

8 Breathing Emergencies

In a breathing emergency, a person's breathing becomes impaired, causing a potentially life-threatening situation. When air cannot travel freely and easily into the lungs, it greatly reduces the body's oxygen supply or may cut off the oxygen supply entirely. This lack of oxygen can eventually stop the heart (cardiac arrest) and, in the case of a drowning victim, prevent blood from reaching the brain and other vital organs in as little as 3 minutes after a victim submerges. Brain cell damage or death begins to occur within 4 to 6 minutes.

As a lifeguard, you may be called upon at any time to respond to a breathing emergency; therefore, it is important for you to know how to recognize and care for these emergencies.

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8-1 RECOGNIZING AND CARING FOR BREATHING EMERGENCIES

If a victim suffers a breathing emergency and is deprived of adequate oxygen, hypoxia will result. **Hypoxia** is a condition in which insufficient oxygen reaches the cells. Hypoxia may result from an obstructed airway, shock, inadequate breathing, drowning, strangulation, choking, suffocation, cardiac arrest, head trauma, carbon monoxide poisoning or anaphylactic shock.

Signs and symptoms of hypoxia can include an increased heart rate, **cyanosis** (a condition that develops when tissues do not get enough oxygen and turn bluish, particularly in the lips and nail beds), changes in the level of consciousness (LOC), restlessness and chest pain.

There are two types of breathing (also referred to as respiratory) emergencies: **respiratory distress**, a condition in which breathing becomes difficult, and **respiratory arrest**, a condition in which breathing stops. Respiratory distress can lead to **respiratory failure**, which occurs when the respiratory system is beginning to shut down, which in turn can lead to respiratory arrest.

Breathing problems can be identified by watching and listening to a victim's breathing and by asking the victim how they feel (Figure 8-1) if they are awake and alert. Because oxygen is vital to life, always ensure that the victim has an open airway and is breathing. Without an open airway, a victim cannot breathe and will die. A victim who can speak, cry or cough forcefully is responsive, has an open airway, is breathing and has a pulse.



Figure 8-1 | Watch and listen for breathing problems in a responsive victim. Ask the victim how they feel.

Respiratory Distress

A victim who is having difficulty breathing is experiencing respiratory distress.

Causes of Respiratory Distress

Respiratory distress can be caused by:

- A partially obstructed airway
- Illness
- Chronic conditions, such as asthma, emphysema and congestive heart failure
- Electrocution, including lightning strikes
- Heart attack
- Injury to the head, chest, lungs or abdomen
- Allergic reactions
- Drug overdose
- Poisoning
- Emotional distress
- Anaphylactic shock

Signs and Symptoms of Respiratory Distress

Signs and symptoms of respiratory distress include:

- Slow or rapid breathing
- Unusually deep or shallow breathing
- Shortness of breath or noisy breathing
- 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
- Gasping for breath
- Wheezing, gurgling or high-pitched noises
- Inability to speak in full sentences
- Tingling in the hands, feet or lips
- Feelings of apprehension or fear

Caring for Respiratory Distress

You do not need to know the exact cause of respiratory distress to provide initial care. When you find a victim experiencing difficulty breathing, activate the emergency action plan (EAP) and:

- Maintain an open airway.
- Summon emergency medical services (EMS) personnel.
- Help the victim to rest in a comfortable position that makes breathing easier, such as sitting and leaning slightly forward.
- Reassure and comfort the victim.
- Assist the victim with any of their prescribed medication.
- Keep the victim from getting chilled or overheated.
- Administer emergency oxygen and monitor oxygen saturation, if available and you are trained and authorized by state law to do so.

ASTHMA

Asthma is an ongoing illness in which the airways swell. An asthma attack happens when an asthma trigger, such as dust or exercise, affects the airways, causing them to suddenly swell and narrow. This makes breathing difficult, which can be frightening.

Recognizing an Asthma Attack

You can often tell when a person is having an asthma attack by the hoarse whistling sound made when inhaling and/or exhaling. This sound, known as **wheezing**, occurs because the small airways have narrowed or become obstructed.

Signs and symptoms of an asthma attack include:

- Coughing or wheezing
- Coughing that occurs after exercise, crying or laughing
- Difficulty breathing
- Shortness of breath
- Rapid, shallow breathing

- Sweating
- Tightness in the chest
- Inability to talk without stopping frequently for a breath or speaking in one- to three-word sentences
- Bent posture with shoulders elevated and lips pursed to make breathing easier
- Feelings of fear or confusion

Caring for an Asthma Attack

When someone is having trouble breathing, it is a life-threatening emergency. Assist the person with their prescribed quick-relief medication, usually an inhaler, if requested and if permitted by state or local regulations. To care for a victim of an asthma attack, follow these guidelines:

- Get the medication to them as soon as possible, and call 9-1-1 or the designated emergency number if breathing does not improve after 5 to 15 minutes or if it worsens.

ASTHMA, CONTINUED

- A metered-dose inhaler (MDI) is the most common way to deliver medication to a person having a sudden asthma attack. Different companies produce different styles of MDIs, but they all work in basically the same way.
- Use only the medication prescribed for the person and only if the person is having a severe (acute) asthma attack. Some inhalers contain long-acting preventive medication that should not be used in an emergency.
- Ensure that the prescription is in the person's name and is a quick-relief medication prescribed for acute attacks. Ensure that the expiration date of the medication has not passed. Read and follow any instructions printed on the inhaler before administering the medication to the victim.

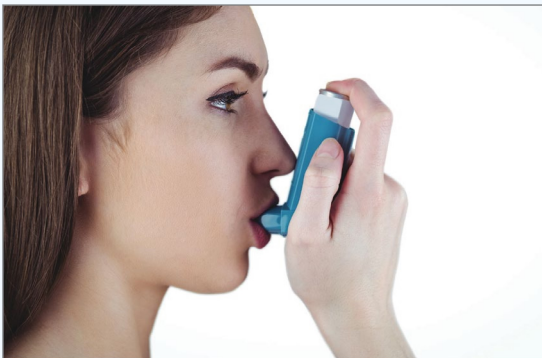


Figure 8-2 | Assist a victim with using an asthma inhaler if local protocols allow.

Once delivered, the medication can work quickly but may take as long as 5 to 15 minutes to reach full effectiveness.

To assist a person with asthma with a rescue or quick-relief inhaler, obtain consent and then follow these general guidelines, if local protocols allow (Figure 8-2):

1. Help the person sit up and rest in a position comfortable for breathing.
2. If the person has prescribed asthma medication, help them take it.
3. Shake the inhaler, and then remove the cover from the mouthpiece. Position the spacer, if the victim uses one.
4. Have the person breathe out fully through the mouth, and then place the lips tightly around the inhaler mouthpiece.
5. Have the person inhale deeply and slowly as the person (or you, if the person is unable) depresses the inhaler canister to release the medication, which they then inhale into the lungs.
6. Have the person hold their breath for a count of 10. If using a spacer, have the person take 5 to 6 deep breaths with the spacer still in the mouth, without holding the breath.
7. Monitor the person's condition.
8. If breathing does not improve after 5 to 15 minutes, or if it worsens, call 9-1-1.

Respiratory Arrest

A victim who has stopped breathing but has a pulse is in respiratory arrest.

Causes of Respiratory Arrest

Respiratory arrest may develop from respiratory distress, respiratory failure or other causes, including:

- Drowning
- Obstructed airway (choking)
- Injury to the head, chest, lungs or abdomen

- Illness, such as pneumonia
- Respiratory conditions, such as emphysema or asthma
- Congestive heart failure
- Heart attack
- Coronary heart disease (such as angina)
- Allergic reactions (food or insect stings)
- Electrocution, including lightning strikes
- Shock
- Poisoning
- Drug overdose
- Emotional distress

Caring for Respiratory Arrest

Although respiratory arrest may have many causes, you do not need to know the exact cause to provide care. Begin by following the general procedures for injury or sudden illness on land.

To determine if someone is breathing, see if the victim's chest clearly rises and falls (Figure 8-3). Listen for escaping air, and feel for air against the side of your face when simultaneously checking for breathing and a pulse during the primary assessment. You usually can observe the chest rising and falling.

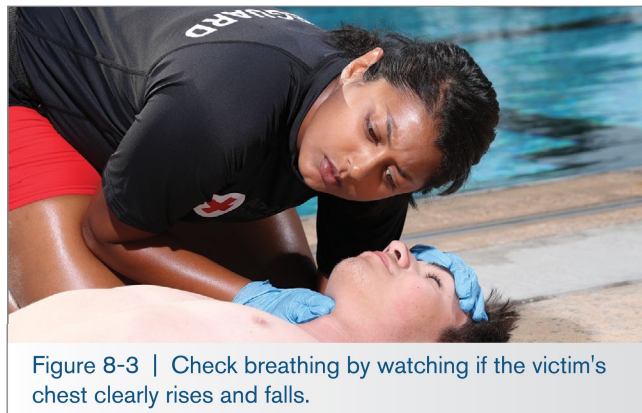


Figure 8-3 | Check breathing by watching if the victim's chest clearly rises and falls.

Normal, effective breathing is regular, quiet and effortless. The normal breathing rate for an adult is between 12 and 20 breaths per minute; however, some people breathe slightly slower or faster. In an unresponsive person, you may detect isolated or infrequent gasping in the absence of normal breathing. These are called agonal breaths. Agonal breathing is isolated or infrequent gasping that occurs in the absence of normal breathing in an unresponsive victim. These breaths can occur after the heart has stopped beating and are considered a sign of cardiac arrest. Agonal breaths are not normal breathing. If the victim is demonstrating agonal breaths, you need to begin CPR.

Drowning Victims

Anyone who experiences respiratory impairment from submersion in water is a drowning victim. Drowning may or may not result in death. Victims who have been pulled from the water and are not breathing are in immediate need of ventilations. In general, if the victim is rescued quickly enough, giving ventilations may resuscitate the victim. Without oxygen, a victim's heart will stop and death will result. Your objective is to get the victim's

mouth and nose out of the water, open the airway and give ventilations as quickly as possible.

Always ensure that victims who have been involved in a drowning incident are taken to the hospital, even if you think the danger has passed. Complications can develop as long as 72 hours after the incident and may be fatal.

OPIOID OVERDOSE

With a growing epidemic of opioid (commonly heroin, oxycodone, Fentanyl and Percoset™) overdoses in the United States, local and state departments of health have increased access to the medication naloxone (Figure 8-4), which can counteract the effects of an opioid overdose, including respiratory arrest. Naloxone (also referred to by its trade name Narcan™) has few side effects and can be administered intranasally through the nose. Trained responders should administer the drug when the victim is in respiratory arrest and an opioid overdose is

suspected. Responders should follow local medical protocols and regulations to determine the dosing and timing of naloxone administration.

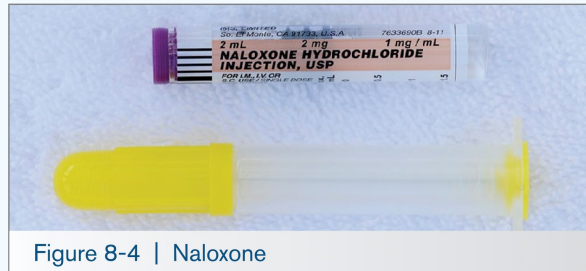


Figure 8-4 | Naloxone

8-2 GIVING VENTILATIONS

If the victim is not breathing but has a definitive pulse, the victim is in respiratory arrest. To care for a victim experiencing respiratory arrest, you must give ventilations. Giving ventilations is a technique to supply oxygen to a victim who is in respiratory arrest. Give 1 ventilation every 5 to 6 seconds for an adult, with each ventilation lasting about 1 second and making the chest rise. Give 1 ventilation about every 3 seconds for a child or infant.

When giving ventilations, it is critical to avoid over-ventilating a victim by giving ventilations at a rate and volume greater than recommended; that is, more than 1 ventilation every 5 to 6 seconds, or for longer than 1 second each.

In addition to causing gastric distension (air in the stomach) and possible vomiting, over-ventilation can lead to increased pressure in the chest and a subsequent decrease in the effectiveness of CPR.

When giving ventilations to a victim:

- Maintain an open airway by keeping the head tilted back in the proper position.
- Seal the mask over the victim's mouth and nose.

- Give ventilations (1 ventilation every 5 to 6 seconds for an adult and 1 ventilation every 3 seconds for a child or infant) for about 2 minutes, and then reassess for breathing and a pulse.
- If the victim has a pulse but is not breathing, continue giving ventilations.

When giving ventilations, if the chest does not rise after the first breath, reopen the airway, make a seal and try a second breath. If the breath is not successful, move to compressions and check the airway for an obstruction before attempting subsequent ventilations. If an obstruction is found, remove it and attempt ventilations. However, never perform a blind finger sweep.

Continue giving ventilations until:

- The victim begins to breathe on their 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 and use an AED if one is available and ready to use.
- The scene becomes unsafe.

For more details, see Table 8-2.

CPR Breathing Barriers

CPR breathing barriers create a barrier between your mouth and the victim's mouth and nose. This barrier can help prevent contact with a victim's blood, vomitus and saliva, and from breathing the air that the victim exhales when giving ventilations or performing CPR. CPR breathing barriers include resuscitation masks and bag-valve-mask (BVM) resuscitators. A resuscitation mask should be in your hip pack.

Resuscitation Masks

A resuscitation mask allows you to breathe air (with or without emergency oxygen) into a victim without making mouth-to-mouth contact (Figure 8-5, A-C).

Resuscitation masks have several benefits. They help to get air quickly to the victim through both the mouth and nose; create a seal over the victim's mouth and nose; can be connected to emergency oxygen, if equipped with an oxygen inlet; and protect against potential disease transmission.

A resuscitation mask should:

- Be easy to assemble and use.
- Be made of transparent, pliable material that allows you to make a tight seal over the victim's mouth and nose.
- Have a one-way valve for releasing exhaled air.
- Have a standard 15- or 22-mm coupling assembly (the size of the opening for the one-way valve).
- Have an inlet for delivering emergency oxygen, if facility protocols include administering emergency oxygen.
- Perform well under different environmental conditions, such as in water or under extreme temperatures.

When using a resuscitation mask, make sure to use one that matches the size of the victim. For example, use an adult resuscitation mask for an adult victim and an infant resuscitation mask for an infant. Also, ensure that you position and seal the mask properly before blowing into the mask.

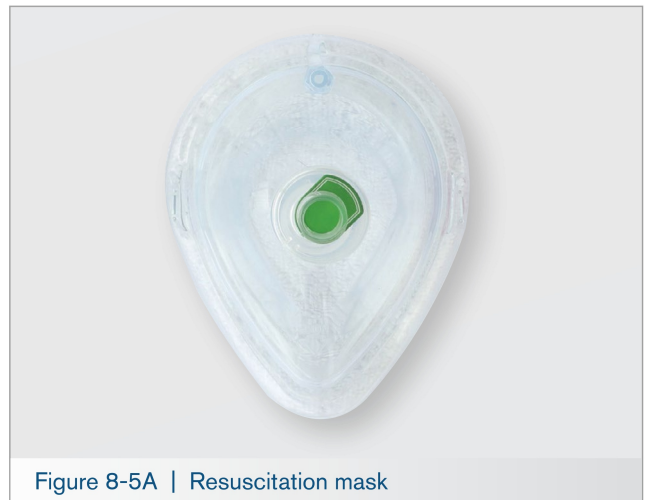


Figure 8-5A | Resuscitation mask



Figure 8-5B | Pediatric resuscitation mask



Figure 8-5C | Resuscitation mask

Bag-Valve-Mask Resuscitators

A BVM resuscitator is a handheld device used to administer a higher concentration of oxygen than a pocket mask. BVMs are operated by two responders in a multiple-responder situation. A BVM has three parts: a bag, a valve and a mask. By placing the mask over the victim's mouth and nose and squeezing the bag, you open the one-way valve, forcing air into the victim's lungs. When you release the bag, the valve closes and air from the surrounding environment refills the bag. Because it is necessary to maintain a tight seal on the mask, two rescuers should operate a BVM (one rescuer positions and seals the mask while



Figure 8-6 | BVMs come in a variety of sizes for use with adults, children and infants.

the second rescuer squeezes the bag). BVMs have several advantages, in that they:

- Increase oxygen levels in the blood by using the air in the surrounding environment instead of the air exhaled by a rescuer.
- Can be connected to emergency oxygen.
- Are more effective for giving ventilations than a resuscitation mask when used correctly by two rescuers.
- Protect against disease transmission and inhalation hazards if the victim has been exposed to a hazardous gas.
- May be used with advanced airway adjuncts.

BVMs come in various sizes to fit adults, children and infants (Figure 8-6); you should use the appropriately sized BVM for the size of the victim. Using an adult BVM on an infant has the potential to cause harm and should **not** be used unless a pediatric BVM is unavailable and more advanced medical personnel advise you to do so.

ANAPHYLAXIS

Anaphylactic shock, also known as **anaphylaxis**, is a severe allergic reaction that can cause difficulty breathing, as air passages swell and restrict airflow in and out of the victim's lungs and airways. Anaphylaxis can also cause other responses, such as a combination of shock, swelling and skin reactions. In susceptible people, triggers can include insect bites or stings, certain foods (like peanuts, tree nuts, shellfish, milk, eggs, soy and wheat), animal dander, plant pollen, certain medications (like penicillin and sulfa drugs), latex and chemicals.

Anaphylactic shock is a life-threatening condition and requires immediate care. A person who is experiencing anaphylaxis may develop one or more of the signs and symptoms within seconds or minutes of coming into contact with the allergen. Anyone at risk should wear a medical identification tag, bracelet or necklace and have an epinephrine auto-injector readily available.

Recognizing Anaphylaxis

Some possible signs and symptoms of anaphylaxis include:

- Trouble breathing
- Swelling of the face, neck, tongue or lips
- A feeling of tightness in the chest or throat
- Skin reactions (such as hives, itchiness or flushing)
- Stomach cramps, nausea, vomiting or diarrhea
- Dizziness
- Loss of consciousness
- Signs and symptoms of shock (such as excessive thirst; skin that feels cool or moist and looks pale or bluish; an altered level of consciousness and a rapid, weak heartbeat)

To determine if a person is experiencing anaphylaxis, look at the situation as well as the person's signs and symptoms (Table 8-1).

Table 8-1: Recognizing Anaphylaxis

Situation	Look For:
You do not know if the person has been exposed to an allergen.	<ul style="list-style-type: none"> ▪ Any skin reaction (such as hives, itchiness or flushing), OR ▪ Swelling of the face, neck, tongue or lips <p>PLUS</p> <ul style="list-style-type: none"> ▪ Trouble breathing, OR ▪ Signs and symptoms of shock
You think the person may have been exposed to an allergen.	<p>Any TWO of the following:</p> <ul style="list-style-type: none"> ▪ Any skin reaction ▪ Swelling of the face, neck, tongue or lips ▪ Trouble breathing ▪ Signs and symptoms of shock ▪ Nausea, vomiting, cramping or diarrhea
You know that the person has been exposed to an allergen.	<ul style="list-style-type: none"> ▪ Trouble breathing, OR ▪ Signs and symptoms of shock

ANAPHYLAXIS, CONTINUED

Caring for Anaphylaxis

If you suspect that someone is experiencing anaphylaxis, you should immediately:

- Have someone summon EMS personnel.
- Offer to help the person administer their medication, if the person carries any (e.g., epinephrine) and if local protocols allow. (Epinephrine is a form of adrenaline medication prescribed to treat the symptoms of severe allergic reactions.)
- Help the person administer the medication, and then summon EMS personnel, if you are alone.
- Make sure the person is sitting in a comfortable position while you wait for help to arrive, or have the person lie down if they are showing signs of shock.
- Assist with the administration of a second dose of epinephrine in 5 to 10 minutes if signs and symptoms persist and EMS has not arrived on scene.

Epinephrine

Epinephrine is a drug that slows or stops the effects of anaphylaxis. If a person is known to have an allergy that could lead to anaphylaxis, they may carry an epinephrine auto-injector (a syringe system, available by prescription only, that contains a single dose of epinephrine). Devices are available in different doses because the dose of epinephrine is based on weight (0.15 milligrams for children weighing between 33 and 66 pounds, and 0.3 milligrams for children and adults weighing more than 66 pounds). Many healthcare providers advise that people with a known history of anaphylaxis carry an anaphylaxis kit containing at least two doses of epinephrine (two auto-injectors) with them at all times. This is because more than one dose may be needed to stop the anaphylactic reaction. Have the person administer a second dose only if emergency responders are delayed and the person is still having signs and

ANAPHYLAXIS, CONTINUED

symptoms of anaphylaxis 5 to 10 minutes after administering the first dose.

It is important to act fast when a person is having an anaphylactic reaction because difficulty breathing and shock are both life-threatening conditions. If the person is unable to self-administer the medication, you may need to help. You may assist a person with using an epinephrine auto-injector when the person has a previous diagnosis of anaphylaxis and has been prescribed an epinephrine auto-injector, the person is having signs and symptoms of anaphylaxis, the person requests your help using an auto-injector and your state laws permit giving assistance. Where state and local laws allow, some organizations (such as schools) keep a stock epinephrine auto-injector for designated staff members who have received the proper training to use in an anaphylaxis emergency. If you are using a stock epinephrine auto-injector, follow your facility's EAP, which may include verifying that the person is showing signs and symptoms of anaphylaxis, ensuring that the person has been prescribed epinephrine in the past and making sure to use a device containing the correct dose based on the person's weight.

Different brands of epinephrine auto-injectors are available, but all work in a similar fashion (and some have audio prompts to guide the user). The device is activated by pushing it against the mid-outer thigh. Once activated, the device injects the epinephrine into the thigh muscle. The device must be held in place for the recommended amount of time (5 to 10 seconds, depending on the device) to deliver the medication. Some medication may still remain in the auto-injector even after the injection is complete. After removing the auto-injector, massage the injection site for several seconds (or have the person massage the injection site). Handle the used device carefully to prevent accidental needlestick injuries.

Place the device in a rigid container, and then give the container to EMS personnel for proper disposal.

To assist with administering epinephrine via an Epi-Pen™:

1. Check the label on the auto-injector. If the medication is visible, check to make sure the medication is clear, not cloudy.
 - If the medication is expired or cloudy, do not use it.
2. Determine whether the person has already given themselves a dose of the medication. If the person has, help them administer a second dose only if EMS personnel are delayed and the person is still having signs and symptoms of anaphylaxis 5 to 10 minutes after administering the first dose.
3. Locate the outer-middle of one thigh to use as the injection site (Figure 8-7).
 - Make sure there is nothing in the way, such as seams or items in a pocket.
4. Grasp the auto-injector firmly in one fist and pull off the safety cap with your other hand.
5. Hold the orange tip (needle end) against the person's outer thigh so that the auto-injector is at a 90-degree angle to the thigh.
6. Quickly and firmly push the tip straight into the outer thigh. You may hear and feel a click.
7. Hold the auto-injector firmly in place for 10 seconds, then remove it from the thigh and massage the injection site with a gloved hand for several seconds or have the victim massage the thigh if gloves are not immediately available (Figure 8-8).
8. Check the person's condition and watch to see how they respond to the medication.
 - If the person is still having signs and symptoms 5 to 10 minutes after administering the first dose and EMS personnel have not arrived, help the person to administer a second dose.

ANAPHYLAXIS, CONTINUED

- Place the used auto-injector in its plastic carrying case or another hard plastic container with the tip facing down. Give it to EMS personnel when they arrive.

Check state and local regulations regarding use of prescription and over-the-counter medications.

Antihistamines

The person's healthcare provider may recommend that the person carry an antihistamine in their anaphylaxis kit, in addition to epinephrine. An antihistamine is a medication that counteracts the effects of histamine, a chemical released by the body during an allergic reaction. Antihistamines are supplied as pills, capsules or liquids and are taken by mouth. The person should take the antihistamine according to the medication label and their healthcare provider's instructions.



Figure 8-7 | Press the tip straight into the outer thigh.



Figure 8-8 | Massage the injection site with a gloved hand.

Giving Ventilations—Special Considerations

Frothing

A white or pinkish froth or foam may be coming out of the mouth and/or nose of victims of a drowning. This froth results from a mix of mucous, air and water during respiration. If you see froth, open the airway and begin giving ventilations. If an unresponsive victim's chest does not clearly rise

after you give a ventilation, re-tilt the head and then reattempt another ventilation. If the ventilation still do not make the chest clearly rise, assume that the airway is blocked and begin CPR, beginning with chest compressions.

Vomiting

When you give ventilations, the victim may vomit. Many victims who have been submerged vomit because water has entered the stomach or air has been forced accidentally into the stomach during ventilations. If this occurs, quickly turn the victim onto their side to keep the vomit from blocking the airway and entering the lungs (Figure 8-9). Support the head and neck, and turn the body as a unit. After vomiting stops, clear the victim's airway by wiping out the victim's mouth using a finger sweep and suction device, if one is available and you are trained to use it, and then turn the victim onto their back and continue with ventilations.

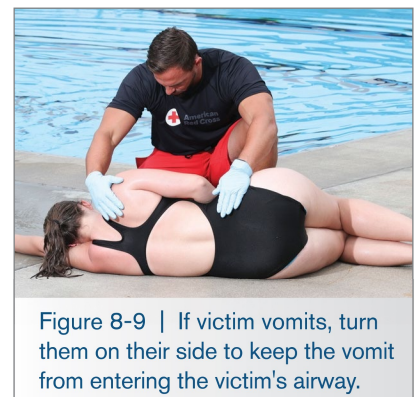


Figure 8-9 | If victim vomits, turn them on their side to keep the vomit from entering the victim's airway.

You can use a finger sweep to clear the airway of an unresponsive victim when the blockage is visible, but when available, you should use a manual suction device to suction the airway clear. **Suctioning** is the process of removing foreign matter from the upper airway by means of a suction device.

When using a manual suction device:

- Remove the protective cap from the tip of the suction catheter.
- Measure the suction tip to prevent inserting the suction tip too deeply.
- Suction for no more than 15 seconds at a time for an adult, 10 seconds for a child and 5 seconds for an infant.
- Apply suction as you withdraw the catheter from the mouth.

Gastric Distention

When giving ventilations, give just enough air to make the victim's chest rise. The chest should fall before you give the next ventilation. If you over-ventilate the victim, air may enter the stomach, causing gastric distention. The victim then will likely vomit, which can obstruct the airway and complicate resuscitation efforts.

Suspected Head, Neck or Spinal Injury

If you suspect that an unresponsive victim has a head, neck or spinal injury, always take care of the airway and breathing first. Open the airway by using the jaw-thrust (without head extension) maneuver to check for breathing or to give ventilations (Figure 8-10). If the jaw-thrust (without head extension) maneuver does not open the airway, use the head-tilt/chin-lift technique. See Chapter 11 for more information.

If the victim vomits, quickly roll the victim (the entire body, not just the head) onto their side to prevent aspiration or airway obstruction. After vomiting stops, remove vomit from the victim's mouth using a finger sweep or suction device, if necessary, and turn the victim onto their back and continue with ventilations.

Dentures

If the victim is wearing dentures, leave them in place unless they become loose and block the airway. Dentures help to support the victim's mouth and cheeks, making it easier to seal the mask when giving ventilations.

Mouth-to-Mouth Ventilations

While on duty as a lifeguard, you are expected to have professional equipment either in your hip pack or readily available. However, if you are in a situation off the job in which you do not have a resuscitation mask or BVM available and you need to provide mouth-to-mouth ventilations:

- Open the airway past a neutral position, using the head-tilt/chin-lift technique.
- Pinch the nose shut, and make a complete seal over the victim's mouth with your mouth.
- Give ventilations by blowing into the victim's mouth. Ventilations should be given one at a time. Take a break between breaths by breaking the seal slightly between ventilations and then taking a breath before re-sealing over the mouth.

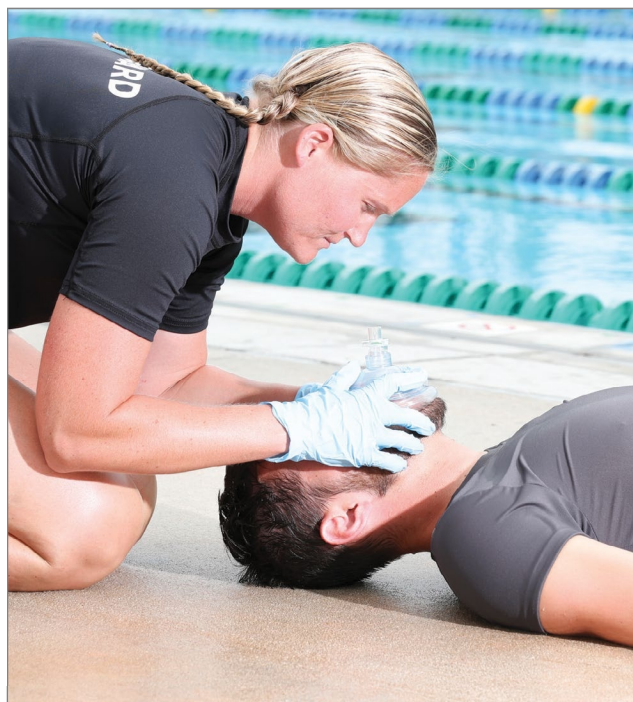


Figure 8-10 | Jaw-thrust (without head extension) maneuver

With mouth-to-mouth ventilations, the victim receives a concentration of oxygen at approximately 16 percent compared to the oxygen concentration of ambient air at approximately 20 to 21 percent. Giving individual ventilations can help maintain this oxygen concentration level. However, if you do not break the seal and take a breath between ventilations, the second ventilation will contain a decreased oxygen concentration.

Mask-to-Stoma Ventilations

Some victims may breathe through a stoma—an opening in the neck as a result of surgery. If so, 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 tracheostomy tube and blow into the mask.

Table 8-2: Giving Ventilations—Adult, Child and Infant

	Giving Ventilations
Adult	<ul style="list-style-type: none"> ▪ Give 1 ventilation every 5 to 6 seconds. ▪ Each ventilation should last about 1 second and make the chest clearly rise. ▪ The chest should fall before you give the next ventilation.
Child and Infant	<ul style="list-style-type: none"> ▪ Give 1 ventilation every 3 seconds. ▪ Each ventilation should last about 1 second and make the chest clearly rise. ▪ The chest should fall before you give the next ventilation.
<p>When giving ventilations to care for a victim in respiratory arrest, keep the following in mind:</p> <ul style="list-style-type: none"> ▪ Maintain an open airway by keeping the head tilted back in the proper position. ▪ Seal the mask over the victim's mouth and nose. ▪ Give ventilations for about 2 minutes, then reassess for breathing and a pulse. ▪ If a ventilation does not make the chest clearly rise, re-tilt the head and attempt another ventilation. <ul style="list-style-type: none"> ◦ If the chest still does not rise after an additional attempt, provide care for a potential airway obstruction by immediately beginning CPR, starting with compressions. ▪ If the victim vomits, roll the victim onto their side and clear the victim's mouth using a finger sweep and suction device, if available. Turn the victim onto their back and continue giving ventilations. ▪ If the victim has a pulse but is not breathing, continue giving ventilations. 	

8-3 AIRWAY OBSTRUCTION

Airway obstruction is a common emergency. You need to be able to recognize that a victim who cannot cough, speak, cry or breathe requires immediate care. Airway obstructions can lead to respiratory and even cardiac arrest if not addressed quickly and effectively. A responsive person clutching their throat is exhibiting what is commonly called the **universal sign for choking**. However, in many cases, a victim will just panic. Other behaviors that might be seen include running about, flailing arms or trying to get another's attention.

There are two types of airway obstruction: mechanical and anatomical. Any foreign body lodged in the airway is a **mechanical obstruction** and requires immediate attention. An **anatomical airway obstruction** is caused by the body itself, most commonly the tongue. An unresponsive victim loses muscle control, which may cause the tongue to fall back and block the airway.

Causes of Airway Obstructions

Common causes of choking include:

- Swallowing poorly chewed food.
- Drinking alcohol before or during meals (Alcohol dulls the nerves that aid swallowing, making choking on food more likely.)
- Eating too fast, or talking or laughing while eating.
- Walking, playing or running with food or objects in the mouth.
- Wearing dentures (Dentures make it difficult to sense whether food is fully chewed before it is swallowed.)

Caring for an Adult or Child Airway Obstruction

You must get consent before helping a responsive choking person. If the person is a child, get consent from a parent or guardian, if present. If no parent or guardian is present, consent is implied (Figure 8-11). If you suspect a person is choking, ask the victim, "Are you choking?" Then, identify yourself and ask if you can help. If the victim is coughing, encourage continued coughing. If the victim cannot cough, speak or breathe or has a weak, ineffective cough, activate the EAP and have another person summon EMS personnel.

For an adult or child, if the victim can cough forcefully, encourage them to continue coughing until they are able to breathe normally. If the victim cannot breathe or has a weak or ineffective cough, you will need to perform a combination of 5 back blows (blows between the shoulder blades) followed by 5 abdominal thrusts (inward and upward thrusts just above the navel). To perform

back blows, position yourself to the side and slightly behind the victim. For a child, you may need to kneel. Place one arm diagonally across the person's chest (to provide support) and bend the person forward at the waist so that the victim's upper body is as close to parallel to the ground as possible. Firmly strike the victim between the shoulder blades with the heel of your other hand. Each back blow should be separate from the others.



Figure 8-11 | If a parent or guardian is present, obtain consent before providing care

To perform abdominal thrusts, stand behind the victim and, while maintaining your balance, make a fist with one hand and place it thumb-side against the victim's abdomen—just above the navel. Cover the fist with your other hand, and give quick, upward thrusts. Perform a combination of 5 back blows followed by 5 abdominal thrusts. Each back blow and abdominal thrust should be a separate and distinct attempt to dislodge the object.

Continue delivering a combination of back blows and abdominal thrusts until the object is forced out; the victim can cough, speak or breathe or the victim becomes unresponsive.

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 chest thrusts (Figure 8-12). To perform chest thrusts, stand behind the victim and place the thumb-side of your fist against the lower half of the victim's sternum (breastbone) and your second hand over the fist. Then give quick, inward thrusts.

If a responsive victim becomes unresponsive, carefully lower the victim to a firm, flat surface, send someone to get an AED and summon EMS if you have not already done so. Immediately begin CPR with chest compressions. Unlike the responsive victim suffering foreign body airway obstruction, consent is implied when a victim is unresponsive. However, you must get consent from

a parent or guardian, if present, before caring for an unresponsive child with an airway obstruction.

As you open the airway to give ventilations, look in the person's mouth for any visible object. If you can see it, use a finger sweep motion to remove it. If you do not see the object, do not perform a blind finger sweep, but continue CPR. Remember to never try more than 2 ventilations during one cycle of CPR, even if the chest does not rise.

Continuing cycles of 30 compressions and 2 ventilations is the most effective way to provide care. Even if ventilations fail to make the chest rise, compressions may help clear the airway by moving the blockage to the upper airway, where it can be seen and removed. For more details, see Table 8-3.



Figure 8-12 | If a victim is obviously pregnant, use chest thrusts instead of abdominal thrusts to dislodge the object.

Caring for an Infant Airway Obstruction

If the victim is an infant, get consent from a parent or guardian, if present. If no parent or guardian is present, consent is implied. Identify yourself and ask if you can help. When an infant is choking and awake but unable to cough, cry or breathe, you will need to perform a series of 5 back blows and 5 chest thrusts from a kneeling position. Start with back blows. Hold the infant face-down on one arm using your thigh for support. Make sure the infant's head is lower than their body and that you are supporting the infant's head and neck. With your other arm, give firm back blows with the heel of your hand between the infant's scapulae.

After 5 back blows, start chest thrusts. Turn the infant over onto your other arm, using your thigh for

support. Make sure to support the head and neck as you move the infant. Place two fingers in the center of the infant's chest, just below the nipple line. Give 5 quick thrusts. Continue this cycle of 5 back blows and 5 chest thrusts until the object is forced out; the infant can cough, cry or breathe; or the infant becomes unresponsive.

If an infant does become unresponsive while choking, carefully place the infant onto a firm, flat surface, send someone to get an AED and summon EMS if you have not already done so. Immediately begin CPR, starting with chest compressions. For more details, see Table 8-3.

Table 8-3: Providing Care for Obstructed Airway—Adult, Child and Infant

	Caring for a Responsive Choking Victim	If a Choking Victim Becomes Unresponsive
Adult and Child	<ul style="list-style-type: none"> ▪ 5 back blows ▪ 5 abdominal thrusts <ul style="list-style-type: none"> ◦ Use chest thrusts if you cannot reach around the victim or the victim is pregnant. 	<ul style="list-style-type: none"> ▪ Carefully lower the victim to a firm, flat surface. ▪ Send someone to get an AED and summon EMS if you have not already done so. ▪ Immediately begin CPR, starting with chest compressions. ▪ After each set of chest compressions and before attempting ventilations, open the victim's mouth and look for the object. <ul style="list-style-type: none"> ◦ If you see an object in the victim's mouth, carefully remove it using your finger. Never perform a blind finger sweep.
Infant	<ul style="list-style-type: none"> ▪ 5 back blows ▪ 5 chest thrusts 	<ul style="list-style-type: none"> ▪ Carefully lower the victim to a firm, flat surface. ▪ Send someone to get an AED and summon EMS if you have not already done so. ▪ Immediately begin CPR, starting with chest compressions. ▪ After each set of chest compressions and before attempting ventilations, open the victim's mouth and look for the object. <ul style="list-style-type: none"> ◦ If you see an object in the victim's mouth, carefully remove it using your finger. Never perform a blind finger sweep.
Continue the cycle of care until:	<ul style="list-style-type: none"> ▪ The object is forced out. ▪ The victim begins to cough forcefully or breathe. ▪ The victim becomes unresponsive. 	<ul style="list-style-type: none"> ▪ The victim begins to breathe on their own. ▪ Another trained rescuer takes over. ▪ More advanced medical personnel, such as EMS personnel, take over. ▪ You are too exhausted to continue. ▪ The scene becomes unsafe.
When providing care:	<ul style="list-style-type: none"> ▪ Use less force on a child than you would on an adult when giving abdominal thrusts. ▪ Use two fingers on the center of the chest, just below the nipple line, when giving chest thrusts to an infant. ▪ Keep one hand on the victim's forehead to maintain an open airway when giving chest thrusts to an infant. 	<ul style="list-style-type: none"> ▪ Remember to never attempt more than 2 ventilations during one cycle of CPR, even if the chest does not rise. Continuing cycles of 30 compressions and 2 ventilations is the most effective way to provide care. ▪ If the victim vomits at any time, including during a compression cycle, immediately roll the victim to their side, clear the mouth, reposition the victim on their back and resume CPR.

8-4 EMERGENCY OXYGEN

When someone has a breathing or cardiac emergency, the supply of oxygen to the brain and heart, as well as the rest of the body, is reduced, resulting in hypoxia. Hypoxia is when an insufficient amount of oxygen reaches the cells. If breathing stops (respiratory arrest), the brain and heart will soon be starved of oxygen, resulting in cardiac arrest and ultimately death if not managed quickly and appropriately.

The air a person normally breathes is about 20 to 21 percent oxygen. When giving ventilations or performing CPR mouth-to-mouth or with a resuscitation mask, the air exhaled into the victim is about 16 percent oxygen. By administering emergency oxygen, you can deliver a higher percentage of oxygen, thus improving or eliminating hypoxia (Figure 8-13).

Emergency oxygen can be given for many breathing and cardiac emergencies, but should be administered as a secondary treatment after the priorities of airway management, ventilation, CPR, AED, bleeding control and other lifesaving care have been addressed. Consider administering emergency oxygen for victims who are hypoxic, as evidenced by an oxygen saturation below 94 percent.

Oxygen should be delivered using equipment that is properly sized for the victim and flow rates that are appropriate for the delivery device.

Emergency oxygen units are available in some jurisdictions, but they require a prescription in most, provided that they contain at least a 15-minute supply of oxygen and are designed to deliver a pre-set flow rate of at least 6 liters per minute (LPM). Medical-grade oxygen cylinders are labeled “U.S.P.” and marked with a yellow diamond containing the word “Oxygen” (Figure 8-14).

Oxygen cylinders come in different sizes and various pressure capacities. In the United States, oxygen cylinders typically have green markings. However, the color scheme is not regulated, so different manufacturers and countries other than the United States may use differently colored markings. Oxygen cylinders are under high pressure and should be handled carefully.



Figure 8-13 | Administering emergency oxygen



Figure 8-14 | Oxygen cylinders are marked with a yellow diamond that reads "Oxygen" and, in the United States, typically have green markings.

Variable-Flow-Rate Oxygen

Many EMS systems use variable-flow-rate oxygen, which allows the rescuer to vary the flow of oxygen. These systems are practical because they are able to deliver a specific amount of oxygen based on a victim's need.

To administer emergency oxygen using a variable-flow-rate system, assemble the following pieces of equipment: an oxygen cylinder, a regulator with pressure gauge and flowmeter, and a delivery device. The regulator lowers the pressure of the oxygen as it comes out of the cylinder so that the oxygen can be used safely (Figure 8-15). The regulator also has a pressure gauge that shows the pressure in the cylinder. The pressure gauge shows if the cylinder is full (2000 pounds per square inch [psi]), nearly empty or in-between. The regulator must be carefully attached to the oxygen

cylinder. An O-ring gasket makes the seal tight (Figure 8-16). The flowmeter controls how rapidly the oxygen flows from the cylinder to the victim. The flow can generally be set from 1 to 15 LPM.



Figure 8-15 | A pressure regulator is attached to an oxygen cylinder to reduce the pressure of oxygen to a safe level.



Figure 8-16 | An O-ring gasket

Fixed-Flow-Rate Oxygen

Some emergency oxygen systems have the regulator set at a fixed-flow rate. Most fixed-flow-rate tanks are set at 15 LPM; however, you may come across tanks set at 6 LPM, 12 LPM or another rate. Some fixed-flow-rate systems have a dual (high/low) flow setting. Fixed-flow-rate oxygen systems typically come with the delivery device, regulator and cylinder already assembled (Figure 8-17), which makes it quick and simple to administer emergency oxygen.

A drawback to fixed-flow-rate oxygen systems is that the flow rate cannot be adjusted, which limits how it can be used, including limiting the concentration of oxygen that can be delivered. For example, a fixed-flow-rate unit with a preset flow of 6 LPM can be used only with a nasal cannula or resuscitation mask, whereas a preset-flow rate of 12 LPM allows the use of only a resuscitation mask or non-rebreather mask.

To operate this type of device, simply turn it on according to the manufacturer's instructions, check that oxygen is flowing and place the delivery device on the victim.



Figure 8-17 | A fixed-flow-rate oxygen system

Oxygen Safety Precautions

When preparing and administering emergency oxygen, safety is a concern. Use emergency oxygen equipment according to the manufacturer's

instructions and in a manner consistent with federal and local regulations and protocols.

Also, follow these recommended guidelines:

- Be sure that oxygen is flowing before putting the delivery device over the victim's face.
- Do not use oxygen around flames or sparks, including smoking materials, such as cigarettes, cigars and pipes. Oxygen causes a fire to burn more rapidly and intensely.
- Do not use grease, oil or petroleum products to lubricate or clean the regulator. This could cause a fire or an explosion.
- Do not stand oxygen cylinders upright, unless they are well secured. If the cylinder falls, the regulator or valve could become damaged or cause injury due to the intense pressure in the tank.
- Do not drag or roll cylinders.
- Do not carry a cylinder by the valve or regulator.
- Do not hold onto protective valve caps or guards when moving or lifting cylinders.
- Do not deface, alter or remove any labeling or markings on the oxygen cylinder.
- Do not attempt to mix gases in an oxygen cylinder or transfer oxygen from one cylinder to another.
- Do not use a defibrillator when around flammable materials, such as free-flowing oxygen or gasoline. (If oxygen is being administered to a victim when an AED is ready to be used, make sure to close the tank before shocking.)

Never attempt to refill an oxygen cylinder; only an appropriately licensed professional should do this. When high-pressure oxygen cylinders have been emptied, close the cylinder valve, replace the valve protection cap or outlet plug, if provided, and mark or tag the cylinder as empty. Promptly return the cylinder to be refilled according to state, local and facility regulations and policies.

Pay specific attention to the following areas concerning oxygen cylinders:

- Check for cylinder leaks, abnormal bulging, defective or inoperative valves or safety devices.
- Check for the physical presence of rust or corrosion on a cylinder or cylinder neck, and any foreign substances or residues, such as adhesive tape, around the cylinder neck, oxygen valve or regulator assembly. These substances can hamper oxygen delivery and, in some cases, have the potential to cause a fire or explosion.

8-5 OXYGEN DELIVERY DEVICES

An **oxygen delivery device** is the equipment used to provide emergency oxygen to a victim. Tubing carries the oxygen from the regulator to the delivery device. When administering emergency oxygen, make sure that the tubing does not get tangled or kinked, which could stop the flow of oxygen to the mask or cannula. Oxygen delivery devices include nasal cannulas, resuscitation masks, non-rebreather masks and BVMs (Table 8-4). Various sizes of these devices are available for adults, children and infants. Appropriate sizing is important to ensure adequate management.

If young children or infants are frightened by a mask being placed on their face, you can use the “blow-by” technique. To perform this technique, you, a parent or guardian holds the mask about 2 inches from the child's or infant's face, waving it slowly from side to side, allowing the oxygen to pass over the face and be inhaled.

Nasal Cannulas

Nasal cannulas are used only on victims who are able to breathe, most commonly on those with minor breathing difficulty or a history of respiratory medical conditions. They are useful for a victim who can breathe but cannot tolerate a mask over the face. Nasal cannulas are held in place over a victim's ears, and oxygen is delivered through two small prongs inserted into the nostrils. Nasal cannulas deliver between 24 percent and 44 percent oxygen to the victim.

These devices are not used often in an emergency because they do not give as much oxygen as a resuscitation mask, non-rebreather mask or

BVM. Victims experiencing a serious breathing emergency generally breathe through the mouth and need a device that can supply a greater concentration of oxygen. Nasal cannulas may not be effective for victims with a nasal airway obstruction, nasal injury or severe cold.

With a nasal cannula, you should set the flow rate between 1 and 6 LPM, although a flow rate between 2 and 4 LPM is most common. Avoid using rates above 6 LPM with this device since they tend to quickly dry out mucous membranes, which causes nose bleeds and headaches.

Resuscitation Masks

A resuscitation mask with oxygen inlet can be used to deliver emergency oxygen to a nonbreathing victim. It also can be used to deliver oxygen to someone who is breathing but still requires emergency oxygen. Some resuscitation masks come with elastic straps to place over the victim's head to keep the mask in place. If the mask does

not have straps, you or the victim can hold the mask in place. With a resuscitation mask, set the oxygen flow rate at 6–10 LPM for a responsive victim, or 6–15 LPM for an unresponsive victim. The resuscitation mask can deliver between 25 percent and 55 percent oxygen concentration.

Non-Rebreather Masks

A non-rebreather mask is used to deliver high concentrations of oxygen to a victim who is breathing. It consists of a face mask with an attached oxygen reservoir bag and a one-way valve between the mask and bag, which prevents the victim's exhaled air from mixing with the oxygen in the reservoir bag.

The victim inhales oxygen from the bag, and exhaled air escapes through flutter valves on the side of the mask. The flow rate should be set at 10-15 LPM. When using a non-rebreather mask with a high-flow rate of oxygen, you can deliver up to 90 percent oxygen concentration to the victim.

Bag-Valve-Mask Resuscitators

A BVM can be used on a breathing or nonbreathing victim. A responsive, breathing victim can hold the BVM to inhale the oxygen, or you can squeeze the bag as the victim inhales in order to deliver more oxygen. Set the oxygen flow rate at 15 LPM or higher when using a BVM. The BVM with an oxygen reservoir bag is capable of supplying 90 percent or more oxygen concentration when used at 15 LPM or higher.

Monitoring Oxygen Saturation

A pulse oximeter is a device that can be used to measure the percentage of oxygen saturation in the blood. Pulse oximetry may be used as an added tool, but an assessment of the victim's signs and symptoms should be used to make decisions about care. It is possible for victims to show a normal

reading but have trouble breathing, or to have a low reading but appear to be breathing normally. The pulse oximeter reading never should be used to withhold oxygen from a victim who appears to be hypoxic or when it is the standard of care to apply oxygen despite good pulse oximetry readings.





Range	Percent Value	Delivery Device
Normal	95 to 100	None
Mild hypoxia	91 to 94	Nasal cannula or resuscitation mask
Moderate hypoxia	86 to 90	Non-rebreather mask or BVM
Severe hypoxia	<85	Non-rebreather mask or BVM

To use a pulse oximeter, apply the probe to the victim's finger or any other measuring site, such as the ear lobe or foot, according to the manufacturer's recommendation (Figure 8-18). Let the machine register the oxygen saturation level and verify the victim's pulse rate on the oximeter with the actual pulse of the victim. Monitor the victim's saturation levels while administering emergency oxygen. If the oxygen level reaches 100 percent and local protocols allow, you may decrease the flow rate of oxygen and change to a lower-flowing delivery device.



Figure 8-18 | Pulse oximeter devices are commonly used by EMS personnel.

Table 8-4: Oxygen Delivery Devices

Delivery Device	Common Flow Rate	Oxygen Concentration	Suitable Victims
Nasal Cannula 	1–6 LPM	24–44%	<ul style="list-style-type: none"> Victims with breathing difficulty Victims unable to tolerate mask
Resuscitation Mask 	6–15 LPM	25–55%	<ul style="list-style-type: none"> Victims with breathing difficulty Victims who are nonbreathing
Non-Rebreather Mask 	10–15 LPM	Up to 90%	Breathing victims only
BVM 	15 LPM or higher	90% or higher	Breathing and nonbreathing victims

8-6 SUCTIONING

Sometimes injury or sudden illness can cause mucus, fluids or blood to collect in a victim's airway. A finger sweep can be used to clear the airway on an unresponsive victim when the blockage is visible, but a more effective method is to suction the airway clear. Suctioning is the process of removing foreign matter from the upper airway using a manual or mechanical device. Suctioning is not necessary or beneficial in attempting to remove water from the lungs of a drowning victim.

It is important to suction when fluids or foreign matter are present or suspected, because the airway must be open and clear in order for the victim to breathe. Manual suction units (Figure 8-19) are operated by hand. They are lightweight, compact and relatively inexpensive. Because they do not require an energy source, they avoid some of the problems associated with mechanical units and are more suited to the aquatic environment. If suctioning is part of facility protocols, there should be several sizes of sterile suction catheters on hand to use on victims of various sizes.



Figure 8-19 | Suctioning devices are used to clear a victim's airway.

AIRWAY ADJUNCTS

The tongue is the most common cause of airway obstruction in an unresponsive person. You can use a mechanical device, called an **airway adjunct**, to keep a victim's airway clear.

There are two types of basic airway adjuncts. One type, called an oropharyngeal airway (OPA) is inserted in the victim's mouth. The other type, called a nasopharyngeal airway (NPA) is inserted in the victim's nose.

OPAs and NPAs come in a variety of sizes. The curved design fits the natural contour of the airways. Once you have positioned the airway adjunct, use a resuscitation mask or BVM to ventilate a non-breathing victim. If using an NPA on a victim who is breathing normally, you may utilize a non-rebreather mask to supply supplemental oxygen.

Oropharyngeal Airways

When properly positioned, an OPA keeps the tongue away from the back of the throat, helping to maintain an open airway (Figure 8-20).

An improperly placed airway device can compress the tongue into the back of the throat, further obstructing the airway.

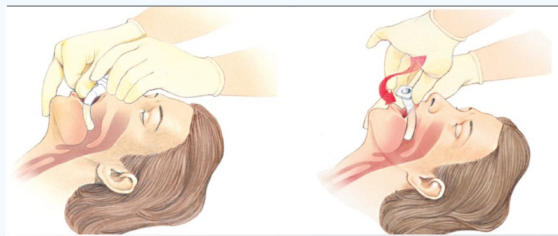


Figure 8-20 | Insert an OPA with the curved tip along the roof of the mouth to clear a victim's airway. Rotate it to drop it into the back of the throat.

Nasopharyngeal Airways

When properly positioned, an NPA can help maintain an open airway. An NPA may be used on a conscious, responsive victim or an unresponsive victim. Unlike an OPA, the NPA does not cause the victim to gag. NPAs should not be used on victims with suspected facial trauma or skull fracture. Follow local protocols for when, how and who can use NPAs.

8-7 WRAP-UP

Breathing emergencies are extremely serious. As a lifeguard, you must know how to recognize the signs and symptoms of respiratory distress, hypoxia and respiratory arrest and react immediately to provide care for victims. This

includes knowing how to give ventilations and care for choking victims. If facility protocols, local laws and regulations allow, it also includes knowing how to administer emergency oxygen and use airway adjuncts and suction devices.

BENCHMARKS FOR LIFEGUARDS

Lifeguards should provide appropriate care for victims experiencing respiratory emergencies, which includes:

- Caring for drowning as a respiratory event.
- Handling life-threatening situations with a sense of urgency.
- Using resuscitation equipment, including appropriately sized breathing barriers and BVMs.
- Recognizing signs and symptoms of respiratory distress and providing care.
- Recognizing and providing care for responsive and unresponsive victims with an obstructed airway.
- Administering emergency oxygen using a variety of oxygen delivery devices if permitted by local protocols and you are trained and certified.

BENCHMARKS FOR LIFEGUARDING OPERATIONS

As professional responders, lifeguards should reasonably expect the following facility-specific operational understanding and training:

- Familiarity with facility-specific resuscitation equipment, such as appropriately sized breathing barriers and BVMs, oxygen delivery equipment (if rescuers are trained and oxygen delivery is permitted by local protocols)
- Regular refresher training and practice of resuscitative care skills, as skills degrade quickly following a training session — this in-service training includes practicing with other responders on team dynamics



Chapter 8 Review

1. Fill in the blanks: Lack of oxygen can eventually stop the heart (cardiac arrest) and prevent blood from reaching the brain and other vital organs in as little as ____ minutes after submerging. Brain cell damage or death begins to occur within ____ to ____ minutes.

2. Describe the two types of respiratory emergencies:

Respiratory distress:

Respiratory arrest:

3. List five possible causes of respiratory distress.

1)

2)

3)

4)

5)

4. When caring for a person in respiratory distress:

A | Ask the victim to stand and lean back to make breathing easier.

C | Do not allow the victim to take their prescribed medication.

B | Determine the exact cause of respiratory distress before providing initial care.

D | Maintain an open airway and summon EMS personnel.



Chapter 8 Review

5. List five possible causes of respiratory arrest.

1)
2)
3)
4)
5)

6. When checking to see if someone is breathing (circle all that apply):

- | | |
|---|---|
| A Look to see if the victim's chest clearly rises and falls. | D Look away from the victim's chest. |
| B Check for breathing before checking for a pulse. | E Keep the victim's mouth closed. |
| C Check for breathing and a pulse simultaneously. | F Listen and feel for air against the side of your face. |

7. Fill in the blanks. The normal breathing rate for an adult is between ____ and ____ breaths per minute.

8. What is a lifeguard's objective when caring for a drowning victim who is not breathing?

--



Chapter 8 Review

9. When giving ventilations to an adult who is not breathing but has a definitive pulse, you should give ventilations:

A | 2 every 5 to 6 seconds

C | 1 every 3 seconds

B | 2 every 3 seconds

D | 1 every 5 to 6 seconds

10. When giving ventilations to a child who is not breathing but has a definitive pulse, you should give ventilations:

A | 2 every 5 to 6 seconds

C | 1 every 3 seconds

B | 2 every 3 seconds

D | 1 every 5 to 6 seconds

11. What should you do if you are giving ventilations and the victim's chest does not rise after the first breath?

12. All of the following describe appropriate care for a conscious person with an airway obstruction (choking) EXCEPT:

A | Check the victim for breathing and a pulse for no more than 10 seconds.

C | Obtain consent; if the victim is a child, get consent from a parent or guardian.

B | Perform a combination of 5 back blows followed by 5 abdominal thrusts.

D | If the victim cannot cough, speak or breathe, activate the EAP and have someone summon EMS.



Chapter 8 Review

13. If a conscious choking victim becomes unresponsive, what should you do?



GIVING VENTILATIONS

Giving Ventilations

Note: Activate the EAP, size up the scene while forming an initial impression, obtain consent, use PPE, perform an initial assessment, care for any severe, life-threatening bleeding and get an AED on the scene as soon as possible.

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.

- **Adult:** Give **1** ventilation about every **5 to 6** seconds.
- **Child or 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.
- Give ventilations for about 2 minutes.

Notes:

- For a child, tilt the head slightly past a neutral position. Do not tilt the head as far back as for an adult.
- For a victim with a suspected head, neck or spinal injury, use the jaw-thrust (without head extension) maneuver to open the airway to give ventilations.
- For an infant, maintain a neutral position.

3 Recheck for breathing and pulse about every 2 minutes.

- Remove the mask and look, listen and feel for breathing and a pulse for at least 5 seconds but no more than 10 seconds.

4 Assess the victim's condition and provide appropriate care.

If unresponsive and no breathing but there is a pulse:

- Continue giving ventilations.

If unresponsive and no breathing or pulse:

- Begin CPR.





GIVING VENTILATIONS

Giving Ventilations *continued*

Do not stop giving care except in one of the following situations:

- *You see an obvious sign of life, such as normal breathing or victim movement.*
- *An AED is ready to analyze the victim's heart rhythm.*
- *Another trained responder or responders take over, such as a member of your safety team or EMS personnel, and relieve you from giving compressions or ventilations.*
- *You are alone and too exhausted to continue.*
- *The scene becomes unsafe.*



GIVING VENTILATIONS

Using a Bag-Valve-Mask Resuscitator

Notes:

- Activate the EAP, size up the scene and form an initial impression, use PPE, perform a primary assessment and get an AED on the scene as soon as possible.
- Always select the appropriately sized mask for the victim.
- Prepare the BVM for use during the primary assessment.

If the victim is not breathing but has a pulse:

- 1** Rescuer 1 kneels behind the victim's head and positions the mask over the victim's mouth and nose.
- 2** To seal the mask and open the airway, use the jaw-thrust (with head extension) maneuver.

Note: For a child, tilt the head back slightly past a neutral position. Do not tilt the head as far back as for an adult. For an infant, position the head in a neutral position.



- 3** Rescuer 2 gives ventilations.
 - Squeeze the bag slowly with both hands.
 - For an adult, give 1 ventilation about every 5 to 6 seconds.
 - For a child or 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 breath is given.
- 4** Rescuer 2 rechecks for breathing and a pulse about every 2 minutes.
 - Remove the mask and look, listen and feel for breathing and a pulse for at least 5 seconds, but no more than 10 seconds.



GIVING VENTILATIONS

Using a Bag-Valve-Mask Resuscitator *continued*

5 Assess the victim's condition and provide appropriate care.

If unresponsive and no breathing but there is a pulse:

- Continue giving ventilations.

If unresponsive and no breathing or pulse:

- Begin CPR.

Do not stop giving care except in one of the following situations:

- *You see an obvious sign of life, such as normal breathing or victim movement.*
- *An AED is ready to analyze the victim's heart rhythm.*
- *Another trained responder or responders take over, such as a member of your safety team or EMS personnel, and relieve you from giving compressions or ventilations.*
- *You are alone and too exhausted to continue.*
- *The scene becomes unsafe.*



CHOKING

Adult and Child

Notes:

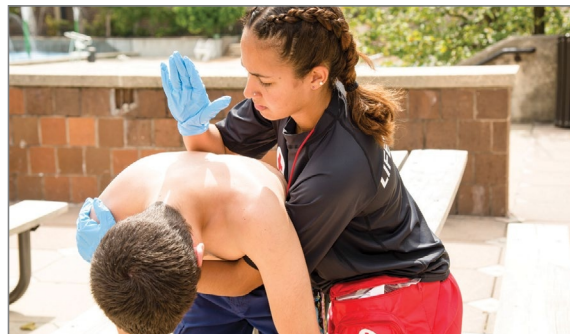
- Activate the EAP, size up the scene while forming an initial impression, obtain consent, use PPE and care for any severe, life-threatening bleeding.
- For a child, obtain consent if a parent or guardian is present.
- Stand or kneel behind the child, depending on the child's size. Use less force on a child than you would on an adult.

If the victim cannot breathe or has a weak or ineffective cough:

1

Give **5** back blows.

- Position yourself slightly behind the victim.
- Place one arm diagonally across the victim's chest and bend the victim forward at the waist. The victim's upper airway should be at least parallel to the ground.
- Firmly strike the victim between the shoulder blades with the heel of your hand.
- Each thrust should be a distinct attempt to dislodge the object.



2

Give **5** abdominal thrusts.

- Stand behind the victim while maintaining your balance.
- 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.
- Make a fist with one hand and place it thumb-side down against the victim's abdomen, just above the navel.
- Cover the fist with your other hand and give quick, upward thrusts.
- Each thrust should be a distinct attempt to dislodge the object.



3

Assess the victim's condition and provide appropriate care.



CHOKING

Adult and Child *continued*

Continue giving 5 back blows and 5 abdominal thrusts until:

- The object is forced out.
- The victim begins to cough, speak or breathe.
- The victim becomes unresponsive.

If the victim becomes unresponsive at any time while choking:

- Carefully lower the victim onto a firm, flat surface, send someone to get an AED, and summon EMS if you have not already done so.
- Immediately begin CPR, starting with 30 chest compressions.
- Open the mouth to look for and do a finger sweep to remove a foreign object only if you see an object.
- Give 2 ventilations.
- As long as the chest does not clearly rise, continue cycles of giving 30 chest compressions, looking for a foreign object, doing a finger sweep only if you see the object and giving ventilations.

Notes:

- *During CPR on an unresponsive choking adult or child, when opening the airway to give ventilations, look into the mouth for any visible object.*
 - *If you see an object, use a finger sweep motion to remove it.*
 - *If you do not see an object, do not do a finger sweep. Instead, continue CPR cycles.*
- *Remember to never try more than 2 ventilations during one cycle of CPR, even if the chest does not rise.*



CHOKING

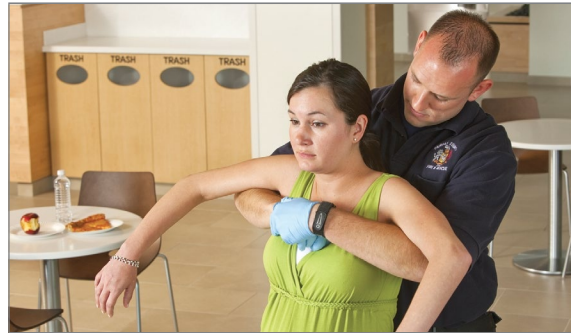
Adult and Child *continued*

Use chest thrusts instead of abdominal 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 lower half of the victim's sternum and the second hand over the fist.
- 2** Give quick, inward thrusts. Look over the victim's shoulder so that their 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, speak, or breathe; or until the victim becomes unresponsive.





CHOKING

Infant

Note: Activate the EAP, size up the scene while forming an initial impression, obtain consent if a parent or guardian is present, use PPE, and care for any severe, life-threatening bleeding.

If the infant is awake and 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 their body.
- 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 their 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 1 1/2 inches.
 - Each chest thrust should be a distinct attempt to dislodge the object.
 - their chest.





CHOKING

Infant *continued*

- 5** Provide appropriate care.

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 unresponsive.

If the infant becomes unresponsive at any time while choking:

- Carefully lower the infant onto a firm, flat surface, send someone to get an AED, and summon EMS if you have not already done so.
 - Immediately begin CPR, starting with 30 chest compressions.
 - Open the mouth to look for and do a finger sweep to remove a foreign object only if you see an object.
 - Give 2 ventilations.
 - As long as the chest does not clearly rise, continue cycles of giving 30 chest compressions, looking for a foreign object, do a finger sweep only if you see the object and giving ventilations.

Notes:

- *During CPR on an unresponsive infant, when opening the airway to give ventilations, look into the mouth for any visible object.*
 - *If you see an object, use a finger sweep motion to remove it.*
 - *If you do not see an object, do not do a finger sweep. Instead, continue CPR cycles.*
- *Remember to never try more than 2 ventilations during one cycle of CPR, even if the chest does not rise.*



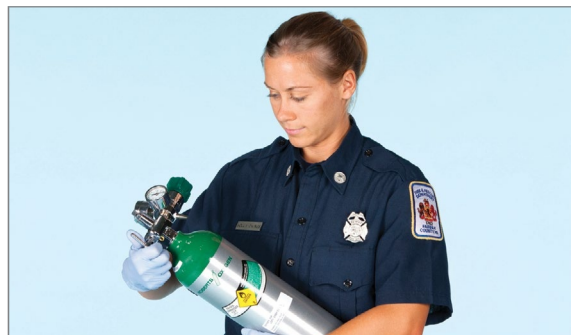
EMERGENCY OXYGEN

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.
- 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.





EMERGENCY OXYGEN

Administering Emergency Oxygen

Notes:

- Activate the EAP, size up the scene and form an initial impression, use PPE, perform an initial assessment and get an AED on the scene as soon as possible.
- 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



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 responsive 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

Using a Manual Suctioning Device

Notes:

- Activate the EAP, size up the scene and form an initial impression, use PPE, perform an initial assessment and get an AED on the scene as soon as possible.
- If needed, assemble the device according to manufacturer's instructions.

1

Position the victim.

- Roll the body as a unit towards you so that the victim is on their side.
- Open the victim's mouth.

2

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

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:
 - **Adult:** 15 seconds at a time
 - **Child:** 10 seconds at a time
 - **Infant:** 5 seconds at a time



