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# Basic Life Support Part II: Airway/Breathing and Continued Cardiopulmonary Resuscitation

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## Overview

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High-quality cardiopulmonary resuscitation (CPR) and defibrillation are the most important interventions for patients with cardiac arrest, and should be the first steps that rescuers perform. This is reflected in the American Heart Association's new "CAB" mnemonic. While rescuers were once taught the "ABCs" of cardiac arrest, they now learn "CAB" - circulation first, followed by airway and breathing. Only once CPR is underway (and defibrillation has been performed, if a defibrillator is available) do we consider providing respiratory support. This video will describe the correct technique for providing respiratory support to a patient in cardiac arrest, and how to continue basic life support over the period of time until help arrives.

This video assumes that all the steps described in "Basic Life Support Part I: Cardiopulmonary Resuscitation and Defibrillation" have already been completed. This video does NOT depict the initial steps taken when arriving at the scene of a cardiac arrest.

## Procedure

Please note that ventilation requires a second rescuer. *While the first rescuer performs continuous, high-quality chest compressions*, the second rescuer performs all the steps needed to ventilate the patient. *Ventilation should never be allowed to interfere with chest compressions*. If there are insufficient personnel to do both, then compressions are the priority.

### 1. While chest compressions are in progress, prepare ventilation equipment

1. Obtain a bag-valve-mask (BVM) device, which is readily available in most hospitals.
  1. Mouth-to-mouth rescue breathing is no longer recommended except in certain extreme circumstances, and should not be performed in the hospital setting.
2. Attach the BVM device to oxygen, setting the flow at 10-15 L/min

### 2. While chest compressions are in progress, open the airway.

### 3. Proper positioning of both patient and rescuer is crucial to effectively open the airway.

1. Position the patient in a supine and flat position, and remove pillows and other items that may obstruct positioning.
2. Stand directly at the head of the bed. It is not possible to properly perform BVM ventilation from the side, or from any other position.
3. Assuming there is no concern for trauma, use the "head tilt/chin lift" maneuver to open the airway. Do this by placing the palm of one hand on the patient's forehead and the fingers of the other under the chin. Use the fingers to lift the chin, extending the neck.
4. In some patients, a prominent occipital bone may make it difficult to adequately extend the neck. If this is the case, use a shoulder roll to lift the shoulders, thereby extending the neck.
5. If there is concern for trauma, it is important to avoid manipulating the cervical spine if possible. In this case, use the "jaw thrust" maneuver. Do this by placing your fingers behind the angle of the mandible, and displacing the mandible anteriorly. Please note that this maneuver is not always effective, in which case a chin lift maneuver must be performed to open the airway. Remember that cervical spine injury is a theoretical concern, whereas airway occlusion is an imminent life threat.

### 4. While chest compressions are in progress, place the mask over the patient's mouth and nose.

1. The pointed part of the mask fits over the nasal bridge, and the rounded part rests on the chin. The mask should not hang over the point of the chin, and should not cover the orbits.

### 5. While chest compressions are in progress, seal the mask firmly to the patient's face. This is necessary to allow air from the bag to enter the lungs, rather than leaking out into the room. The best way to do this is by using the "C/E" technique.

1. Using your dominant hand, make a "C" with your thumb and forefinger around the stem of the mask.
2. Make an "E" with your 3<sup>rd</sup>-5<sup>th</sup> fingers along the patient's mandible, taking care to place the 5<sup>th</sup> finger behind the angle of the mandible.

3. Use your 3<sup>rd</sup>-5<sup>th</sup> fingers to pull the patient's face up into the mask. Do not push the mask down on the face, as this will most often make ventilation more difficult.

## 6. Pause chest compressions to begin ventilations.

1. While maintaining your mask seal on the patient's face, squeeze the bag with your opposite hand to inflate the lungs.
2. Give two slow breaths, squeezing the bag over one second, and releasing it over another second.
3. Observe for chest rise with each breath. This will be your *only* indication of effective ventilation! You will not be able to follow pulse oximetry, as the patient has no pulse.
4. *Avoid hyperventilating* the patient - you should only insufflate enough air to produce visible chest rise. Hyperventilating raises interthoracic pressure and decreases blood flow to the heart.

## 7. If you do not see chest rise, *resume chest compressions*, and prepare to troubleshoot your BVM technique on the next pause for ventilations.

1. First, check your positioning. Are you standing directly at the head of the bed? Is the patient supine, with no pillow or other obstructions?
2. If patient and rescuer positioning are appropriate, reposition your hands, and try again to open the airway using head tilt/chin lift and/or jaw thrust, then attempt to ventilate again.
3. If this is not successful, switch to the two-person technique.
  1. Use the C/E technique to seal the mask to the face using *both* hands. This will allow you to seal the mask more effectively, and add a jaw thrust to your chin lift.
  2. Have an assistant squeeze the bag to inflate the lungs.
4. If this is not successful, insert an oropharyngeal airway (OPA).
  1. Select the correct size of OPA by choosing one that extends from the corner of the patient's mouth to his earlobe.
  2. Insert the hooked end into the mouth, over the base of the tongue. This will pull the tongue forward, out of the hypopharynx.
  3. You may insert the OPA straight into the pharynx, or insert it upside-down, turning it as it passes over the base of the tongue.
  4. Take care not to push the tongue farther back into the hypopharynx. You may need to manually displace the tongue with your gloved hand or with a tongue depressor in order to do this.

## 8. Coordinate chest compressions with ventilations.

## 9. Resume chest compressions immediately after two breaths are given.

## 10. Give 30 chest compressions. Count out loud to keep track of the number of compressions administered.

## 11. After 30 chest compressions, give two more breaths.

## 12. Continue CPR, using a 30:2 compression:breath ratio. Do this for 5 cycles of 30:2, or two minutes timed by a clock or automated defibrillator, at which point it will be time to pause for reassessment.

## 13. Pause CPR for rhythm check.

1. As discussed in the first video, you must pause chest compressions in order to accurately assess the rhythm - this is because chest compressions create electrical interference that will obscure the underlying rhythm.
2. Determine if the rhythm is shockable - i.e., if it is ventricular fibrillation or ventricular tachycardia. These rhythms were discussed in the first video.
3. If the rhythm is shockable, then administer a shock as discussed in the first video. Immediately after shocking, resume chest compressions.
4. If the rhythm is not shockable, then resume chest compressions without shocking.
5. If you don't have a defibrillator available, which may be the case in remote locations, perform a carotid pulse check during these scheduled pauses. You may also assess the carotid pulse at the same time as you're checking the rhythm.

## 14. Continue CPR for as long as clinically indicated.

1. Perform 30 compressions for every two breaths.
2. Pause every 5 cycles or two minutes for a rhythm/pulse check.
3. Stop CPR *only* when it is no longer clinically indicated. Indications for terminating CPR include:
  1. The patient regains consciousness
  2. The patient remains unconscious but regains a pulse

3. Further resuscitation is futile and you intend to pronounce the patient dead

**15. Consider advanced life support measures (like intubation or vascular access) only once help arrives and if these maneuvers can be performed without detracting from the quality and continuity of CPR.**

## Summary

Quality CPR is absolutely essential to cardiac arrest survival, and must be perfected by all healthcare providers. While chest compressions and defibrillation are more important than respiratory support, patients with prolonged resuscitations will benefit from ventilation, and it should be performed whenever there is sufficient manpower and equipment to do so. BVM ventilation is a much more difficult skill than it would seem at first glance, and rescuers must perfect their technique in order to be effective. Knowledge of how to troubleshoot ineffective ventilation is essential for all providers, as standard technique often does not produce chest rise. Continued CPR with integrated respiratory support is essential to ensure that your patient remains perfused and oxygenated until such time as spontaneous circulation is restored.