



Chapter 11

BLS Resuscitation

Introduction

- The principles of basic life support (BLS) were introduced in 1960.
- Specific techniques have been revised every 5 to 6 years.
- Information here follows the 2005 guidelines.

Elements of BLS (1 of 8)

- Noninvasive emergency lifesaving care
- Used to treat medical conditions including:
 - Airway obstruction
 - Respiratory arrest
 - Cardiac arrest



Elements of BLS (2 of 8)

- Focus is on what has often been termed the ABCs
 - Airway (obstruction)
 - Breathing (respiratory arrest)
 - Circulation (cardiac arrest or severe bleeding)



Elements of BLS (3 of 8)

- BLS follows a specific sequence for adults, infants, and children.
- Ideally, only seconds should pass between the time you recognize a patient needs BLS and the start of treatment.



Elements of BLS (4 of 8)



TIME IS CRITICAL!

- 0–1 min: cardiac irritability
- 0–4 min: brain damage not likely
- 4–6 min: brain damage possible
- 6–10 min: brain damage very likely
- More than 10 minutes: irreversible brain damage

Elements of BLS (5 of 8)

- Cardiopulmonary resuscitation (CPR)
 - Used to establish circulation and artificial ventilation in a patient who is not breathing and has no pulse



Elements of BLS (6 of 8)



- CPR steps
 1. Chest compressions to circulate blood.
 2. Open airway.
 3. Provide artificial respirations by rescue breathing.
 - Mouth-to-mouth
 - Mouth-to-nose
 - Use of mechanical devices

Elements of BLS (7 of 8)

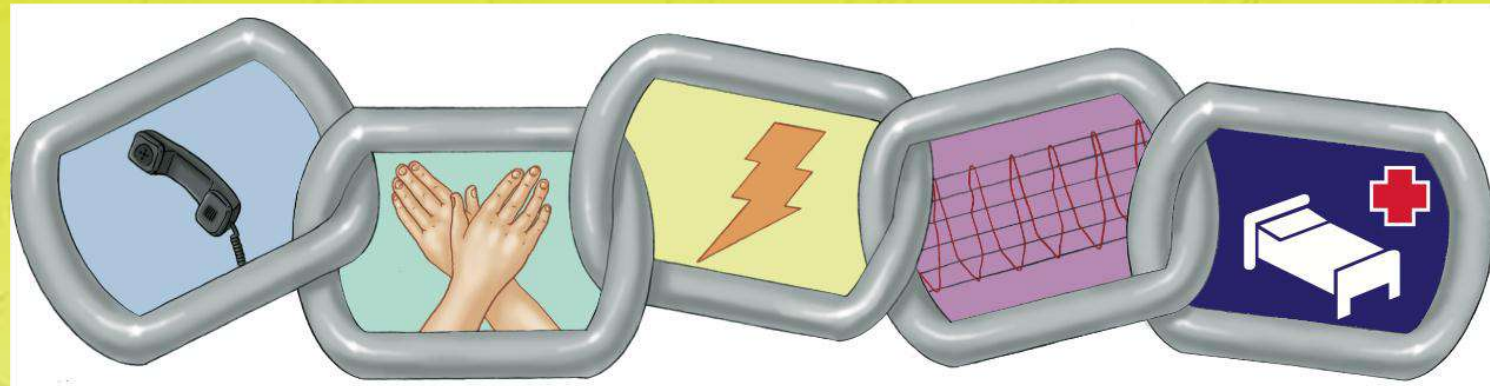


Elements of BLS (8 of 8)

- BLS differs from advanced life support (ALS)
- ALS involves:
 - Cardiac monitoring
 - Intravenous fluids and medications
 - Advanced airway adjuncts



The System Components of CPR (1 of 2)



Early access

Early CPR

Early defibrillation

Early advanced care

Post-arrest care

Source: American Heart Association

The System Components of CPR (2 of 2)



- AHA's chain of survival
 - Early access
 - Early CPR
 - Early defibrillation
 - Early advanced care
 - Integrated post-arrest care
- If any one of the links in the chain is absent, the patient is more likely to die.

Automated External Defibrillation (1 of 3)



- Vital link in the chain of survival
- Automated external defibrillator (AED) should be applied to cardiac arrest patients as soon as available.
- Simple design of AED makes it easy for EMT and laypersons to use.

Automated External Defibrillation (2 of 3)



- Begin CPR and apply the AED as soon as it is available.
- Children
 - Safe for children older than 1 month of age
 - Apply after first five cycles of CPR.
 - Manual defibrillator preferred for infants 1 month to 1 year or dose-attenuating system.
 - For child 1 to 8 years of age, use pediatric-sized pads and dose-attenuating system, if available.

Automated External Defibrillation (3 of 3)



- Special situations
 - Pacemaker
 - Wet patients
 - Transdermal medication patches

Assessing the Need for BLS

(1 of 3)

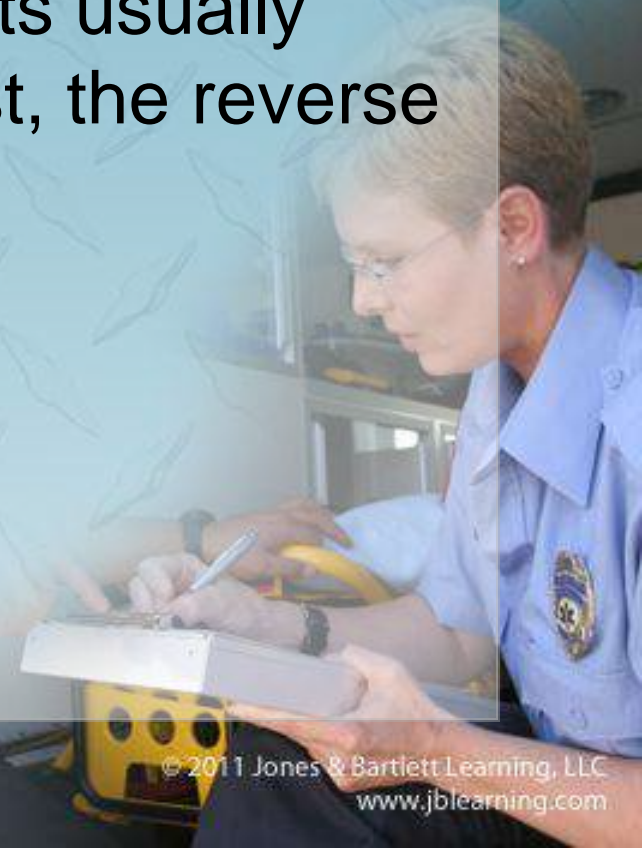
- Always begin by surveying the scene.
- Complete primary assessment as soon as possible.
- Determine unresponsiveness.
 - Conscious patient does not need CPR.
- Protect spinal cord from further injury.



Assessing the Need for BLS

(2 of 3)

- Basic principles of BLS are same for infants, children, and adults.
- Although cardiac arrest in adults usually occurs before respiratory arrest, the reverse is true for infants and children.



Assessing the Need for BLS

(3 of 3)



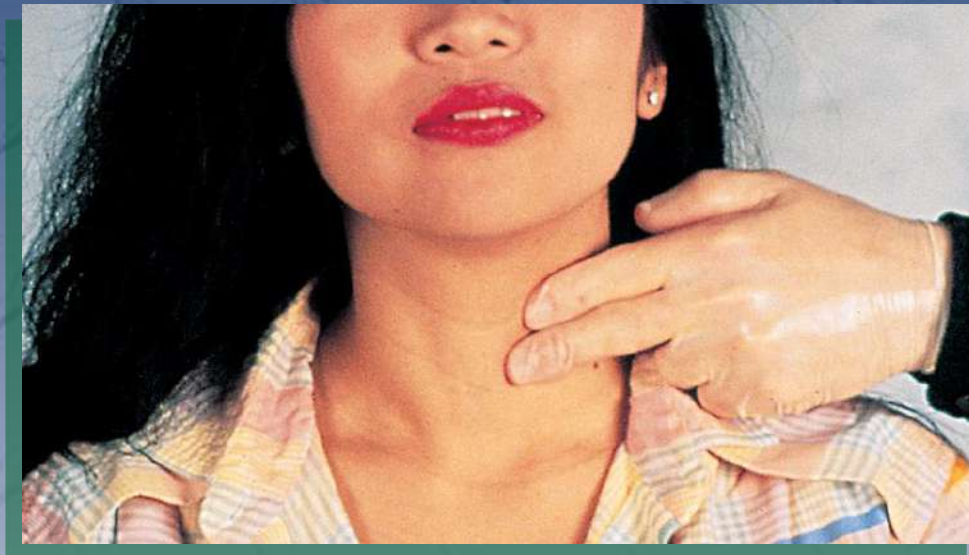
Positioning the Patient

- Position the patient so the airway is open.
- For CPR, patient must be supine on firm surface.
- Must be enough space for two rescuers to perform CPR (**Skill Drill 11-1**)
- Log roll patient onto backboard for easier access.



Assessing Pulse, Airway, and Breathing (1 of 16)

- After determining that unresponsive patient is not breathing:
 - Check for pulse at carotid artery.



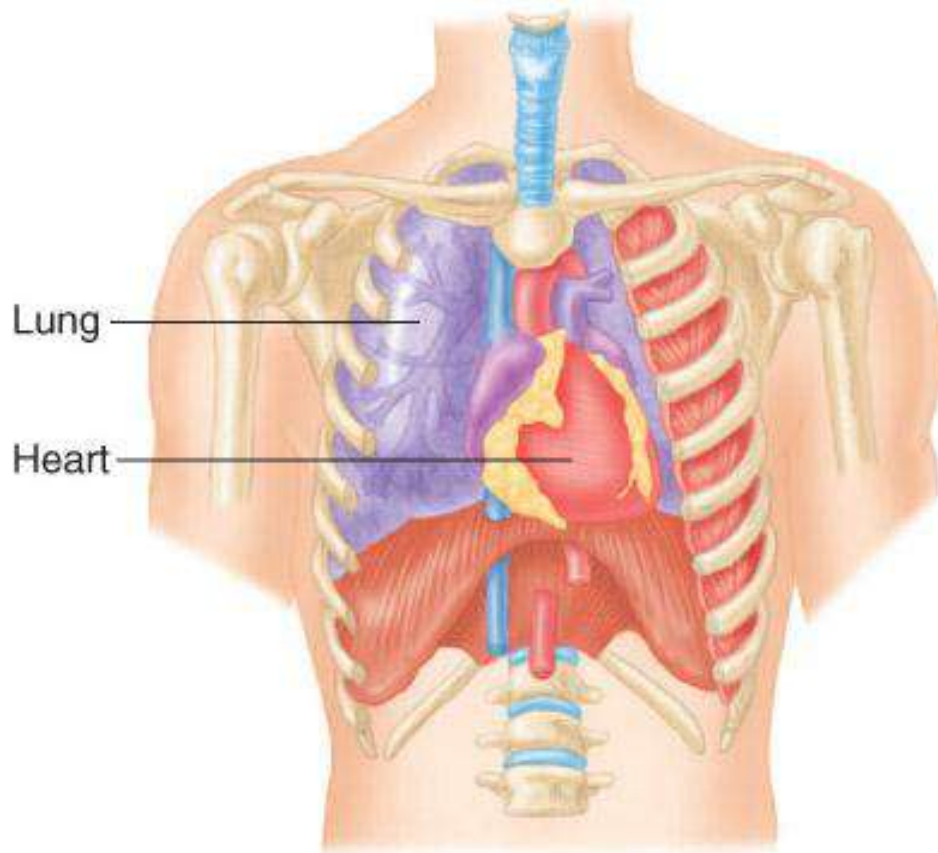
Assessing Pulse, Airway, and Breathing (2 of 16)

- If pulse cannot be felt, begin CPR.
- Administer chest compressions.
 - Apply rhythmic pressure and relaxation to lower half of sternum.
 - Heart is located slightly to left of middle between sternum and spine.
 - Compressions squeeze heart, acting as a pump to circulate blood.

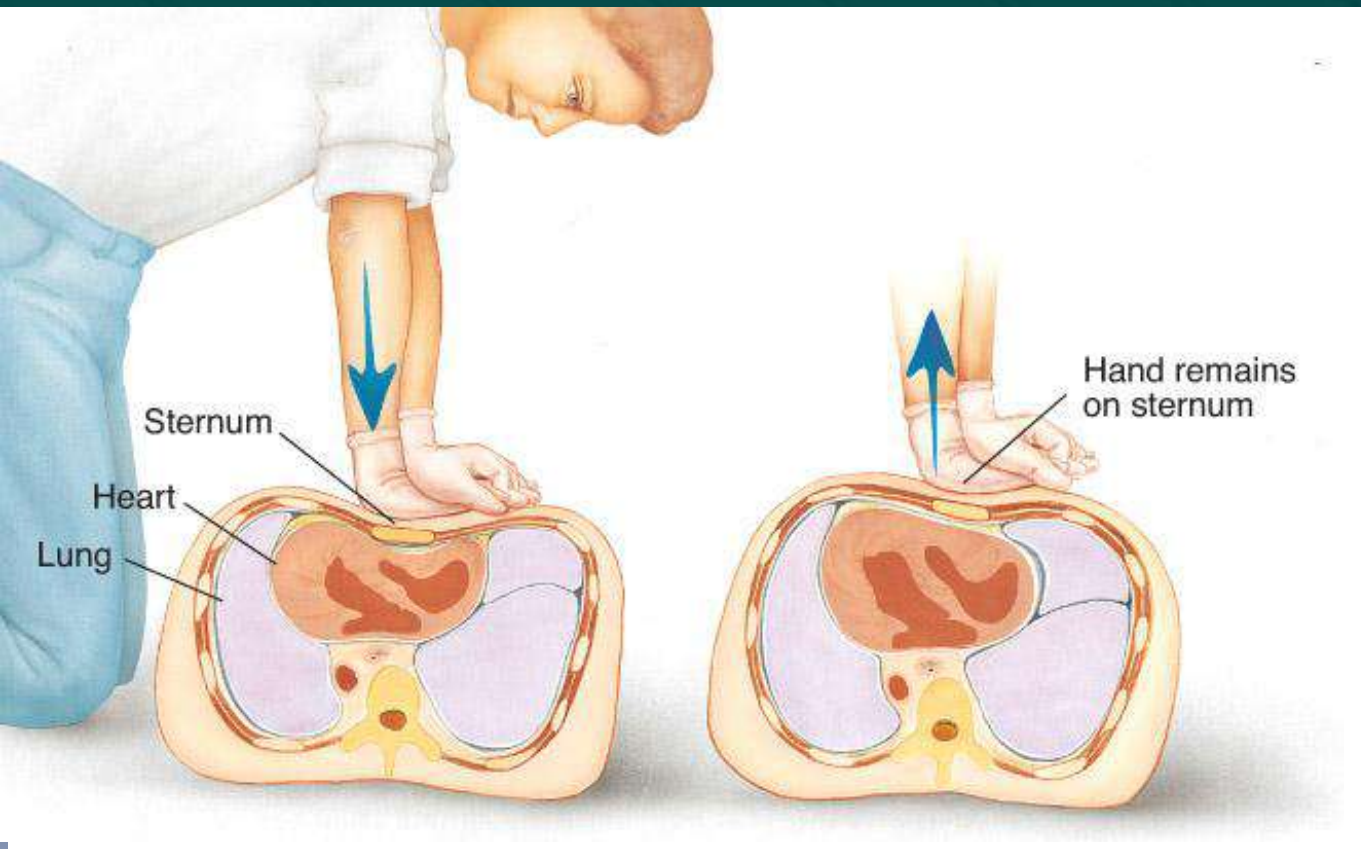
Assessing Pulse, Airway, and Breathing (3 of 16)

- Administer chest compressions (cont'd)
 - Place patient on firm, flat surface.
 - Proper hand positioning is crucial.
 - Injuries can be minimized by proper technique and hand placement.
 - See **Skill Drill 11-2**.

Assessing Pulse, Airway, and Breathing (4 of 16)



Assessing Pulse, Airway, and Breathing (5 of 16)

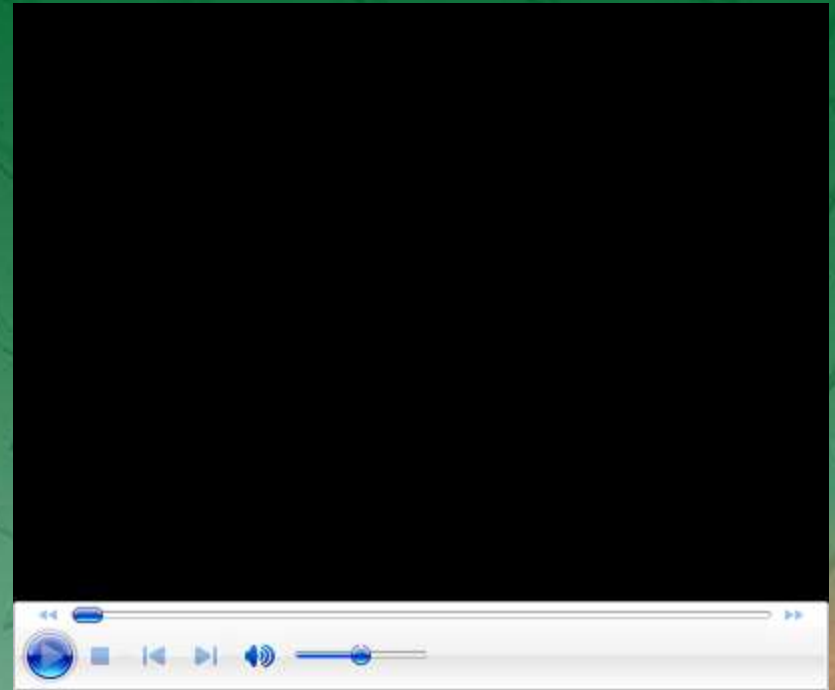
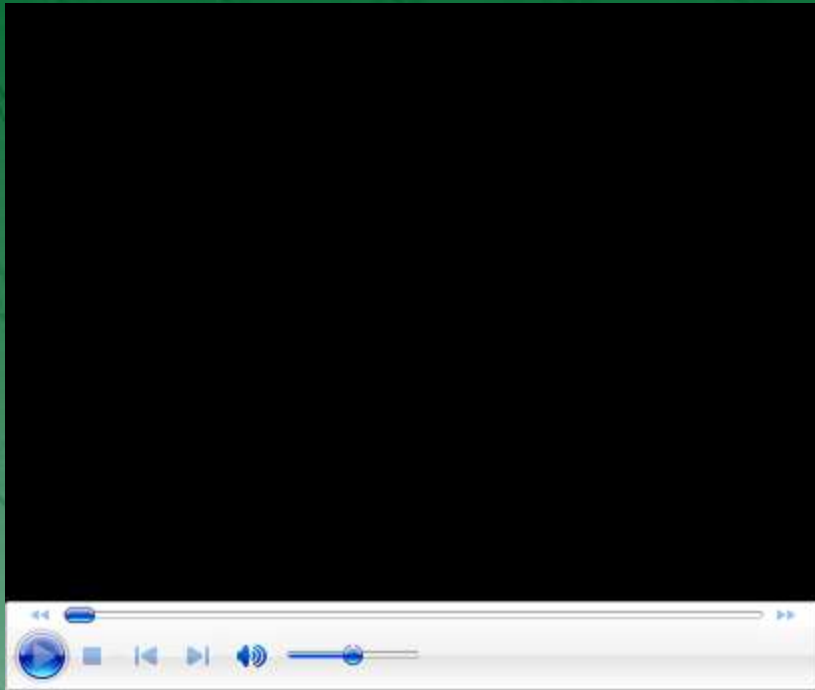


Assessing Pulse, Airway, and Breathing (6 of 16)

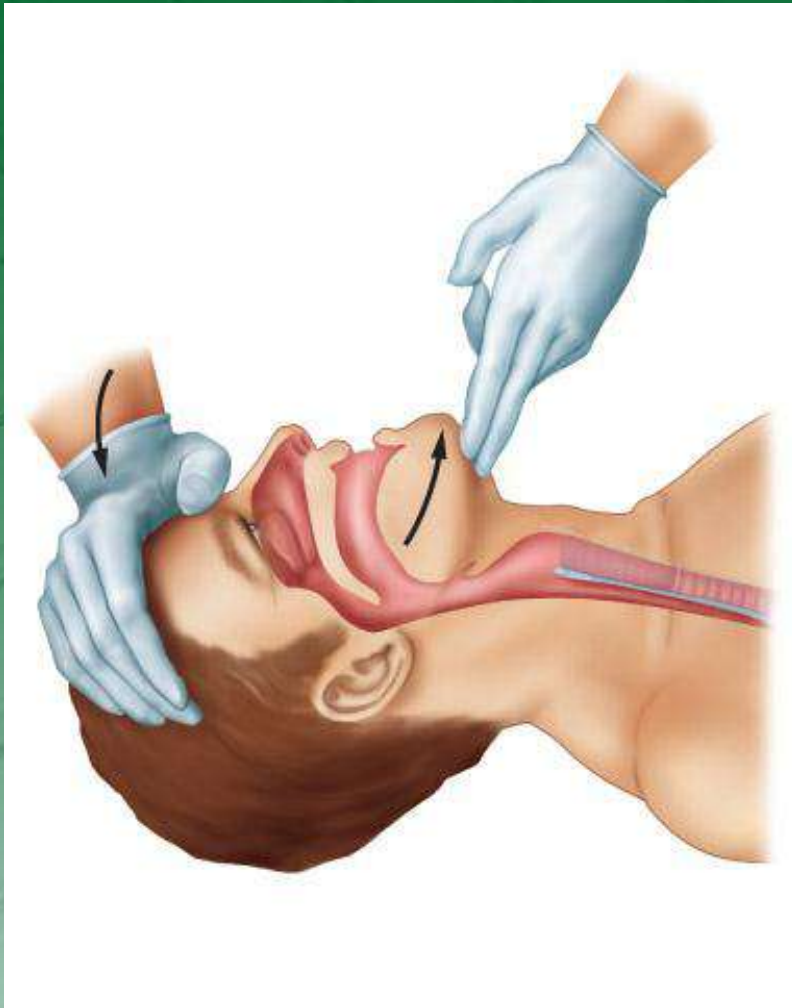
- Two techniques of opening airway in adults
 - Head tilt–chin lift maneuver
 - Jaw-thrust maneuver



Assessing Pulse, Airway, and Breathing (7 of 16)



Assessing Pulse, Airway, and Breathing (8 of 16)



Head tilt–chin lift maneuver



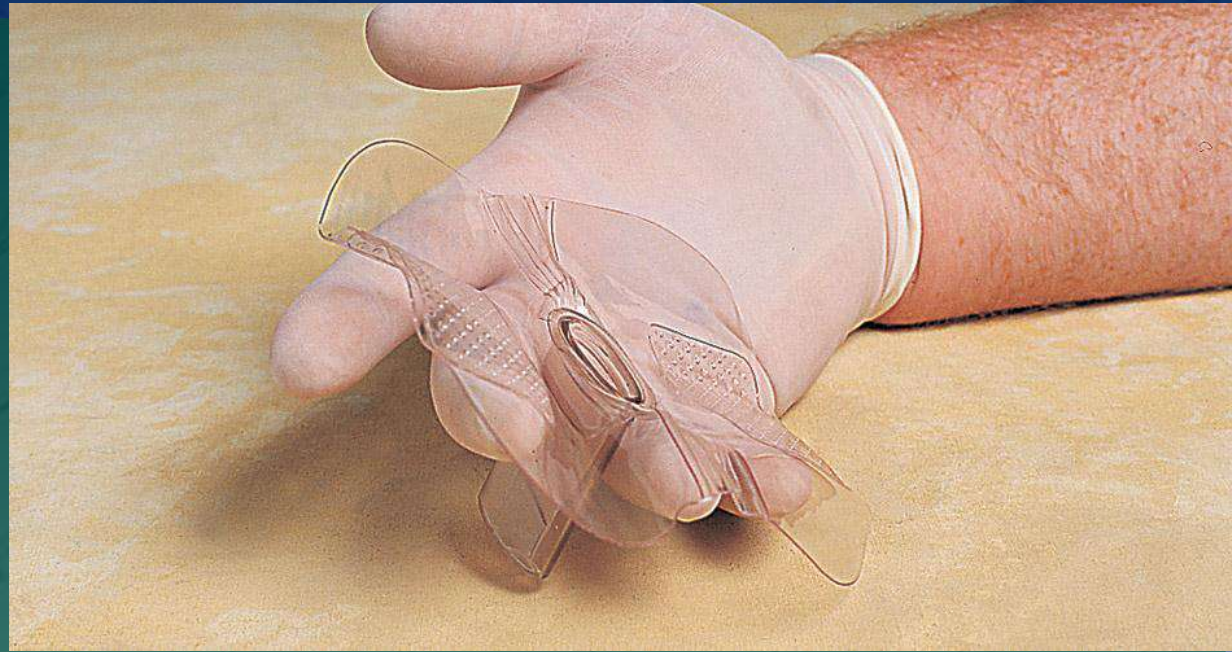
Jaw-thrust
maneuver



Assessing Pulse, Airway, and Breathing (9 of 16)

- For patients who are not breathing and do not have a pulse, provide rescue breaths following initial chest compressions.
- Ventilations can be given by one or two EMTs, by EMRs, or by trained bystanders.
- Use a barrier device.

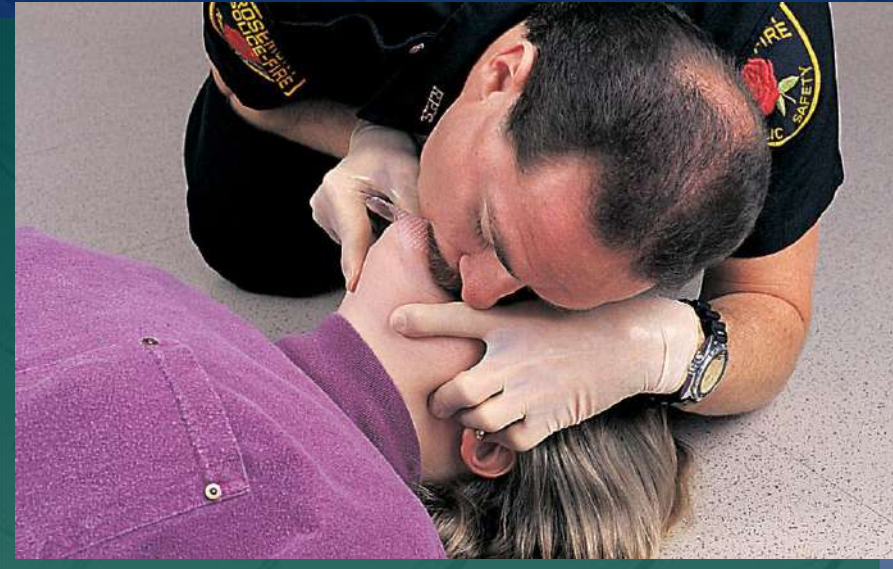
Assessing Pulse, Airway, and Breathing (10 of 16)



Assessing Pulse, Airway, and Breathing (11 of 16)



Assessing Pulse, Airway, and Breathing (12 of 16)



Assessing Pulse, Airway, and Breathing (13 of 16)

- For a patient with a stoma, place a bag-mask device or pocket mask directly over the stoma.
- Artificial ventilation may result in gastric distention.
 - The stomach becomes filled with air

Assessing Pulse, Airway, and Breathing (14 of 16)



Assessing Pulse, Airway, and Breathing (15 of 16)

- If you determine that the patient is breathing, and there are no signs of trauma, place the patient in the recovery position.
 - Maintains clear airway
 - Allows vomitus to drain from mouth
 - Not for patients with potential head or spinal injuries

Assessing Pulse, Airway, and Breathing (16 of 16)



Recovery position



One-Rescuer Adult CPR

- Single rescuer gives both chest compressions and artificial ventilations.
- Ratio of compressions to ventilations is 30:2.
- See **Skill Drill 11-3**.



Two-Rescuer Adult CPR (1 of 5)

- Always preferable to one-rescuer CPR
 - Less tiring. Rescuer doing compressions can be switched.
 - Facilitates effective chest compressions
- See **Skill Drill 11-4.**



Two-Rescuer Adult CPR (2 of 5)

- Several devices are available to assist EMTs:
 - Impedance threshold device (ITD)
 - Valve device placed between endotracheal tube and bag-mask device
 - Limits air entering lungs during recoil phase between chest compressions



Two-Rescuer Adult CPR (3 of 5)



Courtesy of Advanced Circulatory Systems, Inc.



Courtesy of Michigan Instruments, Inc.

Two-Rescuer Adult CPR (4 of 5)

- Mechanical piston device
 - Depresses sternum via compressed gas-powered plunger
- Load-distributing band CPR or vest CPR
 - Composed of constricting band and backboard



Two-Rescuer Adult CPR (5 of 5)



Infant and Child CPR (1 of 3)



- Heart is healthy in most children.
 - Therefore sudden cardiac arrest is rare.
- Cardiac arrest in children usually comes from respiratory or circulatory failure from illness or injury.
 - Airway and breathing are the focus of pediatric BLS.

Infant and Child CPR (2 of 3)

A photograph in the top right corner shows a man in a blue shirt performing CPR on a child. The man is looking down at the child, and his hands are positioned on the child's chest. The background is slightly blurred, showing other people in blue shirts.

- Causes of child respiratory problems :
 - Injury
 - Infections
 - Foreign body
 - Near drowning
 - Electrocution
 - Poisoning/overdose
 - SIDS

Infant and Child CPR (3 of 3)

- Pediatric BLS can be divided into 4 steps:
 - Determining responsiveness
 - Circulation (see **Skill Drills 11-5** and **11-6**)
 - Airway
 - Breathing

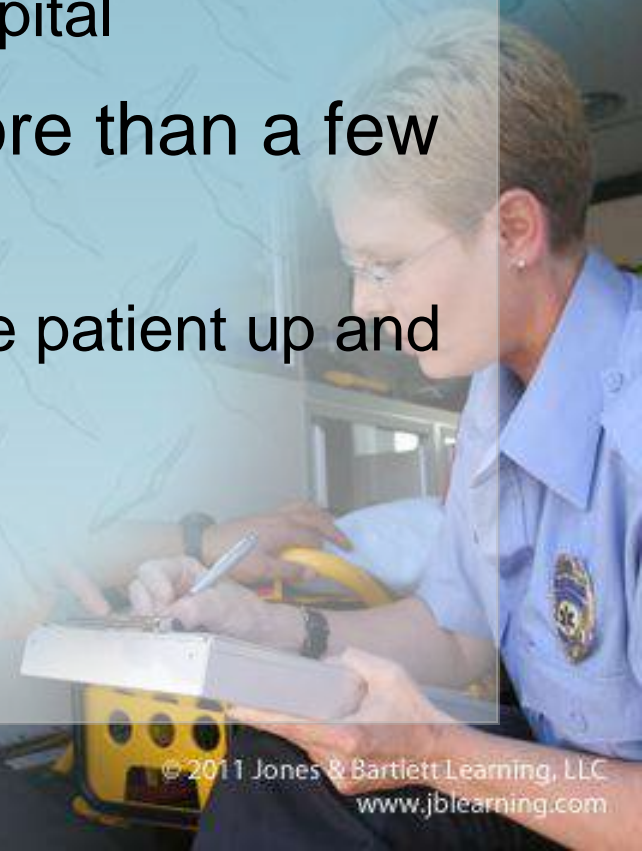
Interrupting CPR (1 of 2)

- CPR is an important holding action.
- Patient receives definitive care afterwards:
 - Defibrillation
 - Further care at hospital



Interrupting CPR (2 of 2)

- If no ALS available at scene:
 - Provide transport per protocol.
 - ALS rendezvous en route to hospital
- Try not to interrupt CPR for more than a few seconds.
 - Necessary, for example, to move patient up and down stairs



When Not to Start BLS (1 of 3)

- If the patient has obvious signs of death
 - Rigor mortis (stiffening of body)
 - Dependent lividity (livor mortis)
 - Putrefaction or decomposition of body
 - Evidence of nonsurvivable injury:
 - Decapitation
 - Dismemberment
 - Burned beyond recognition



When Not to Start BLS (2 of 3)



Dependent lividity



When Not to Start BLS (3 of 3)

- If the patient and physician have previously agreed on do not resuscitate (DNR) orders:
 - Can be complicated issue
 - Advanced directives expressing patient's wishes may be hard to find.
 - When in doubt, begin CPR.



When to Stop BLS

- Once you begin CPR, continue until (STOP acronym):
 - **S** Patient *Starts* breathing and has a pulse
 - **T** Patient is *Transferred* to another trained responder
 - **O** You are *Out* of strength
 - **P** *Physician* directs to discontinue
- “Out of strength” does not just mean tired, but physically unable to continue.



Foreign Body Airway Obstruction in Adults (1 of 7)

- Airway obstruction may be caused by:
 - Relaxation of throat muscles
 - Vomited stomach contents
 - Blood
 - Damaged tissue
 - Dentures
 - Foreign bodies



Foreign Body Airway Obstruction in Adults (2 of 7)

- In adults, usually occurs during a meal.
- In children, usually occurs during a meal or at play.
- Patient with mild airway obstruction is able to exchange air but with signs of respiratory distress.



Foreign Body Airway Obstruction in Adults (3 of 7)

- Sudden, severe obstruction is usually easy to recognize in conscious patients.
- In unconscious patient, suspect obstruction if maneuvers to open airway and ventilate are ineffective.
- Abdominal-thrust maneuver (Heimlich) is recommended in conscious adults and children older than 1 year.

Foreign Body Airway Obstruction in Adults (4 of 7)



Foreign Body Airway Obstruction in Adults (5 of 7)

- Instead of abdominal-thrust maneuver (Heimlich), use chest thrusts in:
 - Women in advanced stages of pregnancy
 - Very obese patients



Foreign Body Airway Obstruction in Adults (6 of 7)



Foreign Body Airway Obstruction in Adults (7 of 7)

- When victim is found unconscious:
 - Determine unresponsiveness.
 - Open airway.
 - Attempt ventilation.
 - Perform 30 compressions, open airway, and look in mouth.
 - Attempt to carefully remove any visible object.

Foreign Body Airway Obstruction in Infants and Children (1 of 6)

- Common problem
- On conscious, standing or sitting child, perform Heimlich maneuver.
- On unconscious child older than 1 year, follow **Skill Drill 11-7**.



Foreign Body Airway Obstruction in Infants and Children (2 of 6)



Foreign Body Airway Obstruction in Infants and Children (3 of 6)

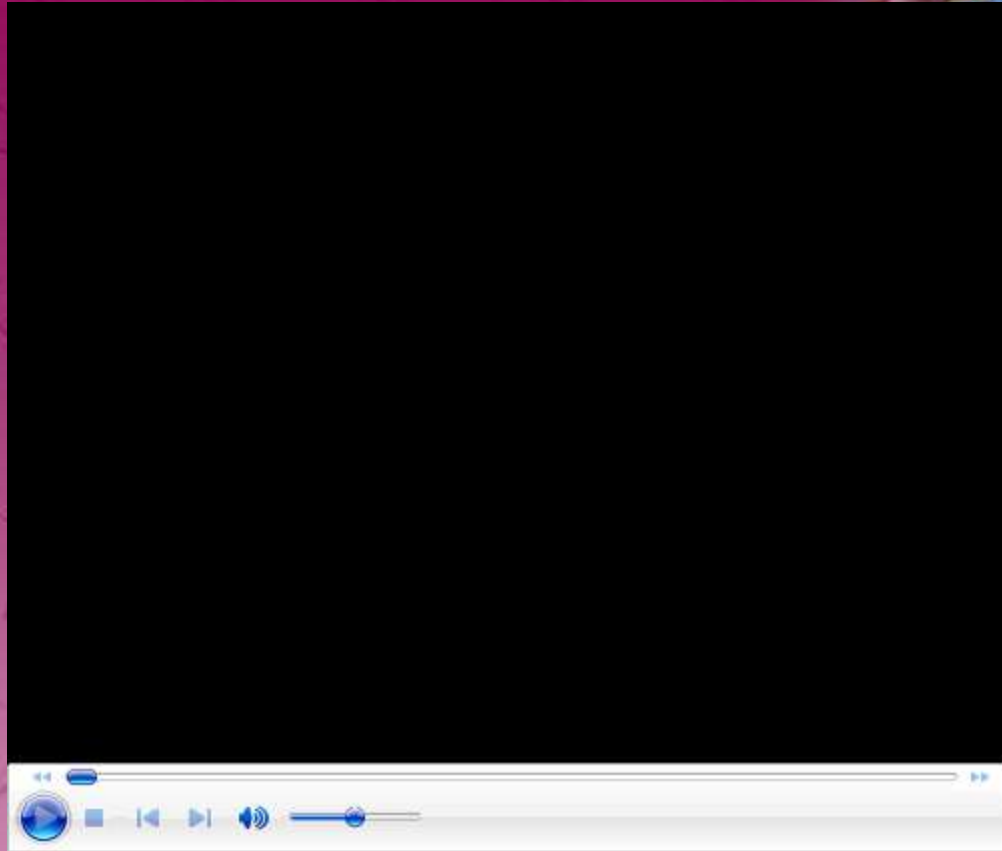
- Infants
 - Abdominal thrusts are not recommended for conscious infants.
 - Instead, perform back slaps and chest thrusts.



Foreign Body Airway Obstruction in Infants and Children (4 of 6)



Foreign Body Airway Obstruction in Infants and Children (5 of 6)



Foreign Body Airway Obstruction in Infants and Children (6 of 6)

- In unconscious infants, begin CPR but include one extra step:
 - Look inside the infant's airway each time before ventilating.
 - Remove the object if seen.

Summary (1 of 12)

- BLS is noninvasive emergency lifesaving care that is used to treat medical conditions, including airway obstruction, respiratory arrest, and cardiac arrest.

Summary (2 of 12)

- BLS care focuses on what is often termed the ABCs: airway (obstruction), breathing (respiratory arrest), and circulation (cardiac arrest or severe bleeding).

Summary (3 of 12)

- CPR is used to establish circulation and artificial ventilation in a patient who is not breathing and has no pulse.

Summary (4 of 12)

- The goal of CPR is to restore spontaneous breathing and circulation; however, advanced procedures such as medications and defibrillation are often necessary for this to occur.

Summary (5 of 12)

- ALS involves advanced lifesaving procedures, such as cardiac monitoring, administration of intravenous fluids and medications, and use of advanced airway adjuncts.

Summary (6 of 12)

- The links in the chain of survival are early access, early CPR, early defibrillation, early advanced care, and integrated post-arrest care.

Summary (7 of 12)

- The AED should be applied to cardiac arrest patients as soon as it is available.

Summary (8 of 12)

- For infants aged 1 month to 1 year, a manual defibrillator or AED with pediatric pads and a dose-attenuating system is preferred. If neither is available, an adult AED should be used.
- When using an AED on a child between 1 and 8 years of age, you should use pediatric-sized pads and a dose-attenuating system (energy reducer). If these are not available, an adult AED should be used.

Summary (9 of 12)

- Start CPR in virtually all patients in cardiac arrest. Two exceptions are if the patient has obvious signs of death or if the patient and physician previously agreed on DNR or no-CPR orders.

Summary (10 of 12)

- Once you begin CPR in the field, you must continue until one of the following events: the patient starts breathing and has a pulse, the patient is transferred to another trained responder, you are out of strength, or a physician gives direction to discontinue CPR.

Summary (11 of 12)

- An airway obstruction may be caused by various things, including relaxation of the throat muscles in an unconscious patient, vomited or regurgitated stomach contents, blood, damaged tissue after an injury, dentures, or foreign bodies such as food or small objects.

Summary (12 of 12)

- The manual maneuver recommended for removing severe airway obstructions in the conscious adult and child is the abdominal-thrust maneuver (Heimlich maneuver).