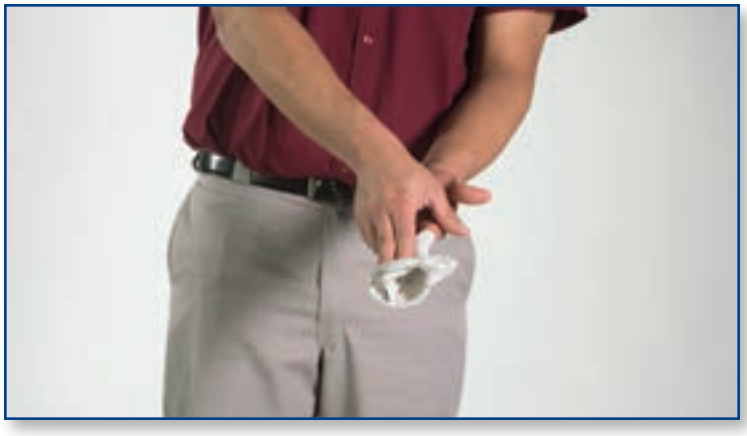


Remove Inside Out

- Gently pull the glove away from the palm and toward the fingers, turning the glove inside out without snapping.
- Gather the glove you just removed with your gloved hand.

Slide Finger under Second Glove

- Carefully slide your bare index finger inside the wrist band of the gloved hand.



Remove Inside Out

- Gently pull outwards and down, inverting the glove and trapping the first glove inside.
- Throw away gloves in an appropriate container to prevent any further contact.
- Use soap and water to clean your hands and any exposed skin. Use an alcohol-based hand sanitizer if soap and water are not available.

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Legal Considerations

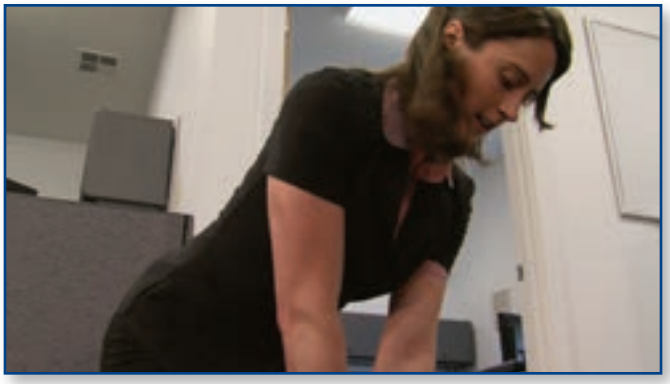
There are some basic legal considerations to be aware of as a CPR provider.

Implied Consent

When a person is unresponsive, the legal concept of implied consent assumes a person would agree to be helped given the circumstances.

Abandonment

Once care has begun, remain with the person until someone with equal or greater emergency medical training takes over. If you are alone, and unable to use a mobile phone, you may need to leave to get help. Return to the person as soon as you can.



Good Samaritan Laws

Some people fear being sued as a result of incorrectly performing care in an emergency. In almost every case, this fear is unwarranted.

All states have passed what are known as Good Samaritan laws to help encourage bystanders to assist those in need.

These laws help protect anyone who

- voluntarily provides assistance, without expecting or accepting compensation;
- is reasonable and prudent;
- does not provide care beyond the training received; and
- is not grossly negligent, or completely careless, in delivering emergency care.

Good Samaritan laws vary from state to state. Become familiar with the laws in your state and other states where you work or travel.

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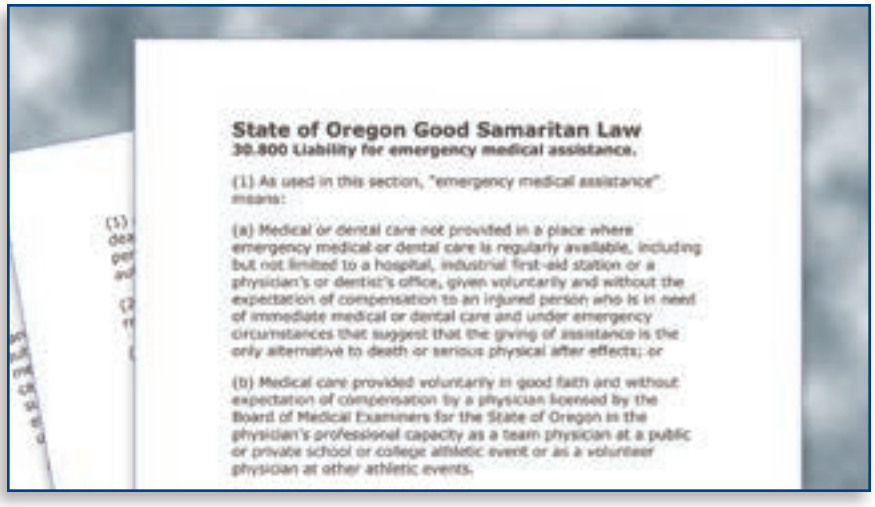
Regardless of location, it is always appropriate to use common sense:

- Activate EMS or an occupational emergency action plan (EAP) immediately.
- If the scene is unsafe, do not enter!
- Ask a responsive person for permission before giving care.
- Never attempt skills that exceed your training.
- And, once you have started, don't stop until someone with equal or greater training relieves you.



Other Legal Considerations

Duty to Act — A predetermined requirement to provide care, typically by job description (such as firefighter, police officer, or lifeguard) or by relationship (such as parent or guardian). In general, a trained person is encouraged, but not required by duty, to act.

Negligence — Occurs when someone is caused further harm due to care that did not meet the expected standard of someone with a duty to act.

Assault and Battery — Placing a person in fear of bodily harm. Forcing care on a person against his or her wishes may be considered grounds for this.

Knowledge Check

You return from your lunchbreak to your work area and discover a coworker who appears to have collapsed and does not respond to your voice or touch. You immediately begin to help. What legal concept related to providing first aid care applies in this situation?

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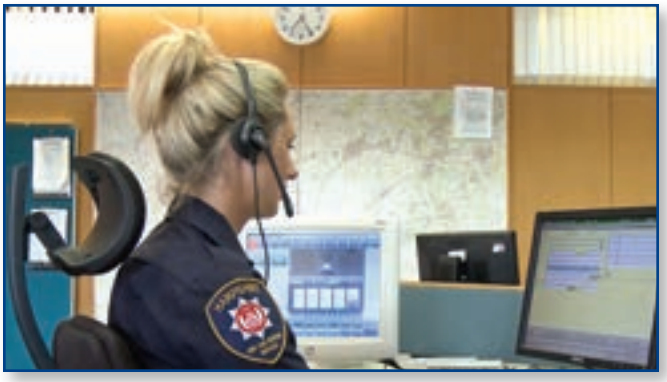
Calling for Help

An essential role of the CPR and AED provider is recognizing when additional help is needed and knowing how to get it.

Emergency Medical Services (EMS)

Emergency medical services (EMS) describes the prehospital emergency medical response system developed within a community. An EMS system uses specialized emergency communication equipment to gather information and dispatch appropriate emergency resources.



Trained EMS providers within the system respond directly to emergency scenes, provide advanced medical care, and transport ill or injured people to a hospital.

Activating the EMS system usually consists of calling an easy-to-remember emergency number, such as 911.

When you make a phone call to activate EMS, a trained dispatcher will guide you through the call. EMS dispatchers may be trained to guide you in the care you provide, especially with CPR.

The dispatcher will ask for basic information, such as the type of emergency, location, and what care is being provided. Answer questions as clearly and concisely as you can. Appropriate resources will be notified to respond while you are on the line.

The majority of emergency calls in the United States are now made on mobile phones. With a mobile phone, you can quickly activate EMS while staying in place next to the affected person. The speaker function of a phone allows you to listen to the dispatcher and provide care at the same time.

Knowledge Check

You enter a warehouse door to get to your work area and discover one of your coworkers lying motionless on the floor. He does not respond to your voice or touch. Should you activate EMS?

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Chest Compressions

External compression of the chest increases pressure inside the chest and directly compresses the heart, forcing blood to move from the chest to the lungs, brain, and the rest of the body.

Quality matters. The better you compress, the greater the influence on survival. Focus on high-quality techniques:

- Compress deeply, more than 2 inches. It is likely you will not compress deep enough. While injury could occur from deeper compressions, do not let the fear of this affect compression depth.
- Compress fast, between 100 and 120 times per minute. Do not let a higher compression speed result in shallower compression depth.
- Allow the chest wall to fully recoil, or rebound, between compressions. Avoid leaning on the chest at the top of each compression.

When compressing properly, you may hear and feel changes in the chest wall. This is normal. Forceful external chest compressions may cause chest injury, but are critical if the person is to survive. Reassess your hand positioning and continue compressions.

Children and Infants

The compression technique for children is similar to that of adults. You can use the heel of one hand on the lower half of the breastbone to compress the chest of a child. If this is difficult, or you are getting tired, use two hands to perform compressions.

Use the tips of two fingers on the breastbone, just below the nipple line, to compress the chest of an infant.

Knowledge Check

What are the 3 measures of high-quality chest compressions for an adult?

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Chest Compressions — Adults

Position Your Hands

- Position person face up on a firm, flat surface. Kneel close to chest.
- Place heel of one hand on center of chest, on lower half of breastbone.
- Place heel of your other hand on top of and parallel to first. You can interlace your fingers to keep them off chest.

Position Your Body

- Bring your body up and over chest so your shoulders are directly above your hands. Straighten your arms and lock your elbows.

Compress

- Bending at the waist, use upper body weight to push straight down at least 2 inches.
- Lift hands and allow chest to fully return to its normal position. Move immediately into downstroke of next compression.
- Avoid leaning on chest at the top of each compression.
- Continue compressions at a rate of 100–120 times per minute.

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Chest Compressions — Children and Infants

Child

Positioning

- Position child face up on a firm, flat surface. Kneel close to chest.
- Place heel of one hand on lower half of breastbone, just above point where ribs meet. Use both hands if needed.
- Bring your body up and over chest so your shoulders are directly above your hand. Straighten your arm and lock your elbow.

Compress

- Bending at waist, use upper body weight to push straight down 1/3 depth of chest, or about 2 inches.
- Lift your hand and allow chest to return fully to its normal position. Move immediately into downstroke of next compression.
- Avoid leaning on chest at top of each compression.
- Continue compressions at a rate of 100–120 times per minute.

Infant

Positioning

- Position infant face up on a firm, flat surface.
- Place 2 fingertips on breastbone just below nipple line.

Compress

- Compress at least 1/3 depth of chest, or about 1 1/2 inches.
- Lift fingers and allow chest to return fully to its normal position. Move immediately into downstroke of next compression.
- Continue compressions at a rate of 100–120 times per minute.

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Rescue Breaths

Rescue breaths are artificial breaths given to someone who is not breathing. They are given by blowing air into the mouth to inflate the lungs.

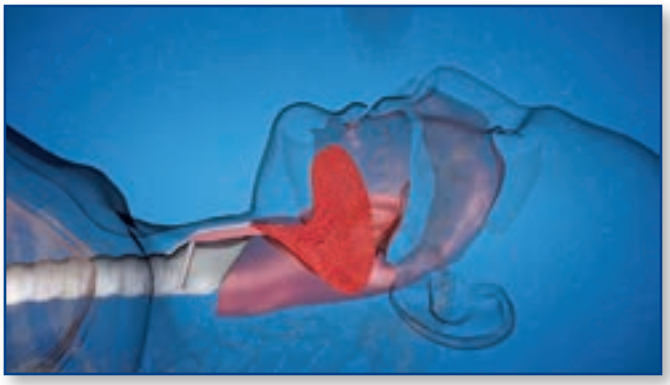
The air you breathe contains about 21% oxygen. Your exhaled air still contains between 16% and 17% oxygen. This exhaled oxygen is enough to support someone's life.

Establishing an Airway

To give rescue breaths, you need to make sure there is an open airway. The airway is the only path for getting air into the lungs.

Someone who is unresponsive can lose muscle tone. If flat on his or her back, the base of the tongue can relax and obstruct the airway. This is the most common cause of a blocked airway.

The tongue is attached to the lower jaw. Lifting the jaw forward, while keeping the mouth open, pulls the tongue away from the back of the throat and opens the airway.



You can open a person's airway by using the head tilt-chin lift technique:

- Place one hand on the forehead.
- Place the fingertips of your other hand under the bony part of the chin.
- Apply firm, backward pressure on the forehead while lifting the chin upward. This will tilt the head back and move the jaw forward.
- Avoid pressing into the soft tissue of the chin with your fingers, as this can also obstruct the airway.
- Leave the mouth slightly open.

When caring for someone who is seriously injured, establishing an open airway is a higher priority than protecting a possible injury to the spine. Without an airway, a person will not survive, regardless of illness or injury.

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Using Barrier Devices

As a trained provider, you should use a protective barrier such as a CPR mask or overlay shield when giving rescue breaths, to minimize your exposure to infectious disease.

Delivering Breaths

Each breath should be about 1 second in length and have only enough air to create a visible rise of the chest, but no more. Additional air is unnecessary.

During CPR, 2 rescue breaths are given at a time. Provide these as quickly as you can, in less than 10 seconds.

Remove your mouth and let the person exhale between breaths. Take a regular breath before delivering the second rescue breath.

If you remove your hands from the head, the airway will close again. It is necessary to open the airway each time you give rescue breaths.

If you cannot get the chest to rise with a breath, reposition the head further back by using head tilt-chin lift again, and try another breath.

When giving rescue breaths, avoid blowing too hard or too long. This reduces the quality of your care. Air can be pushed into the stomach, making additional breaths more difficult and increasing the chance of vomiting.

Children and Infants

Rescue breaths for children and infants are performed in the same manner as for adults.

If possible, use a barrier device appropriately sized for the child or infant.

Special care should be taken to not give too much air in a single breath. Provide only enough air to make the chest visibly rise, but no more.

When using an adult CPR mask to give rescue breaths to an infant, consider rotating the mask 180 degrees to get a better seal.

When using a shield or when giving rescue breaths without a barrier device, cover both the infant's mouth and nose with your mouth to make an air-tight seal.

Unprotected Rescue Breaths

A provider may elect not to use barriers, depending on his or her relationship to the person and knowledge of the person's health status. Direct mouth-to-mouth rescue breaths can be performed using the same technique as with an overlay shield.

Mouth-to-nose rescue breaths may be useful if you have difficulty with mouth-to-mouth. Tilt the head back and close the mouth when lifting the chin. Seal your mouth around the nose and blow.

Knowledge Check

What is the recommended length and volume of a rescue breath?

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Rescue Breaths — CPR Mask

Position Mask

- Inspect mask to make sure one-way valve is in place.
- Place mask flat on person's face with top of mask over bridge of nose.
- Use thumb and forefinger to provide uniform pressure around top of mask.
- Use thumb of your hand lifting chin to control bottom.

Open Airway

- Hook fingertips of hand controlling bottom of mask under bony ridge of chin.
- Tilt head and lift chin to open airway. Lift face up into mask to create an airtight seal.

Deliver Breath

- Blow through valve opening to deliver breaths.
- Each breath is 1 second in length. Give only enough air to create a visible rise of chest, but no more.
- Remove mouth and let person exhale after each breath. Take a regular breath before delivering another rescue breath.

Children and Infants

- When possible, use appropriately sized mask.
- Be careful not to give too much air.

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Rescue Breaths — CPR Shield

Position Shield

- Place breathing port of shield between teeth and into person's mouth.

Open Airway

- Place one hand across forehead.
- Hook fingertips of your other hand under bony ridge of chin.
- Tilt head and lift chin to open airway.
- Seal nose by pinching nostrils closed over or under the shield.

Deliver Breath

- Take a normal breath. Open your mouth wide. Press your mouth on shield around person's mouth to create airtight seal.
- Blow through port to deliver breath. Each breath is 1 second in length. Give only enough air to create a visible rise of chest, but no more.
- Remove your mouth and let person exhale before delivering second rescue breath.
- The same technique can be used to give direct mouth-to-mouth rescue breaths if you elect not to use a barrier device.

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Automated External Defibrillation

AED Operation

AEDs are designed to be simple to use. Voice, lights, and screen instructions guide a user in operating the device. There are many different brands of AEDs, but the same basic steps for operation apply to all.

Turn on AED

Opening the lid will turn on the power for some AEDs. With others, simply press the power button. This starts voice instructions and readies the device for use.

Adhere Defibrillation Pads to Chest

Pads must be applied to a bare chest. If needed, quickly tear away or use scissors to remove all clothing from the torso. For a woman, remove the bra to provide better access for pad placement.

Locate and pull out the defibrillation pads. The pads have pictures on them to show proper placement. Proper placement will assure that the pads are able to direct the electrical shock through the heart. Peel the pads from the backing sheet one at a time and place them as shown in the pictures. Place one pad below the right collarbone, above the nipple, and beside the breastbone. Make sure it adheres well by pressing it flat. Place the other pad lower on the left side, over the ribs, and a few inches below the armpit. Again, press firmly.

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Allow AED to Analyze Heart Rhythm

An AED automatically starts analyzing once the pads are in place. Most pads are already connected to the device. Stop CPR. Movement can interrupt the analysis. Be certain that no one is touching the person. If defibrillation is advised, the AED will begin to charge for shock delivery.

Deliver Shock if Directed to by AED

To prevent the accidental shock of a rescuer, quickly look to make sure no one, including you, is in contact with the person before delivering the shock. For most AEDs, a button is pressed to deliver the shock. Once delivered, immediately resume CPR, starting with chest compressions.

Children and Infants

Cardiac arrests involving children are likely caused by the initial loss of the airway or breathing. High-quality CPR with effective rescue breaths may be the only treatment required for successful resuscitation.

However, conditions can occur for which defibrillation of a child or infant is warranted. Most AEDs have specially designed pads or mechanisms available that reduce the defibrillation energy to a level more appropriate for a smaller body size.

The steps for using an AED on a child or infant are the same as for an adult, but the pad placement may be different.

For smaller chests, place one pad on the center of the chest just below the collarbones. Attach the second pad on the center of the back between the shoulder blades.

If an AED specifically equipped for use on a child or infant is not available, an AED configured for an adult can be used instead.

AED Troubleshooting & Considerations

AEDs are also designed to detect problems during use and guide you through corrective actions. If a troubleshooting message occurs at any time, stay calm and follow the AED's voice instructions.

When it becomes necessary to troubleshoot an AED, CPR should be provided, without interruption, until the problem is corrected or another AED becomes available. Pauses of CPR lasting longer than 10 seconds should be avoided.

If the AED indicates a problem with the pads, the pads are not completely adhered to the skin or there is a poor connection to the AED. Press pads firmly, especially in the center, to make sure they are adhering well. Make sure the pads' cable connector is firmly connected to the AED.

If the chest is wet, dry the chest before applying pads. If the chest becomes wet after the pads are applied, remove the pads and dry the chest. Apply a new set of pads, if available.

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Thick chest hair may prevent the AED pads from adhering to the skin. If chest hair is excessive, quickly shave the hair in the areas where the pads will be placed. If pads were placed over chest hair and do not adhere, pull the pads off quickly and shave the hair. Attach another set of pads, if available. Otherwise, re-apply the original pads.

Another troubleshooting message may indicate that analysis has been interrupted due to movement. Stop all sources of movement, such as chest compressions or rescue breaths.

If a message indicates the need to replace a battery, there may be only enough energy for a limited number of shocks and only a few more minutes of operation. If the AED fails to operate, the depleted battery should be removed and replaced with a new one. If a battery needs replacement during resuscitation, it should be replaced during a CPR interval.

A person should be removed from standing water before using an AED. It is okay to use an AED when a person is lying on a wet surface, such as in the rain or near a swimming pool. An AED should never be immersed in water or have fluids spilled on it.

AEDs can also be used safely on metal surfaces, such as gratings or stairwells. Make sure pads do not directly touch any metal surface.

Someone may have a surgically implanted device in the chest, such as a pacemaker or an automated internal defibrillator. A noticeable lump and surgical scar will be visible. If the implanted device is in the way of correct pad placement, place the pads so the edges are at least 1 inch away from the device.

Defibrillating over medication patches could reduce the effectiveness of the shock. If a medication patch is interfering with placement, use a gloved hand to peel off the patch and wipe away any remaining residue before placing pads.

Knowledge Check

You have been asked to respond to a meeting room with an AED. As you enter the room, you see another CPR provider performing chest compressions on a man who is lying on the floor. You kneel next to the man and lay the AED next to his head. What are the 4 basic steps you will take to use the AED on him?

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Using an AED — Adults

Perform CPR

- If person is unresponsive and not breathing, immediately perform CPR.
- Provide continuous cycles of 30 compressions and 2 rescue breaths.

When Available, Attach AED

- Turn on AED and bare person's chest.
- Peel first pad from backing and place below right collarbone, above nipple, and beside breastbone.
- Remove second pad from backing and place on left side, over ribs, and a few inches below armpit.

If Indicated, Deliver Shock

- Allow AED to analyze heart. Stop CPR. Do not touch the person.
- If shock is advised, clear everyone and press button to deliver shock.

Resume CPR

- Quickly resume CPR with chest compressions. Follow any additional voice instructions from AED.
- Continue until another provider or EMS personnel take over.
- If person responds, stop CPR and place in recovery position. Leave AED on and attached.

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Using an AED — Children and Infants

Perform CPR

- If child is unresponsive and not breathing, immediately perform CPR.
- Provide continuous cycles of 30 compressions and 2 rescue breaths.

When Available, Attach AED

- Turn on AED and bare child's chest.
- Peel first pad from backing and place in center of chest just below collarbones.
- Roll child and place second pad on center of back between shoulder blades.

If Indicated, Deliver Shock

- Allow AED to analyze heart. Stop CPR. Do not touch the child.
- If shock is advised, clear everyone and press button to deliver shock.

Resume CPR

- Quickly resume CPR with chest compressions. Follow any additional voice instructions from AED.
- Continue until another provider or EMS personnel take over.
- If child responds, stop CPR and place in recovery position. Leave AED on and attached.

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Primary Assessment — Unresponsive Person

The primary assessment is a simple way to quickly identify if a life-threatening condition is present. It is the initial approach to anyone suspected of being ill or injured.

The steps of the primary assessment are always the same:

- If it is safe to provide care, check for responsiveness.
- If unresponsive, activate EMS and get an AED, if one is available.
- Check for normal breathing.

If you determine a person is unresponsive, send a bystander to activate EMS and get an AED. If you are alone, do this yourself and quickly return to the person.

When alone with an unresponsive child or infant, provide about 2 minutes of CPR before leaving to call for EMS and get an AED.

If you have a mobile phone, use it to activate EMS. The speaker function will allow you to follow instructions from an EMS dispatcher while providing care.

To check for normal breathing, quickly look at the face and chest. Take no longer than 10 seconds. Normal breathing is effortless, quiet, and regular. If you are unsure, assume breathing is not normal.

Weak, irregular gasping, snorting, or gurgling sounds can occur early in cardiac arrest. These actions provide no usable oxygen. This is not normal breathing.

If the person is not breathing, or only gasping, perform CPR, beginning with compressions.

When an unresponsive person is breathing normally, and uninjured, place him or her in a side-lying recovery position to help protect the airway.

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Recovery Position

The recovery position helps protect the airway by using gravity to drain fluids from the mouth and keep the tongue from blocking the airway.

Frequently assess the breathing of anyone placed in the recovery position. The person's condition could quickly become worse and require additional care.

When a head, neck, or back injury is suspected, it is best to leave the person in the position found. However, if the airway is threatened, quickly roll the person as needed to clear and protect it. Keep the head, shoulders, and torso from twisting as best you can.

Always perform a primary assessment anytime you suspect someone is ill or has been injured to quickly determine the need for CPR.

Knowledge Check

A fellow employee collapses near you during a staff meeting. As a trained CPR provider, you move to help. You kneel next to him, squeeze his shoulder, and loudly ask, "Are you all right?" He is unresponsive, so you direct other employees to activate EMS and get the company's AED. You look closely at the face and chest for breathing; he makes a brief gasping snort, but then remains still. What do you do next?

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Primary Assessment — Unresponsive Person

Assess Scene

- Pause and assess scene for safety.
- If unsafe, or if it becomes unsafe at any time, GET OUT!

Check for Response

- Tap or squeeze shoulder and ask loudly, “Are you all right?”
- If unresponsive, have someone activate EMS and get an AED.

Look for Normal Breathing

- Position person face-up on a firm, flat surface.
- Look at face and chest for normal breathing. Take no longer than 10 seconds. If unsure, assume breathing is not normal.
- Weak, irregular gasping, snorting, or gurgling is not normal breathing.

Provide Indicated Care

- If person is not breathing, or only gasping, perform CPR, beginning with compressions.
- If normal breathing is found, place an uninjured person in recovery position.

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Recovery Position

Prepare

- Place arm nearest you up alongside head.
- Bring far arm across chest and place back of hand against cheek.
- Grasp far leg just above knee and pull it up so the foot is flat on ground.

Roll

- Grasping shoulder and hip, roll person toward you in a single motion, keeping head, shoulders, and body from twisting.
- Roll far enough for face to be angled toward ground.

Stabilize

- Position elbow and legs to stabilize head and body. Ensure there is no pressure on chest that restricts breathing.
- Make sure head ends up resting on extended arm and head, neck, and body are aligned.
- If person has been seriously injured, do not move unless fluids are in airway, or you need to leave to get help.

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Caring for Cardiac Arrest

Immediate, high-quality CPR and defibrillation with an AED from a bystander can double or even triple the chance of surviving sudden cardiac arrest.

Before anything else, pause and assess the scene for hazards. If the situation is dangerous to you, do not approach.

If it is safe, quickly assess for responsiveness. If unresponsive, send someone to activate EMS and get an AED If you are alone, activate EMS and get the AED yourself. Quickly return to the person..

Check for normal breathing. Do not be fooled by gasping actions. If not breathing, or only gasping, begin compressions at 100 to 120 times per minute. Remember that quality matters. Push hard and push fast. Do not lean on the chest at the top of compressions.

After 30 compressions, give 2 rescue breaths. Establish an airway first and give only enough air to see the chest rise but no more. Do this quickly, in less than 10 seconds.

Return to compressions and perform ongoing CPR cycles of 30 compressions and 2 rescue breaths. Compress hard and fast, and allow the chest to fully recoil to its normal position after each compression.

Use the AED immediately when it arrives. If another person is available to operate the AED, do not stop CPR. Continue compressions as best you can until the AED is ready to analyze the heart rhythm.

Turn on the AED and adhere the defibrillation pads to the bare chest. Allow the AED to analyze the heart. If a shock is advised, make sure no one is touching the person before delivering the shock.

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Immediately after a shock is delivered, resume CPR starting with compressions. Voice instructions and additional analysis by the AED will guide you through further care. Don't stop until the person shows signs of life, another provider or EMS personnel take over, or you are too exhausted to continue.

If a person clearly responds, stop CPR and place the person in the recovery position. Leave the AED on and attached in case cardiac arrest returns.

If a shock is not indicated by the AED, immediately resume CPR. Continue to follow the AED's instructions.

Blood pressure is created and maintained with ongoing compressions. When compressions stop, pressure is quickly lost and has to be built up again. Avoid interruptions to maintain high-quality CPR.

Performing effective chest compressions is tiring. When others can help, take turns performing CPR. Quickly switch compressors every few minutes. When possible, do this during the automatic AED analysis that occurs every 2 minutes.

Do the best you can. A person without breathing or circulation will not survive without help. Nothing you can do can make the outcome worse.

Compression-only CPR is an approach that is being widely promoted to people who are not trained in CPR.

Simple instructions in compression-only CPR can be shared in many different ways, including social media and as public service announcements. EMS dispatchers can also provide compression-only instructions during an emergency call.

However, compression-only CPR is a limited approach. At some point, rescue breaths are essential for all cardiac arrests, especially those involving an airway or breathing problem, or those involving children.

As a trained provider, perform both compressions and breaths during CPR. If you are unable or unwilling to perform rescue breaths, you should provide high-quality, uninterrupted compressions at a minimum.

Children and Infants

Performing CPR on children or infants is similar to performing CPR on an adult. Since most cardiac arrests of a child or infant is the result of the loss of an airway or breathing, an emphasis on effective rescue breaths as part of your CPR delivery is important.

When alone with an unresponsive child or infant, provide about two minutes of CPR before leaving to call for EMS and get an AED.

Special CPR Situations

Fluids in Airway — Roll person on side to quickly drain fluids. Roll without twisting, like a log. Remove any material still in mouth with a gloved finger.

Cold Environments — Handle cold people gently to prevent cardiac arrest. If body is solid, do not start CPR.

Drowning — As quickly and safely as possible, get person onto solid ground. Expect vomiting. Do not attempt to expel water using abdominal thrusts.

Serious Injury — Someone in cardiac arrest due to injury is unlikely to survive. If it is clear injury has caused arrest, do not start CPR.

Electric Shock/Lightning — Approach only if it is safe. Electric shock can cause ventricular fibrillation. When safe, perform CPR and use an AED.

Neck Breather — Provide rescue breaths through surgical opening, or stoma, in neck using CPR mask or shield.

Knowledge Check

You have responded to a store customer who collapsed. Your primary assessment indicated she was in cardiac arrest and you have started CPR. Another employee has gone to activate EMS and get an AED. Describe the basic details for performing CPR and using an AED in this situation.

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Caring for Cardiac Arrest — Adults

Assess Person

- If safe, tap or squeeze shoulder. Ask loudly, “Are you all right?”
  ***No response*!**
- Have someone activate EMS and get an AED.
- Check face and chest for normal breathing.
  Normal breathing absent!

Give 30 Compressions

- Place heel of one hand on center of chest. Place heel of other hand on top of first.
- Bring body up and over chest, using upper body weight to push down hard, at least 2 inches.
- Push fast, at a rate of 100–120 times per minute. Allow chest to fully recoil.

Give 2 Rescue Breaths

- Using a barrier device, tilt head, lift chin to open airway.
- Make chest visibly rise with each breath, but no more.
- Take a fresh breath between rescue breaths. Give breaths in less than 10 seconds
- Provide continuous cycles of 30 compressions and 2 rescue breaths.

Use an AED

- If AED becomes available, stop CPR and use it immediately. Turn AED on and follow its voice instructions.
- Deliver a shock if indicated by AED. Immediately resume CPR after a shock is delivered or no shock is advised.
- Continue until another provider or EMS personnel take over, the person shows signs of life, or you are too exhausted to continue.

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Caring for Cardiac Arrest — Children

Assess Child

- If safe, tap or squeeze the shoulder. Ask loudly, “Are you alright?”
  No response.
- Have someone activate EMS and get an AED. If alone, perform CPR for 2 minutes before doing this yourself.
- Check face and chest for normal breathing.
  Normal breathing absent!

Give 30 Compressions

- Place heel of one hand on lower half of breastbone, just above point where ribs meet. Use both hands if needed.
- Bring body up and over chest, using upper body weight to push down at least 1/3 depth of chest or about 2 inches.
- Push fast, at a rate of 100-120 times per minute. Allow chest to fully recoil.

Give 2 Rescue Breaths

- Using a barrier device, tilt head and lift chin to open airway.
- Make chest visibly rise with each breath, but no more.
- Take a fresh breath between rescue breaths. Give breaths in less than 10 seconds.
- Provide continuous cycles of 30 compressions and 2 rescue breaths.
- Continue until another provider or EMS personnel take over, the child shows signs of life, or you are too exhausted to continue.

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Caring for Cardiac Arrest — Infants

Assess Infant

- If safe, tap the foot. Yell loudly.
  No response.
- Have someone activate EMS and get an AED. If alone, perform CPR for 2 minutes before doing it yourself.
- Check face and chest for normal breathing.
  Normal breathing absent!

Give 30 Compressions

- Place 2 fingertips on breastbone just below nipple line.
- Compress at least 1/3 depth of chest, or about 1 ½ inches.
- Push fast, at a rate of 100-120 times per minute. Allow chest to fully recoil.

Give 2 Rescue Breaths

- Using a barrier device, tilt head, lift chin to open airway.
- Make chest visibly rise with each breath, but no more.
- Take a fresh breath between rescue breaths. Give breaths in less than 10 seconds.
- Provide continuous cycles of 30 compressions and 2 rescue breaths.
- Continue until another provider or EMS personnel take over, the infant shows signs of life, or you are too exhausted to continue.

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Multiple Provider Approach to CPR

Commonly more than one trained provider is available to help when cardiac arrest occurs. Providers can work together to improve performance and reduce interruptions.

CPR is tiring, and switching providers about every 2 minutes helps to maintain CPR quality. Communicate about switches ahead of time. Coordinate your actions to switch smoothly and minimize interruption time.

Prior to AED Arrival

Switch at the end of a CPR cycle while the person who is going to move out is giving rescue breaths. The new provider can get into position to start compressions. When rescue breaths are completed, immediately resume compressions.

When an AED Arrives

If another person is available to operate the AED, do not stop CPR. Continue compressions as best you can until the AED is ready to analyze the heart rhythm.

After an AED is Attached

Switch when the AED analyzes the heart. This occurs about every 2 minutes. The new CPR provider gets into position to perform compressions and the new AED provider gets in place to operate the AED. After a shock is delivered or if no shock is indicated, immediately start compressions.

When 2 providers are present, simply take turns doing CPR. Rotate extra providers in if more than 2 providers are present.

Knowledge Check

As a trained CPR provider, you respond to a situation in which CPR is already being performed for an employee who has collapsed. An AED is coming but has not yet arrived. The CPR provider looks exhausted. How would you smoothly integrate yourself to take over doing the CPR?

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Multiple Provider Approach to CPR

Consider a Switch

- CPR is tiring. When available, switch CPR providers about every 2 minutes.
- Clearly communicate switches ahead of time so everyone understands.

Prior to the Arrival of an AED

- Incoming CPR provider moves into place while outgoing provider is giving rescue breaths.
- New CPR provider immediately begins compressions when rescue breaths are completed.

When an AED Is Attached

- Switch roles when AED analyzes heart. This occurs about every 2 minutes.
- Immediately begin compressions after a shock is delivered or when AED advises no shock is indicated.

More than 2 Providers

- Rotate extra providers in if more than 2 providers are present.

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CPR Summary

	Adult	Child	Infant
Age Determination	Onset of puberty and older	1 year until onset of puberty	Less than 1 year of age.
Scene Safety?	If the scene is unsafe or at anytime becomes unsafe, GET OUT!	If the scene is unsafe or at anytime becomes unsafe, GET OUT!	If the scene is unsafe or at anytime becomes unsafe, GET OUT!
Response?	Tap shoulder, shout name.	Tap shoulder, shout name.	Tap foot, shout out.
Activate Emergency Response System/ Get an AED	Send a bystander. When alone, do it yourself immediately.	Send a bystander. When alone, perform about 2 minutes of CPR before doing it yourself.	Send a bystander. When alone, perform about 2 minutes of CPR before doing it yourself.
Breathing?	Look at face and chest for no breathing or only gasping.	Look at face and chest for no breathing or only gasping.	Look at face and chest for no breathing or only gasping.
Normal Breathing Present?	Place person in recovery position and monitor breathing.	Place child in recovery position and monitor breathing.	Place infant in recovery position and monitor breathing.
Normal Breathing Absent?	Perform CPR starting with compressions. Provide continuous cycles of 30 compressions and 2 rescue breaths.	Perform CPR starting with compressions. Provide continuous cycles of 30 compressions and 2 rescue breaths.	Perform CPR starting with compressions. Provide continuous cycles of 30 compressions and 2 rescue breaths.
Compressions	• Two hands on center of chest; lower half of breastbone • At least 2 inches in depth • Rate of 100–120 times a minute • Hard, fast, full recoil, minimize interruption	• One or two hands on lower half of breastbone • At least 1⁄3 diameter of chest or about 2 inches in depth • Rate of 100–120 times a minute • Hard, fast, full recoil, minimize interruption	• Two fingers on breastbone just below nipple line • At least 1⁄3 diameter of chest or about 1 1⁄2 inches in depth • Rate of 100–120 times a minute • Hard, fast, full recoil, minimize interruption
Rescue Breaths	• Tilt head, lift chin to open airway first • 1 second in length • Make chest visibly rise, • but no more.	• Tilt head, lift chin to open airway first • 1 second in length • Make chest visibly rise, but no more.	• Tilt head, lift chin to open airway first • 1 second in length • Make chest visibly rise, but no more.
Defibrillation with AED	• Turn on power • Attach pads • If indicated, deliver shock • Immediately resume CPR • Follow voice instructions	• Use pediatric system, if not use AED for adult • Turn on power • Attach pads • If indicated, deliver shock • Immediately resume CPR • Follow voice instructions	• Use pediatric system, if not use AED for adult • Turn on power • Attach pads • If indicated, deliver shock • Immediately resume CPR • Follow voice instructions

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Choking

Choking can occur when a solid object, such as a piece of food, or a small object, enters a narrowed part of the airway and becomes stuck. On inhalation, the object can be drawn tighter into the airway and block air from entering the lungs.

A forceful thrust beneath the ribs and up into the diaphragm can pressurize the air in the chest and pop an obstruction out of the airway. Compression of the chest over the breastbone can also create enough pressure to expel an object.

Mild Obstruction

To provide the appropriate care, you must first be able to recognize the difference between a mild blockage and a severe blockage.

With a mild blockage, a person can speak, cough, or gag. This type of blockage is typically cleared naturally through forceful coughing. Allow someone with a mild blockage to try and resolve the problem on his or her own. Stay close and be ready to take action if things worsen.

Severe Obstruction

When a severe blockage occurs, a person cannot take in enough air to dislodge the object. Signs of severe obstruction include very little or no air exchange, lack of sound, and the inability to speak or cough forcefully. The person may hold his or her hands to the throat while attempting to clear the obstruction.

A person without any air exchange requires your help to survive.

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Children and Infants

Young children are particularly at risk for choking because of the small size of their air passages, inexperience with chewing, and a natural tendency to put objects in their mouths.

For a choking child, the approach is nearly the same as for adults. It might be easier to kneel behind a choking child to deliver thrusts. Use less force on your thrusts.

Since infants do not speak, it may be more difficult to recognize choking. A sudden onset differentiates it from other breathing emergencies. Signs include weak, ineffective coughs, and the lack of sound, even when an infant is clearly attempting to breathe.

Pregnant or Obese

When someone is clearly pregnant or obese, use chest thrusts instead of abdominal thrusts. Position yourself directly behind the person. Reach under the armpits and place the thumb side of your fist on the center of the chest. Grasp your fist with your other hand and thrust straight backward. Try to not put pressure on the ribs.

Self-Care

If you are choking and alone, try pressing your abdomen quickly against a rigid surface, such as falling onto the back of a chair. If one is not available, attempt abdominal thrusts on yourself.

Knowledge Check

You are in the company cafeteria eating lunch with a coworker. He is laughing at something you said when he suddenly stops, grasps his throat with his hands, and stands up quickly. He clearly looks distressed, so you stand up next to him and ask, "Are you choking?" He is unable to answer you and completely silent. You decide to perform abdominal thrusts. Describe how to perform them.

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Choking — Adults

Assess Person

- Ask, “Are you choking?”
- If person nods yes, or is unable to speak or cough, act quickly.
- If available, have a bystander activate EMS.

Position Yourself

- Stand behind person. Reach around and locate navel.
- Make a fist with other hand and place thumb side against abdomen, just above navel and below ribs.
- Grasp fist with other hand.

Give Thrusts

- Quickly thrust inward and upward into abdomen.
- Repeat. Each thrust needs to be given with intent of expelling object.
- Continue until person can breathe normally.

If Person Becomes Unresponsive

- Carefully lower person to ground.
- If not already done, activate EMS and get an AED, if one is available.
- Begin CPR, starting with compressions.
- Look in mouth for an object before giving rescue breaths. Remove any object seen.
- Continue CPR until person shows obvious signs of life, or another provider or EMS personnel take over.

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Choking — Children

Assess Child

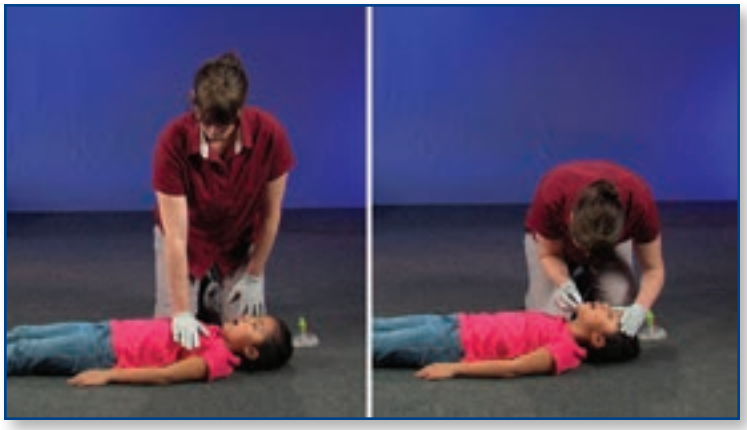
- Ask, “Are you choking?”
- If child nods yes, or is unable to speak or cough, act quickly.
- If available, have a bystander activate EMS.

Position Yourself

- If needed, kneel behind child. Reach around and locate naval.
- Make a fist with other hand and place thumb side against abdomen, just above navel and below ribs.
- Grasp fist with other hand.

Give Thrusts

- Quickly thrust inward and upward into abdomen.
- Repeat. Each thrust needs to be given with intent of expelling object.
- Continue until child can breathe normally.



If Child Becomes Unresponsive

- Carefully lower child to ground.
- If alone, provide 2 minutes of CPR before activating EMS and getting an AED.
- Begin CPR, starting with compressions.
- Look in mouth for an object before giving rescue breaths. Remove any object seen.
- Continue CPR until child shows obvious signs of life, or another provider or EMS personnel take over.

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Choking — Infants

Assess Infant

- Look at infant's face.
- If infant has weak, ineffective coughs, or lack of sound even when clearly attempting to breathe, act quickly!
- If available, have a bystander activate EMS.

Give 5 Back Blows

- Lay infant face down over your forearm with legs straddled and with head lower than the chest. Support the head by holding the jaw.
- Using heel of other hand, give 5 back blows between shoulder blades.

Give 5 Chest Thrusts

- Sandwich infant between your forearms and turn onto back.
- Place 2 fingers on breastbone just below nipple line and give 5 chest thrusts.
- Repeat back blows and chest thrusts until infant can breathe normally.

If Infant Becomes Unresponsive

- Gently place infant on firm surface.
- If alone, provide 2 minutes of CPR before activating EMS yourself.
- Begin CPR, starting with compressions.
- Look in mouth for an object before giving rescue breaths. Remove any object seen.
- Continue CPR until child shows obvious signs of life, or another provider or EMS personnel take over.

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Emotional Considerations

Caring for someone in an emergency can create emotional distress. Exposure to an extreme situation or having a close relationship with those involved can intensify these feelings.

Common reactions include the following:

- Anxiety
- Trembling or shaking
- Sweating
- Nausea
- Fast breathing
- Pounding heartbeat

This is a normal human reaction to a traumatic event. Calm yourself as best you can and acknowledge your limitations as a provider.

When an emergency is over, a provider is often left alone while an ill or injured person is quickly transported away by EMS. With limited time for closure, you can begin to experience a variety of reactions. These may include the following:

- Feeling abandoned or helpless
- Recalling the event over and over
- Self-doubt about not doing enough
- Difficulty concentrating
- Heaviness in the chest
- Upset stomach or diarrhea
- Difficulty sleeping or nightmares

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These feelings are normal and should pass with time. However, there are actions you can take to help work through the difficulty:

- Share your feelings.
- Talk with someone you trust to listen without judgment, such as a family member, friend, or coworker.
- Get back to a normal routine as soon as possible.
- Accept that it will take time to resolve these emotions.

If unpleasant feelings persist, formal assistance from a professional counselor may be helpful as you deal with your emotions about the event.

Knowledge Check

You responded and performed CPR on a coworker who collapsed. She is now being transported by EMS to a hospital. The experience was overwhelming and you have not heard the status of her condition. The experience has clearly left you shaken. You keep going over your actions in your head and wonder if you did enough. How can you help address the feelings you are having?

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Glossary

abdominal thrust
Thrusts administered to the abdomen of a responsive, choking person to dislodge an object blocking a person's airway.

acute coronary syndrome (ACS)
Often described as a heart attack, ACS occurs when there is reduced blood flow to the tissues of the heart.

airway
The passageway between mouth and lungs that allows life-sustaining oxygen into the body.

automated external defibrillator (AED)
A small, portable, computerized device that allows a minimally trained bystander to provide defibrillation much faster than EMS.

bloodborne pathogens
Infectious microorganisms in human blood that can cause disease in humans. These pathogens include, hepatitis B (HBV), hepatitis C (HCV) and human immunodeficiency virus (HIV).

cardiopulmonary resuscitation (CPR)
A combination of rescue breaths and chest compressions performed on a person experiencing cardiac arrest, intended to restore some oxygen to the brain.

chain of survival
A concept of five interdependent links (early access to EMS, early CPR, rapid defibrillation, effective advanced care, and integrated post-cardiac care) that describe the most effective approach for treating sudden cardiac arrest.

chest compression
A basic CPR skill that creates increased pressure in the chest cavity and direct compression of the heart. This forces blood to move from the chest to the lungs, brain, and rest of the body.

chest thrust
Thrusts administered on the breastbone of a responsive, choking person to dislodge an object stuck in the person's airway.

compression-only CPR
A simple, but limited, approach to treating sudden cardiac arrest that is being widely promoted to people who are not formally trained in CPR.

CPR mask
A protective barrier device used to prevent exposure to potentially infectious body fluids while performing rescue breaths on a person. The mask fits over the mouth and nose of the person and includes a one-way valve to blow through.

defibrillation
The delivery of an electrical shock through the heart intended to end chaotic electrical activity in the heart and allow the heart's normal electrical activity to return.

emergency medical services (EMS)
An emergency medical response system developed within a community, consisting of a specialized communications network and trained professional responders, all accessible through an emergency phone number such as 911.

Good Samaritan law
A law enacted to legally protect trained providers who voluntarily stop to help, act prudently, do not provide care beyond training, and are not completely careless in delivering emergency care.

head tilt-chin lift
The recommended technique to open and maintain the airway of an unresponsive person. It pulls the jaw forward and lifts the tongue away from the back of the throat.

heart attack
See acute coronary syndrome.

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implied consent

A legal concept referring to the assumption that an unresponsive person would give permission to be helped if responsive.

naloxone

A medication that can temporarily reverse the life-threatening effects of opioids. It is administered either through an auto-injector device or through an aerosol that is sprayed into the nose. Naloxone is becoming more readily available to lay providers.

overlay shield

A protective barrier device used to prevent exposure to potentially infectious body fluids while performing rescue breaths on a person. The shield lays over the face and includes a one-way valve or filter to blow through.

primary assessment

An initial approach to quickly identify if a life-threatening condition is present.

protective barrier

An item that helps reduce the risk of exposure to blood and other potentially infectious body fluids. Examples include disposable gloves, CPR masks, and face shields.

recovery position

A side-lying position in which an unresponsive breathing person is placed to drain fluids from the mouth and keep the tongue from blocking the airway.

rescue breaths

Artificial breaths given to someone who is not breathing, administered by blowing air into the mouth to inflate the lungs.

standard precautions

A consistent set of protective practices used whether or not an infection is suspected. The approach is the same for everyone, regardless of relationship or age.

sudden cardiac arrest (SCA)

The abrupt loss of the heart's ability to contract and push blood forward through the circulatory system. Typically caused by a sudden disruption of the heart's electrical system.

unresponsive

A condition in which a person does not respond to physical or verbal attempts to get a response.

ventricular fibrillation

A chaotic, quivering heart rhythm that prevents the normal contraction of the heart and the ability to pump blood.

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Sources

The ASHI CPR and AED Student Book is based upon the following standards, guidelines, and recommendations:

2015 International Consensus on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science With Treatment Recommendations. Circulation 132, suppl 1 (2015):S2–S268.

2015 International Consensus on First Aid Science With Treatment Recommendations. Circulation 132, suppl 1 (2015):S269–S311.

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ANSI/ASSE. Z490.1-2016: Criteria for Accepted Practices in Safety, Health, & Environmental Training Standard. Park Ridge, IL: ASSE, 2016.

ASTM International. F2171-02 Standard Guide for Defining the Performance of First Aid Providers in Occupational Settings. West Conshohocken, PA: ASTM International, 2009.

U.S. Occupational Safety and Health Administration. Best Practices Guide: Fundamentals of a Workplace First-Aid Program. OSHA 3317-06N. Washington DC: Department of Labor, 2006.

Endnotes

1. “Latex Allergy,” MedlinePlus Medical Encyclopedia, U.S. National Library of Medicine, last updated March 9, 2016, https://www.nlm.nih.gov/medlineplus/latexallergy.html.

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Knowledge Check Answers

Cardiac Arrest — *Page 3*

1. Early recognition of cardiac arrest and activation of EMS
2. Immediate CPR with high-quality chest compressions
3. Rapid defibrillation, or electrical shock, to the heart with an AED

CPR and AED Provider — *Page 6*

If the scene is safe, you should still help your coworker. You are only the first link in a progressive chain of emergency care. Your involvement lasts only until relieved by another provider or responding EMS personnel—in most cases, a very short period of time. Your training provides you with sound knowledge and skills designed only to help – and not harm – those in need. Extensive medical knowledge is not necessary. CPR and defibrillating, using an AED are simple and easy to provide.

Protecting Yourself — *Page 8*

False. Standard precautions is a set of protective practices used whether or not an infection is suspected.To be effective, your approach is the same for everyone, regardless of relationship or age.

Legal Considerations — *Page 11*

Implied consent, which assumes your coworker would agree to be helped given the circumstances, applies in this situation.

Calling for Help — *Page 12*

Yes. EMS activation is appropriate when someone is found to be unresponsive.

Chest Compressions — *Page 13*

1. Compress deeply, more than 2 inches
2. Compress fast, between 100 to 120 times per minute
3. Get close but do not lean on chest, and allow the chest to fully recoil

Rescue Breaths — *Page 17*

Each breath should be about 1 second in length, and only have enough air to create a visible rise of the chest, but no more. Additional air is unnecessary.

Automated External Defibrillation — *Page 22*

1. Turn on the AED.
2. Adhere defibrillation pads to bare chest.
3. Allow the AED to analyze the heart rhythm.
4. Deliver a shock if directed to by the AED.

Primary Assessment — Unresponsive Person — *Page 26*

Perform CPR immediately, starting with compressions. Irregular gasping, snorting, or gurgling sounds do not provide oxygen and do not indicate normal breathing.

Caring for Cardiac Arrest — *Page 30*

Begin CPR starting with compressions. Perform ongoing cycles of 30 chest compressions and 2 rescue breaths. Take no longer than 10 seconds to give the 2 rescue breaths. Stop CPR when the AED is attached and ready to analyze.

Multiple Provider Approach to CPR — *Page 34*

Communicate about the switch ahead of time. Coordinate your actions to switch smoothly and minimize interruption time. Prior to the arrival of an AED, switch at the end of a CPR cycle, while the person who is going to move out is giving rescue breaths.

Choking — *Page 38*

Stand behind him. Reach around and locate his navel with your finger. Make a fist with your other hand and place the thumb side against the abdomen, just above your finger and below his ribs. Grasp your fist with the other hand and give a quick inward and upward thrust to expel the obstruction. Repeat thrusts until he can breathe normally.

Emotional Considerations — *Page 43*

It is normal to feel anxious and emotional following an emergency. Try to share your feelings with someone you trust. If possible, return to your normal routine, and give yourself time to resolve your emotions about the experience. If your unpleasant feelings persist, consider seeing a professional counselor.

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Rate Your Program

This course evaluation allows you to rate the training course you have just completed. This evaluation will provide your training provider with feedback on the quality of the instruction you received.

Program Name _____ ☐ ASHI ☐ MEDIC First Aid

Instructor _____ Date of Course_____

Please rate the following course elements as indicated below. Place a check in the box that best represents your opinion of the quality of each element. *Thank you for your help.*	4–Excellent	3–Good	2–Average	1–Poor
Course Presentation				
Organization, pace, and flow	☐	☐	☐	☐
Not too basic, not too complex	☐	☐	☐	☐
Time allowed for skill practice	☐	☐	☐	☐
Increased your confidence and ability to take action	☐	☐	☐	☐
Instructor(s)				
Subject knowledge	☐	☐	☐	☐
Teaching ability (clear, concise, organized)	☐	☐	☐	☐
Demeanor (friendly, helpful, engaging)	☐	☐	☐	☐
Program Materials				
Video	☐	☐	☐	☐
PowerPoint®	☐	☐	☐	☐
Student Book	☐	☐	☐	☐
Online Training Component (if taken)	☐	☐	☐	☐
Location and Equipment				
Space	☐	☐	☐	☐
Training equipment	☐	☐	☐	☐
Self Assessment				
How would you rate your emergency care skills BEFORE taking this class?	☐	☐	☐	☐
How would you rate your emergency care skills AFTER taking this class?	☐	☐	☐	☐
How willing would you be to respond in an emergency BEFORE taking this class?	☐	☐	☐	☐
How willing would you be to respond in an emergency AFTER taking this class?	☐	☐	☐	☐
Your overall score for the course	☐	☐	☐	☐

What did you like most about this course? _____

_____

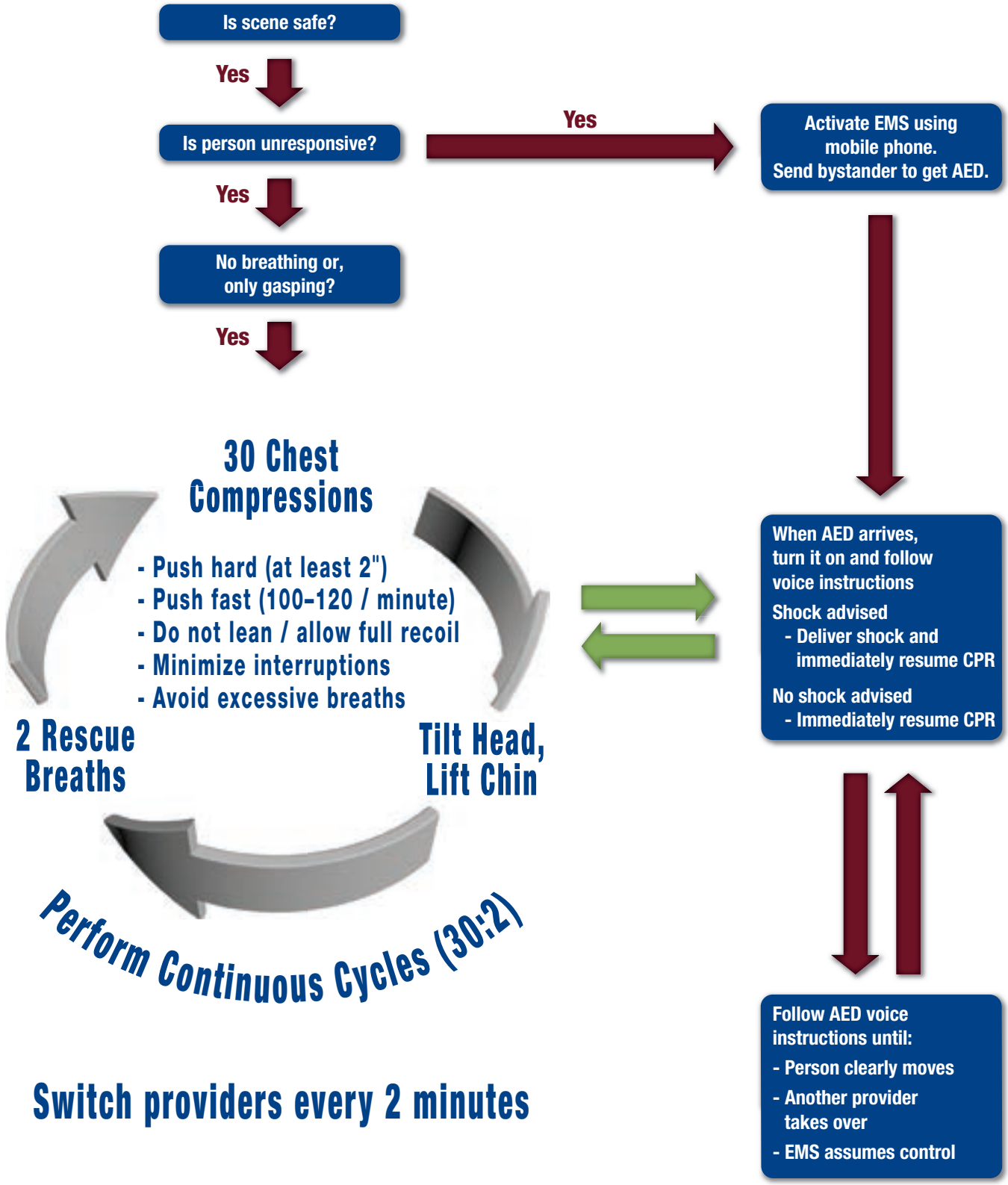
What did you like least about this course? _____

_____

Would you recommend this course to others? ☐ Yes ☐ No

Student input is an essential aspect of our ongoing quality assurance efforts. HSI requires that students be given the opportunity to evaluate their ASHI or MEDIC First Aid course using this “Rate Your Program” course evaluation form. You may also may provide feedback directly to HSI at www.hsi.com/rateyourprogram.

CPR and AED Algorithm



STUDENT BOOK

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