What to Do Next

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, open the mouth and look for an object.
- Continue to provide care for an unconscious choking victim.

Use chest thrusts if:

- You cannot reach far enough around the victim to give abdominal thrusts.
- The victim is obviously pregnant or known to be pregnant.

To perform chest thrusts:

1. Stand behind the victim and place the thumb side of your fist against the center of the victim's chest, or slightly higher on the victim's chest if she is pregnant.

2. Grab your fist and give quick, inward thrusts. Look over the victim's shoulder so that his or her head does not hit your face when you perform the chest thrusts.

3. Repeat until the object is forced out, the victim begins to cough forcefully or breathe, or until the victim becomes unconscious.

CONSCIOUS CHOKING—**INFANT**

Note: ***Activate the EAP; size-up the scene for safety, which includes using appropriate PPE; and obtain consent.***

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 back blows with the heel of your hand between the infant's shoulder blades.
   - Each back blow should be a distinct attempt to dislodge the object.

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.
   - Each chest thrust should be a distinct attempt to dislodge the object.

What to Do Next

Continue giving 5 back blows and 5 chest thrusts until:

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

If the infant becomes unconscious:

- Carefully lower the infant to the ground, open the mouth and look for an object.
- Continue to provide care for an unconscious choking infant.

UNCONSCIOUS CHOKING

Notes:

- ***Activate the EAP, 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 at any time the chest does *not* clearly rise:

1 Retilt the head and give another ventilation.

2 If the chest still does not clearly rise, give **30** chest compressions.

- Place the heel of one hand on the center of the chest.
- Place the other hand on top of the first hand and compress the chest **30** times.
- For an adult, compress the chest at least **2** inches.
- For a child, compress the chest about **2** inches.
- Compress at a rate of about **100** compressions per minute.

3 Look for an object inside the mouth.

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

Continued on Next Page

UNCONSCIOUS CHOKING *continued*

4 If you see an object, remove it.

- Slide your finger along the inside of the victim's cheek, using a hooking motion to sweep out the object.

5 Give **2** ventilations.

- Replace the resuscitation mask and give **2** ventilations.

What to Do Next

If at any time the chest does *not* rise:

- Repeat Steps 2–5.

If the ventilations make the chest clearly rise:

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

If unconscious but breathing, place in a recovery position:

- Leave the victim face-up and continue to monitor the victim's condition.

If unconscious and no breathing but there is a pulse:

- Give ventilations.

If unconscious and no breathing or pulse:

- Begin CPR.

Notes:

- ***Keep your fingers off the chest when giving chest compressions.***
- ***Use your body weight, not your arms, to compress the chest.***
- ***Position your shoulders over your hands with your arms as straight as possible.***

ASSEMBLING THE OXYGEN SYSTEM

Note: ***Always follow standard precautions when providing care.***

1 Check the cylinder.

- Make sure that the oxygen cylinder is labeled "U.S.P." (United States Pharmacopeia) and is marked with a yellow diamond containing the word "Oxygen."

2 Clear the valve.

- Remove the protective covering.
- Remove and save the O-ring gasket, if necessary.
- Turn the cylinder away from you and others before opening for 1 second to clear the valve of any debris.

3 Attach the regulator.

- Put the O-ring gasket into the valve on top of the cylinder, if necessary.
- Make sure that it is marked "Oxygen Regulator" and that the O-ring gasket is in place.
- Check to see that the pin index corresponds to an oxygen cylinder.
- Secure the regulator on the cylinder by placing the two metal prongs into the valve.
- Hand-tighten the screw until the regulator is snug.

4 Open the cylinder counterclockwise one full turn.

- Check the pressure gauge.
- Determine that the cylinder has enough pressure (more than 200 psi). If the pressure is lower than 200 psi, DO NOT use.

Continued on Next Page

ASSEMBLING THE OXYGEN SYSTEM *continued*

5 Attach the delivery device.

- Attach the plastic tubing between the flowmeter and the delivery device.

Note: ***When breaking down the oxygen equipment, be sure to bleed the pressure regulator by turning on the flowmeter after the cylinder has been turned off.***

ADMINISTERING EMERGENCY OXYGEN

Notes:

- ***Always follow standard precautions when providing care. Follow local protocols for using emergency oxygen.***
- ***Check the cylinder to make sure the oxygen cylinder is labeled "U.S.P." and is marked with a yellow diamond containing the word "Oxygen."***
- ***Determine that the cylinder has enough pressure (more than 200 psi). If the pressure is lower than 200 psi, DO NOT use. Assemble the cylinder, regulator and delivery device prior to delivery.***

1 Turn the unit on and adjust the flow as necessary.

- For a variable-flow-rate oxygen system, turn the flowmeter to the desired flow rate.
  - Nasal cannula: 1–6 LPM
  - Resuscitation mask: 6–15 LPM
  - Non-rebreather mask: 10–15 LPM
    - Inflate the oxygen reservoir bag to two-thirds full by placing your thumb over the one-way valve until the bag is sufficiently inflated.
  - BVM: 15 LPM or higher

2 Verify the oxygen flow.

- Listen for a hissing sound and feel for oxygen flow through the delivery device.

3 Place the delivery device on the victim and continue care until EMS personnel take over.

Note: ***When monitoring a conscious victim's oxygen saturation levels using a pulse oximeter, you may reduce the flow of oxygen and change to a lower flowing delivery device if the blood oxygen level of the victim reaches 100 percent.***

USING A MANUAL SUCTIONING DEVICE

Note: ***Follow standard precautions and then perform a primary assessment. If needed, assemble the device according to manufacturer's instructions.***

1 Position the victim.

- Roll the body as a unit onto one side.
- Open the mouth.

2 Remove any visible large debris from the mouth with a gloved finger.

Continued on Next Page

USING A MANUAL SUCTIONING DEVICE *continued*

3 Measure and check the suction tip.

- Measure from the victim's earlobe to the corner of the mouth.
- Note the distance to prevent inserting the suction tip too deeply.
- Check that the suction is working by placing your finger over the end of the suction tip as you squeeze the handle of the device.

4 Suction the mouth.

- Insert the suction tip into the back of the mouth.
- Squeeze the handle of the suction device repeatedly to provide suction.
- Apply suction as you withdraw the tip using a sweeping motion, if possible.
- Suction for *no more than 15 seconds at a time for an adult*, *10 seconds for a child* or *5 seconds for an infant*.

CHAPTER 9

Cardiac Emergencies

A cardiac emergency is life threatening. It can happen at any time to a victim of any age, on land or in the water. You may be called on to care for a victim of a cardiac emergency. This care includes performing CPR and using an automated external defibrillator (AED)—two of the links in the Cardiac Chain of Survival. By following the Cardiac Chain of Survival, you can greatly increase a victim's chance of survival.

Chapter 7 describes how to identify and give initial care for life-threatening conditions by performing a primary assessment. Chapter 8 covers how to recognize and care for breathing emergencies. This chapter covers how to provide care for cardiac emergencies, such as heart attack and cardiac arrest. ■

CARDIAC CHAIN OF SURVIVAL

To effectively respond to cardiac emergencies, it is important to understand the Cardiac Chain of Survival. The four links in the Cardiac Chain of Survival are:

- **Early recognition and early access to the emergency medical services (EMS) system.** The sooner someone calls 9-1-1 or the local emergency number, the sooner EMS personnel will arrive and 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. Defibrillation is delivered using an AED.
- **Early 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.

HEART ATTACK

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

Causes of a Heart Attack

Heart attacks usually result from cardiovascular disease. Other common causes of heart attack include respiratory distress, electrocution and traumatic injury. The most common conditions caused by cardiovascular disease include coronary heart disease (also known as coronary artery disease) and stroke.

Recognizing a Heart Attack

The sooner you recognize the signs and symptoms of a heart attack and act, the better the victim's chance of survival. 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 usually is not caused by a heart problem.

Summon EMS personnel and provide prompt care if the victim shows or reports any of the signs and symptoms listed below. Ask open-ended questions, such as "How are you feeling?" to hear the symptoms described in the victim's own words.

- Chest discomfort or pain that is severe, lasts longer than 3 to 5 minutes, goes away and comes back, or persists even during rest
- Discomfort, pressure or pain that is persistent and ranges from discomfort to an unbearable crushing sensation in the center of 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
- Nausea or vomiting
- Fatigue, lightheadedness or loss of consciousness

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 and 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 and unexplained fatigue or malaise.

Caring for a Heart Attack

If you think someone is having a heart attack:

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

You should also ask questions to get information that relates to the victim's condition, such as what happened, whether the victim has any medical conditions or is taking any medications, or when was the last time the victim had anything to eat or drink.

Administering Aspirin for a Heart Attack

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. Aspirin never should replace 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® (warfarin)?
- Have you been told by a doctor not to take aspirin?

If the victim answers "no" to all of these questions and if local protocols allow, consider administering two chewable (162-mg) baby aspirins or up to one 5-grain (325-mg) adult aspirin tablet with a small amount of water. You also may offer these doses of aspirin if you have cared for the victim and he or she has regained consciousness and is able to take the aspirin by mouth.

Be sure that you give *only* aspirin and not acetaminophen (e.g., Tylenol®) or other nonsteroidal anti-inflammatory drugs (NSAIDs), such as ibuprofen (e.g., Motrin® or Advil®) or naproxen (e.g., Aleve®). Likewise, do not offer coated aspirin products since they take too long to dissolve, or products meant for multiple symptoms, such as cold, fever and headache.

CARDIAC ARREST

Cardiac arrest is a life-threatening emergency that may be caused by a heart attack, drowning, electrocution, respiratory arrest or other conditions. Cardiac arrest occurs when the heart stops beating, or beats too irregularly or weakly to circulate blood effectively. Cardiac arrest can occur suddenly and without warning. In many cases, the victim already may be experiencing the signs and symptoms of a heart attack.

The signs of a cardiac arrest include sudden collapse, unconsciousness, no breathing and no pulse.

CPR

A victim who is unconscious, not breathing and has no pulse is in cardiac arrest and needs CPR (Figure 9-1). The objective of CPR is to perform a combination of effective chest compressions and ventilations to circulate blood that contains oxygen to the victim's brain and other vital organs. In most cases, CPR is performed in cycles of 30 chest compressions followed by 2 ventilations.

Figure 9-1

CPR is delivered in cycles of chest compressions and ventilations.

Summoning EMS personnel immediately is critical for the victim's survival. If an AED is available, it should be used in combination with CPR and according to local protocols until EMS personnel take over.

To most effectively perform compressions, place your hands in the center of the chest. Avoid pressing directly on the *xiphoid process*, the lowest point of the breastbone. Compressing the chest straight down provides the best blood flow and is also less tiring for you. Kneel at the victim's side, opposite the chest, with your hands in the correct position. Keep your arms as straight as possible, with your shoulders directly over your hands.

The effectiveness of compressions can be increased if:

- The victim is on a firm, flat surface
- Compressions are the proper depth.
- Compression rate is appropriate.
- The chest fully recoils after each compression (letting the chest come all the way back up).
- CPR is performed without interruption.

Remember that when giving ventilations to a victim, you should:

- Maintain an open airway by keeping the head tilted back in the proper position.
- Seal the mask over the victim's mouth and nose.
- Blow into the one-way valve, ensuring that you can see the chest clearly rise and fall. Each ventilation should last about 1 second, with a brief pause between breaths to let the chest fall.

After ventilations, quickly reposition your hands on the center of the chest and start another cycle of compressions and ventilations.

Table 9-1: **Summary of Techniques for CPR–Adult, Child and Infant**

	Adult	**Child**	**Infant**
Hand position	Heel of one hand in center of chest (on lower half of sternum) with the other hand on top 		Two or three fingers on the center of the chest (just below the nipple line) 
Compression depth	At least **2** inches	About **2** inches	About **1½** inches
Ventilations	Until 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	
Rate	At least 100 compressions per minute		

Once you begin CPR, do not stop. Continue CPR until:

- You see an obvious sign of life, such as breathing.
- An AED is available and ready to use.
- Another trained rescuer takes over, such as a member of your safety team.
- EMS personnel take over.
- You are too exhausted to continue.
- The scene becomes unsafe.

When performing CPR, it is not unusual for the victim's ribs to break or cartilage to separate. The victim may vomit, there may be frothing at the nose and mouth, and the scene may be chaotic. The victim also may produce agonal gasps. Remember that agonal gasps are not breathing—this victim needs CPR.

Understand that, despite your best efforts, not all victims of cardiac arrest survive.