



**American  
Red Cross**

# CPR/AED for Professional Rescuers and Health Care Providers

**HANDBOOK**







American Red Cross  
CPR/AED for Professional Rescuers  
and Health Care Providers

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This *CPR/AED for Professional Rescuers and Health Care Providers Handbook* is part of the American Red Cross CPR/AED for Professional Rescuers and Health Care Providers program. By itself, it does not constitute complete and comprehensive training. Visit [redcross.org](http://redcross.org) to learn more about this program.

The emergency care procedures outlined in this book reflect the standard of knowledge and accepted emergency practices in the United States at the time this book was published. It is the reader's responsibility to stay informed of changes in emergency care procedures.

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# ACKNOWLEDGMENTS

This handbook is dedicated to the thousands of employees and volunteers of the American Red Cross who contribute their time and talent to supporting and teaching lifesaving skills worldwide and to the thousands of course participants and other readers who have decided to be prepared to take action when an emergency strikes.

Many individuals shared in the development and revision process in various supportive, technical and creative ways. The *American Red Cross CPR/AED for Professional Rescuers and Health Care Providers Handbook* was developed through the dedication of employees and volunteers. Their commitment to excellence made this handbook possible.

The care steps outlined within this product are consistent with the Guidelines 2010 for First Aid and the 2010 Consensus on Science for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. These treatment recommendations and related training guidelines have been reviewed by the American Red Cross Scientific Advisory Council, a panel of nationally recognized experts in fields that include emergency medicine, occupational health, sports medicine, school and public health, emergency medical services (EMS), aquatics, emergency preparedness and disaster mobilization.

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SECTION

1

**THE PROFESSIONAL RESCUER**

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# THE DUTY TO RESPOND

In many professions, there is a job-related duty to act in an emergency and provide care. Your actions are often critical and may determine whether a seriously injured or ill victim survives.

## Legal Considerations

Laws vary from state to state so you should inquire about your state's specific laws for the following legal considerations:

- **Duty to act:** The duty to respond to an emergency and provide care. Failure to fulfill these duties could result in legal action.
- **Scope of practice:** The range of duties and skills you have acquired in training that you are authorized by your certification to practice.
- **Standard of care:** The public's expectation that personnel summoned to an emergency will provide care with a certain level of knowledge and skill.
- **Negligence:** Failure to follow a reasonable standard of care, thereby causing or contributing to injury or damage.
- **Consent:** A victim's indication that a rescuer may provide care. Consent must first be obtained, either verbally or through a gesture, before providing care to an injured or ill victim. To obtain consent:
  - Identify yourself to the victim.
  - State your level of training.
  - Ask the victim whether you may help.
  - Explain what you observe.
  - Explain what you plan to do.

When an adult is unable to give consent, such as if he or she is unconscious, confused, mentally impaired, seriously injured or seriously ill, consent is implied. This means the law assumes the victim would give consent if able. For a minor, you must obtain consent from a parent or guardian. If the condition is life threatening and a parent or guardian is not present, consent is implied.

- **Refusal of care:** A victim's indication that a rescuer may not provide care. Refusal of care must be honored, even if the victim is seriously injured or ill or desperately needs assistance. A victim can refuse some or all care. If a witness is available, have the witness listen to, and document in writing, any refusal of care.
- **Advance directives:** Written instructions that describe a person's wishes regarding medical treatment or health care decisions. Guidance for advance directives, including any required identification and verification process, is documented in state, regional or local



laws, statutes and/or protocols and must be followed. Advance directives include:

- Do Not Resuscitate (DNR) orders (also called Do Not Attempt Resuscitation [DNAR] orders).
  - Living wills.
  - Durable powers of attorney.
- **Battery:** The unlawful, harmful or offensive touching of a person without the person's consent.
  - **Abandonment:** Discontinuing care once it has begun. You must continue care until someone with equal or more advanced training takes over.
  - **Confidentiality:** The principle that information learned while providing care to a victim is private and should not be shared with anyone except emergency medical services (EMS) personnel directly associated with the victim's medical care.
  - **Documentation:** An established, written record of the events that took place, the care that was provided and the facts you discovered after the incident occurred.

## PREVENTING THE SPREAD OF BLOODBORNE PATHOGENS

Bloodborne pathogens, such as bacteria and viruses, are present in blood and body fluids and can cause disease (**Table 1**).

Table 1: **Bloodborne Pathogens of Primary Concern**

| Name               | Description  | Vaccine  |
|--------------------|--|--|
| <b>Hepatitis B</b> | Liver infection caused by the hepatitis B virus  | Hepatitis B vaccination series (must be made available within 10 working days of initial assignment, after appropriate training has been completed, to all employees who have occupational exposure) |
| <b>Hepatitis C</b> | Liver disease caused by the hepatitis C virus  | None   |
| <b>HIV</b>         | Virus that causes AIDS; attacks white blood cells and destroys the body's ability to fight infection | None   |

## OSHA Regulations

Occupational Safety and Health Administration (OSHA) regulations and guidelines:

- Apply to employees who may come into contact with blood or other body fluids that could cause infection.
- Require employers to have an exposure control plan.

## Standard Precautions

Standard precautions are safety measures that combine universal precautions and body substance isolation (BSI) precautions and are based on the assumption that all body fluids may be infectious. Standard precautions can be applied through the use of:

- **Personal protective equipment (PPE).** Specialized clothing, equipment and supplies that keep you from directly contacting infected materials. PPE should be:
  - Available in your workplace.
  - Identified in the exposure control plan.
- **Good hand hygiene.** Hand washing is the most effective measure to prevent the spread of infection. Alcohol-based hand sanitizers allow you to clean your hands when soap and water are not readily available and your hands are not visibly soiled.
- **Engineering controls.** Objects used in the workplace that isolate or remove a hazard, reducing the risk for exposure.
- **Work practice controls.** Methods of working that reduce the likelihood of an exposure incident by changing the way a task is carried out (**Figure 1**).
- **Proper equipment cleaning.** After providing care, the equipment and surfaces you used should always be cleaned and disinfected or properly disposed (**Figure 2**).
- **Proper spill cleanup procedures.** If a spill occurs, appropriate measures should be taken to limit and reduce exposure to possible contaminants.



Courtesy of Terry Georgia

## Preventing Infection

To prevent infection, follow these procedures and guidelines:

- Avoid contact with blood and other body fluids.
- Use CPR breathing barriers when giving ventilations.
- Wear disposable gloves whenever providing care, particularly if you may come into contact with blood or body fluids. Also wear protective coverings, such as a mask, eyewear and a gown, if blood or other body fluids can splash.
- Use gloves that are appropriate for the task and provide an adequate barrier. Do not use disposable gloves that are discolored, torn or punctured, and do not clean or reuse disposable gloves.
- Cover any cuts, scrapes or sores and remove jewelry, including rings, before wearing disposable gloves.
- Avoid handling items such as pens, combs or portable devices when wearing soiled gloves.
- Change gloves before providing care to a different victim.
- Remove disposable gloves without contacting the soiled part of the gloves and dispose of them in a proper container.

## If an Exposure Occurs

If you are exposed, immediately take the following actions:

- Clean the contaminated area thoroughly with soap and water. Wash needlestick injuries, cuts and exposed skin.
- If splashed around the mouth or nose with blood or other body fluids, flush the area with water.
- If the eyes are involved, irrigate with clean water, saline or sterile irrigants for 20 minutes.

After any exposure incident:

- Report the exposure incident to the appropriate person identified in your employer's exposure control plan immediately and to the EMS personnel who take over care.
- Write down what happened. Include the time and date of the exposure as well as the circumstances of the exposure, any actions taken after the exposure and any other information required by your employer.
- Seek immediate follow-up care as identified in your employer's exposure control plan.

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## TAKING ACTION

In any emergency:

- Size-up the scene.
- Perform a primary assessment.
- Summon more advanced medical personnel if needed.

## Scene Size-Up

Size-up any emergency scene to determine whether the scene is safe for you, other rescuers, the victim(s) and any bystanders. When sizing up the scene:

- Use all your senses to check for hazards, such as traffic, unstable structures, downed electrical lines, swift-moving water, violence, explosions or toxic gas exposure.
- Put on the appropriate PPE.
- Determine the mechanism of injury or nature of the illness.
- Determine the number of injured or ill victims.
- Determine what additional help may be needed.
- If the scene appears unsafe, move to a safe distance, notify the appropriate personnel and wait for their arrival.

## Primary Assessment

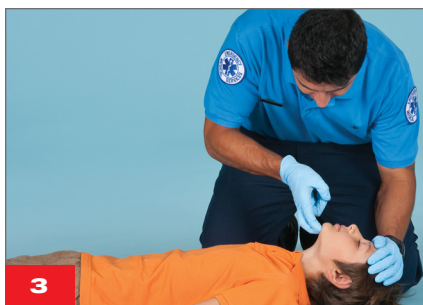
During the primary assessment, you are checking for any life-threatening conditions, including unconsciousness, absence of breathing, absence of pulse and severe bleeding.

- Check for responsiveness and, if the victim is conscious, obtain consent. If no response, summon more advanced medical personnel.
  - Note the victim's level of consciousness (LOC) using the AVPU scale.
    - **Alert:** Able to respond to questions
    - **Verbal:** Able to react to sounds, may need to be stimulated to respond
    - **Painful:** Responds to painful stimuli
    - **Unresponsive:** Does not respond to any stimuli
- Open the airway and quickly check for breathing and a definite pulse.
  - Normal (effective) breathing is regular, quiet and effortless. Isolated or infrequent gasping in the absence of other breathing in an unconscious victim may be agonal gasps, which can occur after the heart has stopped beating. Agonal gasps are not breathing. Care for the victim as though he or she is not breathing at all.
- For drowning and other victims of hypoxia and for children and infants who are more likely to experience respiratory emergencies, give 2 ventilations.
- Quickly scan for severe bleeding.

## Opening the Airway

To open the victim's airway:

- From the side, use the head-tilt/chin-lift technique.
- From above the victim's head, use the jaw-thrust (with head extension) maneuver.
- If a head, neck or spinal injury is suspected, use the jaw-thrust (without head extension) maneuver.



For a child, tilt the head slightly past a neutral position but not as far as you would for an adult (**Figure 3**). For an infant, tilt the head to a neutral position (**Figure 4**).

## ADULT, CHILD AND INFANT: AGES IN THIS GUIDE

For the purpose of the skills in this guide:

- Anyone approximately 12 years old or older is an adult.
- Anyone age 1 year to about 12 years is a child.
- An infant is anyone younger than 1 year.

However, for the purpose of operating an automated external defibrillator (AED), anyone 1 to 8 years of age or weighing less than 55 pounds is considered a child. If precise age or weight is not known, use your best judgment and do not delay care while determining age.

## Giving Ventilations—Special Situations

### Suspected Head, Neck or Spinal Injury

Suspect an injury to the head, neck or spine if the injured victim:

- Was involved in a motor-vehicle, motorcycle or bicycle crash as an occupant, rider or pedestrian.
- Was injured as a result of a fall from greater than standing height.
- Complains of neck or back pain, tingling in the extremities or weakness.
- Is not fully alert.
- Appears to be intoxicated.
- Appears frail or older than 65 years of age or is a child younger than 3 years of age.
- Has an obvious head, neck or spinal injury.

Check for the following signs and symptoms of a possible head, neck or spinal injury before you attempt to provide care:

- Changes in LOC
- Severe pain or pressure in the head, neck or spine
- Loss of balance
- Partial or complete loss of movement of any body part



- Tingling or loss of sensation in the hands, fingers, feet or toes
- Persistent headache
- Unusual bumps, bruises or depressions on the head, neck or back
- Seizures
- Blood or other fluids in the ears or nose

- External bleeding of the head, neck or back
- Impaired breathing or vision as a result of the injury
- Nausea or vomiting
- Bruising of the head, especially around the eyes and behind the ears

If you suspect an unconscious victim has a head, neck or spinal injury, take care of the airway and breathing first. Open the airway by using the jaw-thrust (without head extension) maneuver (**Figure 5**).

## Drowning Victims

Anyone who experiences respiratory impairment from submersion in water is a drowning victim. Drowning may or may not result in death. Do not enter the water unless you are specifically trained to perform in-water rescues. For an adult, a child or an infant, give 2 ventilations after you check for breathing and a pulse.

- White or pinkish foam in the airways and exuding from the mouth and nostrils can be characteristic of drowning victims. Wipe this away from the mouth and nose.
- Many victims who have been submerged vomit because water has filled the stomach or air has been forced into the stomach during ventilations.

## Vomiting

If the victim vomits when you give ventilations:

1. Quickly turn the victim onto his or her side to keep the vomit from blocking the airway and entering the lungs.
  - Support the head and neck and turn the body as a unit.
2. After vomiting stops, clear the victim's airway by wiping the mouth out using a finger sweep (**Figure 6**). Suction if necessary and you are trained to do so.
3. Turn the victim onto his or her back and continue with ventilations.



## Mouth-to-Stoma Ventilations

Keep the airway in a neutral position as you look, listen and feel for breathing with your ear over the stoma. To give ventilations, make an airtight seal with a round pediatric resuscitation mask around the stoma or the tracheostomy tube and blow into the mask.

---

## RECOVERY POSITIONS

If the victim is unconscious but breathing, leave that person in a face-up position and maintain an open airway, especially if a head, neck or spinal injury is suspected. However, there are a few situations in which a victim should be moved into a modified high arm in endangered spine (H.A.IN.E.S.) recovery position to keep the airway open and clear even if a spinal injury is suspected, including:

- If you are alone and must leave the victim (e.g., to call for help).
- If you cannot maintain an open and clear airway because of fluids or vomit.

---

## SUMMONING MORE ADVANCED MEDICAL PERSONNEL

Summon more advanced medical personnel for any of the following conditions:

- Unconsciousness or an altered LOC, such as drowsiness or confusion
- Breathing problems (e.g., trouble breathing or no breathing)
- Chest pain, discomfort or pressure lasting more than a few minutes, that goes away and comes back or that radiates to the shoulder, arm, neck, jaw, stomach or back
- Persistent abdominal pain or pressure
- Severe external bleeding (bleeding that spurts or gushes steadily from a wound)
- Vomiting blood or passing blood
- Severe (critical) burns
- Suspected poisoning
- Seizures
- Stroke (sudden weakness on one side of the face/facial droop, sudden weakness on one side of the body, sudden slurred speech or trouble getting words out, or a sudden severe headache)
- Suspected or obvious injuries to the head, neck or spine



- Painful, swollen, deformed areas (suspected broken bone) or an open fracture
- The victim's condition is not clear or is worsening

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## MOVING A VICTIM

Move an injured victim only when:

- You are faced with immediate danger.
- You must get to another victim who may have a more serious problem.
- It is necessary to provide proper care.

---

## BREATHING EMERGENCIES

Breathing problems can be identified by watching and listening to the victim's breathing and by asking how the victim feels. Because oxygen is vital to life, always ensure that the victim has an open airway and is breathing. A victim who can speak or cry is conscious, has an open airway, is breathing and has a pulse.

### Respiratory Distress

A victim who is having difficulty breathing is experiencing respiratory distress (**Figure 7**).

#### Signs and Symptoms of Respiratory Distress

- Slow or rapid breathing
- Unusually deep or shallow breathing
- Shortness of breath or noisy breathing
- Gasping for breath
- Wheezing, gurgling or high-pitched noises
- Dizziness, drowsiness or light-headedness
- Changes in LOC
- Increased heart rate
- Chest pain or discomfort
- Skin that is flushed, pale, ashen or bluish
- Unusually moist or cool skin
- Inability to speak in full sentences
- Tingling in the hands, feet or lips
- Feelings of apprehension or fear





## **Caring for Respiratory Distress**

- Maintain an open airway.
- Summon more advanced medical personnel.
- Help the victim rest in a comfortable position that makes breathing easier.
- Reassure and comfort the victim.
- Assist the victim with any of his or her prescribed medication.
- Keep the victim from becoming chilled or overheated.
- Administer emergency oxygen, if it is available and you are trained to do so.

## **Respiratory Arrest**

A victim who has stopped breathing is experiencing respiratory arrest.

### **Caring for Respiratory Arrest**

If a victim has a pulse but is not breathing, begin giving ventilations.

## **Hypoxia**

Hypoxia is a condition in which insufficient oxygen reaches the cells.

### **Causes of Hypoxia**

- An obstructed airway
- Shock
- Inadequate breathing
- Drowning
- Strangulation
- Choking
- Suffocation
- Cardiac arrest
- Head trauma
- Carbon monoxide poisoning
- Complications of general anesthesia

### **Signs and Symptoms of Hypoxia**

- Increased breathing and heart rates
- Cyanosis (a condition that develops when tissues do not get enough oxygen and turn blue, particularly in the lips and nail beds)
- Changes in LOC
- Restlessness
- Chest pain

# GIVING VENTILATIONS

Giving ventilations is a technique for breathing air into a victim to provide the oxygen necessary to survive.

Continue giving ventilations until:

- The victim begins to breathe on his or her own.
- Another trained rescuer takes over.
- More advanced medical personnel take over.
- You are too exhausted to continue.
- The victim has no pulse, in which case you should begin CPR or use an AED if one is available and ready to use.
- The scene becomes unsafe.

## AIRWAY OBSTRUCTION

Airway obstructions can be mechanical or anatomical. Any foreign body lodged in the airway is a mechanical obstruction. The most common type of anatomical airway obstruction is the tongue.

### Caring for Airway Obstructions

A conscious person who is clutching the throat is showing what is commonly called the universal sign of choking. The airway may be partially or completely obstructed. If the person is coughing, encourage continued coughing. If the person cannot cough, speak, cry or breathe, provide immediate care. Back blows and abdominal thrusts or chest thrusts are used to effectively clear an obstructed airway.

### Special Considerations for Choking

If you cannot reach far enough around the victim to give effective abdominal thrusts or if the victim is obviously pregnant or known to be pregnant, give back blows followed by chest thrusts.

To perform chest thrusts:

1. Stand behind the victim and make a fist with one hand.
2. Place the thumb side of the fist against the center of the victim's chest, or slightly higher on the victim's chest if she is pregnant.
3. Grab your fist with your other hand and give quick, inward thrusts (**Figure 8**). Look over the victim's shoulder so that his or her head does not hit your face when you perform the chest thrusts.



## Conscious Choking Victim Who Becomes Unconscious

If a conscious choking victim becomes unconscious, carefully lower the victim to the ground, open the mouth and look for an object. Continue to provide care for an unconscious choking victim.

# CARDIAC EMERGENCIES

## Heart Attack

When the muscle of the heart experiences a loss of oxygenated blood, the result is myocardial infarction (MI), or heart attack.

### Causes of Heart Attacks

Heart attacks usually result from cardiovascular disease, but other common causes include:

- Respiratory distress.
- Electrocutation.
- Traumatic injury.

Other common conditions caused by cardiovascular disease include:

- Coronary heart disease, also known as coronary artery disease.
- Stroke, also called a brain attack.

### Recognizing a Heart Attack

Heart attack pain can be confused with the pain of indigestion, muscle spasms or other conditions, often causing people to delay getting medical care. Brief, stabbing pain or pain that gets worse when bending or breathing deeply is not usually caused by a heart problem. Summon more advanced medical personnel and provide prompt care if the victim shows any of the following signs and symptoms:

- Chest discomfort or pain that is severe, lasts longer than 3 to 5 minutes, goes away and comes back, or persists even during rest (**Figure 9**)
- Discomfort, pressure or pain that is persistent and ranges from discomfort to an unbearable crushing sensation in the chest, possibly spreading to the shoulder, arm, neck, jaw, stomach or back, and usually not relieved by resting, changing position or taking medication



- Pain that comes and goes (such as angina pectoris)
- Difficulty breathing, such as at a faster rate than normal or noisy breathing
- Pale or ashen skin, especially around the face
- Sweating, especially on the face
- Dizziness or light-headedness
- Possible loss of consciousness
- Nausea or vomiting

Some individuals may show no signs at all. Women may experience different signs. The chest pain or discomfort experienced by women may be sudden, sharp but short-lived pain outside the breastbone. Women are somewhat more likely to experience some of the other warning signs, such as:

- Shortness of breath.
- Nausea or vomiting.
- Back or jaw pain.
- Unexplained fatigue or malaise.

## **Caring for a Heart Attack**

If you think someone is having a heart attack:

- Take immediate action and summon more advanced medical personnel.
- Have the victim stop any activity and rest.
- Loosen tight or uncomfortable clothing.
- Closely monitor the victim until more advanced medical personnel take over. Note any changes in the victim's appearance or behavior.
- Comfort the victim.
- Assist the victim with medication, such as nitroglycerin or aspirin, and administer emergency oxygen, if available and trained to do so.
- Be prepared to perform CPR and use an AED.

## **Administering Aspirin**

You may be able to help a conscious victim who is showing early signs of a heart attack by offering an appropriate dose of aspirin when the signs first begin, if local protocols allow or medical direction permits. Administration of aspirin should never take the place of more advanced medical care.

If the victim is conscious and able to take medicine by mouth, ask:

- Are you allergic to aspirin?
- Do you have a stomach ulcer or stomach disease?
- Are you taking any blood thinners, such as Coumadin™ or Warfarin™?
- Have you been told by a doctor not to take aspirin?

If the victim answers no to all of these questions, consider administration of two chewable (162-mg) baby aspirins, or up to one 5-grain (325-mg) adult aspirin tablet, with a small amount of water.

## The Cardiac Chain of Survival

The four links in the Cardiac Chain of Survival are:

- **Early recognition and early access to the EMS system.** The sooner someone calls 9-1-1 or the local emergency number, the sooner EMS personnel will take over.
- **Early CPR.** CPR helps supply oxygen to the brain and other vital organs. This helps keep the victim alive until an AED is used or more advanced medical care is provided.
- **Early defibrillation.** An electrical shock, called defibrillation, may help restore an effective heart rhythm.
- **Early more advanced medical care.** EMS personnel provide more advanced medical care and transport the victim to a hospital.

For each minute CPR and defibrillation are delayed, the victim's chance for survival is reduced by about 10 percent.

---

## CARDIAC ARREST

Cardiac arrest is a life-threatening emergency.

### Causes of Cardiac Arrest

- Heart attack
- Electrocution
- Respiratory arrest
- Drowning
- Other conditions

Causes of cardiac arrest in children and infants include:

- Airway and breathing problems.
- Traumatic injuries or accidents (e.g., motor-vehicle collision, drowning, electrocution or poisoning).
- A hard blow to the chest.
- Congenital heart disease.
- Sudden infant death syndrome (SIDS).

### Signs of Cardiac Arrest

- Unconsciousness
- No breathing
- No pulse

---

## CPR

Delivered in cycles of chest compressions and ventilations, CPR circulates blood that contains oxygen to the vital organs of a person whose heart and breathing have stopped. Summoning more advanced medical personnel

immediately is critical for the victim’s survival. If an AED is available, use it in combination with CPR and according to local protocols until more advanced medical personnel take over.



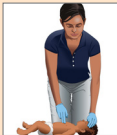
If at any time you notice an obvious sign of life, such as breathing, stop CPR and monitor the victim’s condition.

## Chest Compressions

Effective chest compressions are essential for high-quality CPR. They circulate blood to the victim’s brain and other vital organs.

The effectiveness of compressions can be increased if (**Table 2**):

- The victim is on a firm, flat surface.
- Compressions are the proper depth.
- For an adult or a child, you keep your arms as straight as possible and your shoulders directly over your hands. For an infant, you position your hand over your fingers.
- The chest fully recoils (comes all the way back up) after each compression.
- The compression rate is at least 100 per minute.
- CPR is performed without interruption. If CPR must be interrupted, do so for *only* a few seconds.

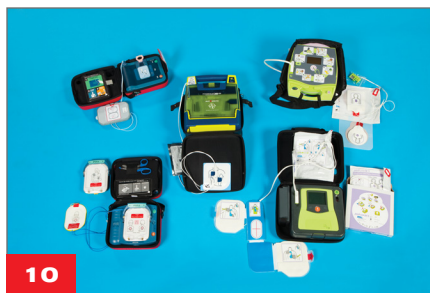
| Table 2: Summary of Techniques for Adult, Child and Infant CPR |   |   |   |
|--|---|---|---|
|  | Adult   | Child   | Infant  |
|  |      |  |                                    |
| Hand position  | Heel of one hand in center of chest (on lower half of sternum) with other hand on top |   | One hand on forehead and two or three fingers in center of chest (on lower half of sternum, just below nipple line) |
| Compression depth  | At least 2 inches   | About 2 inches  | About 1½ inches   |
| Rate   | At least 100 compressions per minute  |   |   |
| Ventilations   | Until the chest clearly rises (about 1 second per ventilation)                        |   |   |
| Cycles (one rescuer)   | 30 chest compressions and 2 ventilations  |   |   |
| Cycles (two rescuers)  | 30 chest compressions and 2 ventilations  | 15 chest compressions and 2 ventilations  |   |

## Two-Rescuer CPR

When an additional rescuer is available, perform two-rescuer CPR. One rescuer gives ventilations and the other performs chest compressions.

## AEDs

AEDs are portable electronic devices that analyze the heart's rhythm and can provide defibrillation, an electrical shock that may help the heart to re-establish an effective rhythm (**Figure 10**).



### Using an AED—Adult

When cardiac arrest occurs, use an AED as soon as it is ready to use. If CPR is in progress, continue until the AED is turned on, the AED pads are applied and the AED is ready to analyze the heart rhythm.

### Using an AED—Child or Infant

AEDs equipped with pediatric AED pads are capable of delivering lower levels of energy appropriate for infants and children up to 8 years old or weighing less than 55 pounds. Use pediatric AED pads and/or equipment, if available. If pediatric-specific equipment is not available, an AED designed for adults can be used on children and infants. Always follow local protocols, medical direction and the manufacturer's instructions.

## AED Precautions

When operating an AED, also follow these general precautions:

- Do *not* use alcohol to wipe the victim's chest dry. Alcohol is flammable.
- Do *not* touch the victim while the AED is analyzing. Touching or moving the victim may affect analysis.
- Before shocking a victim with an AED, make sure that *no one* is touching or is in contact with the victim or any resuscitation equipment.
- Do *not* touch the victim while the device is defibrillating. You or someone else could be shocked.
- Do *not* defibrillate someone when around flammable or combustible materials, such as gasoline or free-flowing oxygen.
- Do *not* use an AED in a moving vehicle. Movement may affect the analysis.
- Do *not* use an AED on a victim wearing a nitroglycerin patch or other medical patch on the chest. With a gloved hand, remove *any* patches from the chest before attaching the device. Never place AED pads directly on top of medication patches.
- Do *not* use a mobile phone or radio within 6 feet of the AED. Electromagnetic and infrared interference generated by radio signals can disrupt analysis.

## AEDs Around Water

If the victim is in water:

- Remove the victim from the water before defibrillation. A shock delivered in water could harm rescuers or bystanders.
- Be sure there are no puddles of water around you, the victim or the AED.
- Remove wet clothing to place the AED pads properly, if necessary.
- Dry the victim's chest and attach the AED pads.

If it is raining, take steps to make sure that the victim is as dry as possible and sheltered from the rain. Ensure that the victim's chest is wiped dry. Do not delay defibrillation when taking steps to create a dry environment. AEDs are very safe, even in rain and snow, when all precautions and manufacturer's operating instructions are followed. Avoid getting the AED or AED pads wet.

## Pacemakers and Implantable Cardioverter-Defibrillators

Pacemakers are small implantable devices sometimes located in the area below the right collarbone, though they can be placed elsewhere (**Figure 11**). An implantable cardioverter-defibrillator (ICD) is a miniature version of an AED.

- If the implanted device is visible or you know that the victim has one, do not place the AED pads directly over the device. This may interfere with the delivery of the shock. Adjust AED pad placement if necessary and continue to follow the AED instructions.
- If you are not sure whether the victim has an implanted device, use the AED as needed. It will not harm the victim or the rescuer.
- Follow any special precautions associated with ICDs, but do not delay performing CPR and using an AED.

## Hypothermia

Hypothermia is a life-threatening condition in which the entire body cools because its ability to keep warm fails. Some people who have experienced hypothermia have been resuscitated successfully even after prolonged exposure to the cold.

### Caring for a Victim with Hypothermia

If the victim is not breathing and does not have a pulse:

- Begin CPR until an AED becomes available.
- Follow local protocols regarding whether you should use an AED in this situation.



*Courtesy of Ted Crites*



If the victim is wet:

- Remove wet clothing, dry the victim's chest and protect the victim from further heat loss.
- Attach the AED pads.
- If a shock is indicated, deliver it, following the instructions of the AED.
- Follow local protocols regarding whether additional shocks should be delivered.
- Do not withhold CPR or defibrillation to warm the victim.
- Be careful not to unnecessarily shake a victim who has experienced hypothermia as this could result in an irregular heart rhythm.

## Chest Hair

Some men have excessive chest hair that may cause difficulty with AED pad-to-skin contact.

- Press firmly on the AED pads to attach them to the victim's chest. If you get a "Check pads" or similar message from the AED, remove the pads and replace with new ones.
- If you continue to get the "Check pads" message, remove the AED pads, carefully shave the victim's chest and attach new AED pads to the victim's chest.

## Special Situations

- **Trauma:** If a victim is experiencing cardiac arrest as a result of traumatic injuries, you may still use an AED. Administer defibrillation according to local protocols.
- **Metal surfaces:** It is safe to deliver a shock to a victim experiencing cardiac arrest on a metal surface, such as bleachers, as long as appropriate safety precautions are taken. Care should be taken that AED pads do not contact the conductive (metal) surface and that no one is touching the victim when the shock button is pushed.
- **Jewelry and body piercings:** You do *not* need to remove jewelry and body piercings when using an AED. Leaving them on the victim does no harm. However, do *not* place the AED pads directly over metallic jewelry or body piercings. Adjust AED pad placement if necessary.
- **Pregnancy:** Defibrillation shocks transfer no significant electrical current to the fetus. Follow local protocols and medical direction.
- **Other AED protocols:** Other AED protocols, such as delivering three shocks and then performing CPR, are neither wrong nor harmful to the victim. Follow the instructions of the AED device you are using.

## AED Maintenance

For defibrillators to perform properly, they must be maintained, as with any machine. AEDs require minimal maintenance, but rescuers should be familiar with the various visual and audible prompts to warn of malfunction or low battery. AEDs should be checked periodically and should have a fully charged backup battery and correct AED pads. Used accessories, including pads, should be replaced before the AED is placed back in service.

SECTION

2

**SKILL SHEETS**

## REMOVING DISPOSABLE GLOVES

**Note:** To remove gloves without spreading germs, never touch your bare skin with the outside of either glove.

### 1 PINCH GLOVE

Pinch the palm side of one glove near your wrist. Carefully pull the glove off so that it is inside out.



### 2 SLIP TWO FINGERS UNDER GLOVE

Hold the glove in the palm of your gloved hand. Slip two fingers under the glove at the wrist of the remaining gloved hand.



### 3 PULL GLOVE OFF

Pull the glove until it comes off, inside out. The first glove should end up inside the glove you just removed.



### 4 DISPOSE OF GLOVES AND WASH HANDS

After removing the gloves:

- Dispose of gloves and other personal protective equipment (PPE) in a proper biohazard container.
- Wash your hands thoroughly with soap and running water, if available. Otherwise, rub hands thoroughly with an alcohol-based hand sanitizer if hands are not visibly soiled.

## PRIMARY ASSESSMENT-ADULT

**Note:** Always follow standard precautions when providing care. Get an automated external defibrillator (AED) on the scene as soon as possible.

**Size-up the scene for safety and then:**

### 1 CHECK FOR RESPONSIVENESS

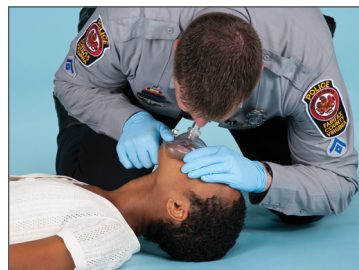
- Tap the shoulder and shout, “Are you okay?”

### 2 IF NO RESPONSE, SUMMON MORE ADVANCED MEDICAL PERSONNEL

- If face-down, roll the victim onto his or her back while supporting the head, neck and back.

### 3 OPEN THE AIRWAY AND CHECK FOR BREATHING AND A PULSE

- Check for no more than **10** seconds.
- Look, listen and feel for breathing.
- Feel for a pulse by placing two fingers in the middle of the victim’s throat then sliding them into the groove at the side of the neck closest to you. Press lightly.



**Note:** For a breathing emergency (e.g., drowning, hypoxia), give **2** ventilations prior to Step 4. If the chest does not clearly rise when giving ventilations, the airway might be blocked. Provide care for an unconscious choking victim.

### 4 QUICKLY SCAN FOR SEVERE BLEEDING



**5 PROVIDE CARE AS NEEDED**

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- If no breathing or pulse, perform CPR.
- If no breathing but there is a pulse, give **1** ventilation about every **5** seconds.
- If there is severe bleeding and the victim is breathing, provide first aid care for the bleeding.
- If unconscious but breathing, leave the victim in a face-up position and maintain an open airway. Place in a modified high arm in endangered spine (H.A.I.N.E.S.) recovery position only if you:
  - Are alone and must leave the victim (e.g., to call for help).
  - Cannot maintain an open and clear airway because of fluids or vomit.

## PRIMARY ASSESSMENT—CHILD AND INFANT

**Note:** Always follow standard precautions when providing care. Get an AED on the scene as soon as possible.

**Size-up the scene for safety and then:**

### 1 CHECK FOR RESPONSIVENESS

- Tap the shoulder and shout. For an infant, you may flick the bottom of the foot.



### 2 IF NO RESPONSE, SUMMON MORE ADVANCED MEDICAL PERSONNEL

- If face-down, roll the victim onto his or her back while supporting the head, neck and back.

### 3 OPEN THE AIRWAY AND CHECK FOR BREATHING AND A PULSE

- Check for no more than **10** seconds.
- Look, listen and feel for breathing.
- Check for a pulse.
  - For a child, place two fingers in the middle of the throat, then slide them into the groove at the side of the neck closest to you. Press lightly.
  - For an infant, place two fingers on the inside of the upper arm between the elbow and shoulder. Press lightly.



**Note:** For a witnessed sudden collapse, skip Step 4.

### 4 IF NO BREATHING, GIVE 2 VENTILATIONS

- Each ventilation should last about **1** second and make the chest clearly rise. The chest should fall before the next ventilation is given.



**Note:** If the chest does not clearly rise during Step 4, the airway might be blocked. Provide care for an unconscious choking victim.

**5 QUICKLY SCAN FOR SEVERE BLEEDING**

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**6 PROVIDE CARE AS NEEDED**

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- If no breathing or pulse, perform CPR.
- If no breathing but there is a pulse, give **1** ventilation about every **3** seconds.
- If there is severe bleeding and the victim is breathing, provide first aid care for the bleeding.
- If unconscious but breathing, leave the victim in a face-up position and maintain an open airway. Place in a modified H.A.I.N.E.S. recovery position only if you:
  - Are alone and must leave the victim (e.g., to call for help).
  - Cannot maintain an open and clear airway because of fluids or vomit.

## RECOVERY POSITIONS

**Note:** If unconscious but breathing, leave the victim in a face-up position and maintain an open airway. Place in a modified H.A.I.N.E.S. recovery position only if you:

- Are alone and must leave the victim (e.g., to call for help).
- Cannot maintain an open and clear airway because of fluids or vomit.

### Modified H.A.I.N.E.S. Recovery Position—Adult, Child and Infant

#### 1 KNEEL AT THE SIDE

#### 2 ROLL THE VICTIM AWAY FROM YOU

- Lift the arm farthest from you up next to the head, with the victim's palm facing up.
- Take the arm closest to you and place it next to his or her side.
- Bend the leg farthest from you up.
- Using your hand closest to the head, cup the base of the skull in your palm and carefully slide your forearm under the shoulder closest to you.
  - Do not lift or push the head or neck.
- Place your other hand under the arm and hip closest to you.
- Using a smooth motion, roll the victim away from you by lifting with your hand and forearm until the victim is on his or her side.
  - Keep the victim's head in contact with his or her extended arm and support the head and neck.

#### 3 PLACE THE TOP LEG ON THE OTHER WITH BOTH KNEES IN A BENT POSITION

#### 4 ALIGN THE ARM ON TOP WITH THE UPPER BODY

- If you must leave to get help, place the hand of the victim's upper arm palm side down with the fingers under the armpit of his or her extended lower arm.



#### Additional Recovery Position—Infant

1. Carefully position the infant face-down along your forearm.
2. Support the infant's head and neck with your other hand while keeping the infant's mouth and nose clear.





## GIVING VENTILATIONS

**Note:** Size-up the scene for safety, then perform a primary assessment. Always select the properly sized mask for the victim.

**If the victim is not breathing but has a pulse:**

### 1 POSITION AND SEAL THE RESUSCITATION MASK



### 2 OPEN THE AIRWAY AND BLOW INTO THE MASK

- For an adult, give **1** ventilation about every **5** seconds.
- For a child or an infant, give **1** ventilation about every **3** seconds.
- Each ventilation should last about **1** second and make the chest clearly rise. The chest should fall before the next ventilation is given.



### 3 RECHECK FOR BREATHING AND A PULSE ABOUT EVERY 2 MINUTES

- Remove the mask, then look, listen and feel for breathing and check for a pulse for no more than **10** seconds.

### 4 PROVIDE CARE AS NEEDED

- If unconscious but breathing, place in a recovery position.
- If unconscious and no breathing but there is a pulse, continue giving ventilations.
- If unconscious and no breathing or pulse, begin CPR.
- If the chest does not clearly rise, provide care for an unconscious choking victim.

## GIVING VENTILATIONS USING A BAG-VALVE-MASK RESUSCITATOR—TWO RESCUERS

**Note:** Size-up the scene for safety, then perform a primary assessment. Prepare the bag-valve-mask resuscitator (BVM) for use during the primary assessment. Always select the properly sized BVM for the victim.

**If the victim is not breathing but has a pulse:**

### 1 RESCUER 1 POSITIONS THE MASK OVER THE VICTIM'S MOUTH AND NOSE

- Kneel behind the victim's head.

### 2 RESCUER 1 SEALS THE MASK



### 3 RESCUER 1 OPENS THE AIRWAY

- Place the thumbs along each side of the mask, using the elbows for support.
- Slide the fingers behind the angles of the victim's jawbone.
- Push down on the mask with the thumbs, lift the jaw and tilt the head back.



### 4 RESCUER 2 GIVES VENTILATIONS

- Squeeze the bag slowly with both hands.
- For an adult, give 1 ventilation about every 5 seconds.
- For a child or an infant, give 1 ventilation about every 3 seconds.
- Each ventilation should last about 1 second and make the chest clearly rise. The chest should fall before the next ventilation is given.



**5 RESCUER 2 RECHECKS FOR BREATHING AND A PULSE ABOUT EVERY 2 MINUTES**

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- Remove the mask, then look, listen and feel for breathing and check for a pulse for no more than **10** seconds.

**6 PROVIDE CARE AS NEEDED**

---

- If unconscious but breathing, place in a recovery position.
- If unconscious and no breathing but there is a pulse, continue giving ventilations.
- If unconscious and no breathing or pulse, begin CPR.
- If the chest does not clearly rise, provide care for an unconscious choking victim.

## CONSCIOUS CHOKING—ADULT AND CHILD

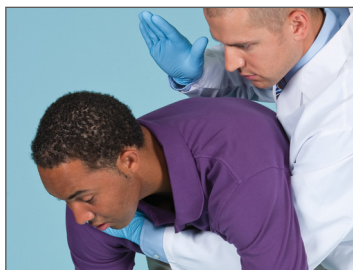
### Notes:

- *Size-up the scene for safety, obtain consent and summon more advanced medical personnel.*
- *For a child, stand or kneel behind the child, depending on the child's size. Use less force on a child than you would on an adult.*

### If the victim cannot cough, speak or breathe:

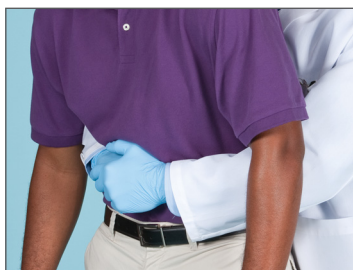
#### 1 GIVE 5 BACK BLOWS

- Place one arm across the chest and bend the victim forward at the waist.
- Firmly strike the victim between the shoulder blades with the heel of your hand.



#### 2 GIVE 5 ABDOMINAL THRUSTS

- Place the thumb side of your fist against the middle of the victim's abdomen, just above the navel.
- Grab your fist and give quick, upward thrusts.



**Continue giving 5 back blows and 5 abdominal thrusts until:**

- The object is forced out.
- The victim begins to cough forcefully or breathe.
- The victim becomes unconscious.

**If the victim becomes unconscious:**

- Carefully lower the victim to the ground and provide care for an unconscious choking victim.

**Note:** *Some conscious choking victims, including those too large to reach your arms around and those who are obviously pregnant or known to be pregnant, may require chest thrusts instead of abdominal thrusts.*

## CONSCIOUS CHOKING—INFANT

**Note:** Size-up the scene for safety, obtain consent and summon more advanced medical personnel.

**If the infant cannot cough, cry or breathe:**

### 1 CAREFULLY POSITION THE INFANT FACE-DOWN ALONG YOUR FOREARM

- Support the infant's head and neck with your hand.
- Lower the infant onto your thigh, keeping the infant's head lower than his or her chest.

### 2 GIVE 5 BACK BLOWS

- Give firm back blows with the heel of your hand between the infant's shoulder blades.



### 3 POSITION THE INFANT FACE-UP ALONG YOUR FOREARM

- Position the infant between both of your forearms, supporting the infant's head and neck.
- Turn the infant face-up.
- Lower the infant onto your thigh with the infant's head lower than his or her chest.



**4 GIVE 5 CHEST THRUSTS**

- Put two or three fingers on the center of the chest just below the nipple line and compress the chest about 1½ inches.

**Continue giving 5 back blows and 5 chest thrusts until:**

- The object is forced out.
- The infant begins to cough forcefully, cry or breathe.
- The infant becomes unconscious.

**If the infant becomes unconscious:**

- Carefully lower the infant to the ground and provide care for an unconscious choking infant.

## UNCONSCIOUS CHOKING

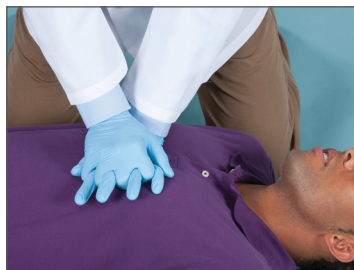
### Notes:

- Size-up the scene for safety and then perform a primary assessment.
- Ensure that the victim is on a firm, flat surface, such as the floor or a table.

**If a ventilation attempt does not make the chest clearly rise:**

### 1 RETILT THE HEAD AND GIVE ANOTHER VENTILATION

### 2 IF THE CHEST STILL DOES NOT CLEARLY RISE, GIVE 30 CHEST COMPRESSIONS



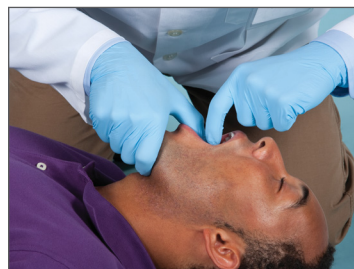
**Note:** Remove the resuscitation mask when giving chest compressions.

### 3 LOOK FOR AN OBJECT INSIDE THE MOUTH

- Grasp the tongue and lower jaw between your thumb and fingers and lift the jaw.

### 4 IF YOU SEE AN OBJECT, REMOVE IT

- Slide your finger along the inside of the cheek, using a hooking motion.
- For an infant, use your *little* finger.





**5 GIVE 2 VENTILATIONS**

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**6 PROVIDE CARE AS NEEDED**

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- If the ventilations still do not make the chest clearly rise, repeat steps 2–5.
- If the ventilations make the chest clearly rise, check for breathing and a pulse for no more than **10** seconds.
  - If unconscious but breathing, place in a recovery position.
  - If unconscious and no breathing but there is a pulse, give ventilations.
  - If unconscious and no breathing or pulse, begin CPR.

## CPR

### Notes:

- *Size-up the scene for safety, then perform a primary assessment.*
- *Ensure that the victim is on a firm, flat surface, such as the floor or a table.*

### If the victim is not breathing and has no pulse:

#### 1 GIVE 30 CHEST COMPRESSIONS

- Push hard, push fast.
  - Compress the center of the chest at least **2** inches for an adult, about **2** inches for a child and about **1½** inches for an infant at a rate of at least **100** per minute.
  - Let the chest rise completely before pushing down again.



**Note:** *Counting out loud or to yourself helps keep an even pace.*

#### 2 GIVE 2 VENTILATIONS



### **3 PERFORM CYCLES OF 30 CHEST COMPRESSIONS AND 2 VENTILATIONS**

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**Do not stop CPR except in one of these situations:**

- You see an obvious sign of life, such as breathing.
- An AED is ready to use.
- Another trained rescuer takes over.
- More advanced medical personnel take over.
- You are presented with a valid Do Not Resuscitate (DNR) order.
- You are too exhausted to continue.
- The scene becomes unsafe.

## TWO-RESCUER CPR

### Notes:

- Size-up the scene for safety, then perform a primary assessment.
- Ensure that the victim is on a firm, flat surface, such as the floor or a table.

### If the victim is not breathing and has no pulse:

#### 1 RESCUER 1 FINDS THE CORRECT HAND POSITION TO GIVE CHEST COMPRESSIONS

- For an adult or a child, place two hands in the center of the chest.
- For an infant, use the two thumbs-encircling technique on the infant's chest.
  - Place thumbs next to each other on the center of the chest just below the nipple line.
  - Place both hands underneath the infant's back and support the infant's back with your fingers.
  - Ensure that your hands do not compress or squeeze the side of the ribs.
  - If available, place a towel or padding underneath the infant's shoulders to help maintain the head in the neutral position.



#### 2 RESCUER 1 GIVES CHEST COMPRESSIONS

- Push hard, push fast.
  - Compress the center of the chest at least **2** inches for an adult, about **2** inches for a child and about **1½** inches for an infant at a rate of at least **100** per minute.
  - For an adult, give **30** chest compressions. For a child or an infant, give **15** chest compressions.

#### 3 RESCUER 2 GIVES 2 VENTILATIONS



#### 4 RESCUERS CHANGE POSITIONS ABOUT EVERY 2 MINUTES

- Rescuer 1 calls for a position change by using the word “Change” at the end of the last compression cycle:
  - For an adult, use the word “Change” in place of the word “30.”
  - For a child or an infant, use the word “change” in place of the word “15.”
- Rescuer 2 gives **2** ventilations.
- Rescuer 1 quickly moves to the victim’s head with his or her own mask while Rescuer 2 quickly moves into position at the victim’s chest.
- Changing positions should take less than **5** seconds.



#### 5 RESCUER 2 BEGINS CHEST COMPRESSIONS

- Rescuers 1 and 2 continue cycles of chest compressions and ventilations.

#### **Do not stop CPR except in one of these situations:**

- You see an obvious sign of life, such as breathing.
- An AED is ready to use.
- Another trained rescuer takes over.
- More advanced medical personnel take over.
- You are presented with a valid DNR order.
- You are too exhausted to continue.
- The scene becomes unsafe.

## USING AN AED

**Note:** Size-up the scene for safety, then perform a primary assessment.

**If the victim is not breathing and has no pulse:**

### 1 TURN ON THE AED AND FOLLOW THE VOICE AND/OR VISUAL PROMPTS

### 2 WIPE THE VICTIM'S BARE CHEST DRY

### 3 ATTACH THE AED PADS TO THE VICTIM'S BARE, DRY CHEST

- Place one pad on the upper right side of the victim's chest and the other pad on the left side of the chest.
- For a child or an infant, use pediatric AED pads if available. If the pads risk touching each other, place one pad in the middle of the chest and the other on the back, between the shoulder blades.



### 4 PLUG IN THE CONNECTOR, IF NECESSARY

### 5 STAND CLEAR

- Make sure no one, including you, is touching the victim.
  - Say, "Everyone, stand clear!"



## 6 ANALYZE THE HEART RHYTHM

- Push the “Analyze” button, if necessary. Let the AED analyze the heart rhythm.

## 7 DELIVER A SHOCK OR PERFORM CPR BASED ON THE AED RECOMMENDATION

- If a shock is advised:
  - Make sure *no one*, including you, is touching the victim.
  - Say, “Everyone, stand clear!”
  - Deliver the shock by pushing the “Shock” button, if necessary.
  - After delivering the shock, perform about **2** minutes of CPR.
  - Continue to follow the prompts of the AED.
- If no shock is advised:
  - Perform about **2** minutes of CPR.
  - Continue to follow the prompts of the AED.



### Notes:

- *If at any time you notice an obvious sign of life, such as breathing, stop CPR and monitor the victim's condition.*
- *If two trained rescuers are present, one should perform CPR while the second rescuer operates the AED.*

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# NOTES



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# NOTES

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# NOTES



## **Thank You for Participating in the CPR/AED for Professional Rescuers and Health Care Providers Program**

Designed for those with a duty to act, this course helps participants respond to breathing and cardiac emergencies in adults, children and infants. This handbook covers:

- Primary Assessment • Ventilations (includes BVM) • Choking (conscious and unconscious) • CPR (one- and two-rescuer) • AED

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**This handbook:** • Has been reviewed by the American Red Cross Scientific Advisory Council • Meets 2010 Consensus on Science for CPR and Emergency Cardiovascular Care (ECC) • Meets 2010 Guidelines for First Aid.

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