

BASIC LIFE SUPPORT STUDY GUIDE

• 1-RESCUER ADULT CPR (puberty and older)

1. Assess for **responsiveness**.

- Tap victim's shoulder and shout "Are you all right?"
- If no response, **shout for help**.

2. If alone, activate EMS and get AED (if available). If someone responds, send person to activate EMS and get AED (if available).



3. **Open airway and check breathing** (take at least 5 seconds and no more than 10 seconds)

- Use **head tilt-chin lift**
- **Look** for chest to rise & fall; **listen** for air during exhalation; **feel** for flow of air on your cheek

4. If not adequate breathing, **give 2 breaths**. Pinch nose and seal your mouth over victim's or use barrier device (e.g., face mask or bag/mask)

- **1 second per breath**; watch for **chest rise**



5. **Check pulse** (take at least 5 seconds and no more than 10 seconds).

- use 2-3 fingers of 1 hand; check **carotid pulse** between trachea & muscles at side of neck
- if DO feel a definite pulse, give 1 breath every 5 seconds. Recheck pulse every 2 minutes.

6. If do NOT definitely feel a pulse, perform **5 cycles of compressions and ventilations (30:2 ratio)**

- remove clothing from victim's chest
- put heel of 1 hand on center of victim's chest between the nipples
- put heel of other hand on top of first hand
- **push hard & fast (100/minute)**; press straight down **1½ - 2 inches** with each compression
- after each compression, allow chest to recoil and re-expand completely
- deliver compressions at **rate of 100/minute**
- **do NOT interrupt chest compression often or for long**
- continue 30:2 until AED arrives, ALS providers take over, or victim starts to move



7. Give 5 cycles of CPR before using AED:

- **Shockable rhythm**: give 1 shock, resume CPR immediately for 5 cycles, check rhythm again
- **No shockable rhythm**: resume CPR for 5 cycles, check rhythm every 5 cycles

8. Continue until ALS providers take over or victim starts to move

• 1-RESCUER CPR FOR CHILDREN (1 year of age to puberty)

1. Assess for **responsiveness**.

- Tap victim's shoulder and shout "Are you all right?"
- If no response, **shout for help**.

2. If someone responds, **send person to activate EMS and get AED** (if available).

If alone, give 5 cycles of CPR before activating EMS and get AED (if available).

If alone and there has been a sudden collapse, activate EMS and get AED (if available).

3. **Open airway and check breathing** (take at least 5 seconds and no more than 10 seconds).
 - Use **head tilt-chin lift**
 - **Look** for chest to rise & fall; **listen** for air during exhalation; **feel** for flow of air on your cheek
4. If not adequate breathing, **give 2 breaths**.
 - **1 second per breath**; watch for **chest rise**; use less air than for larger children & adults
 - Rescuers **may need to try a couple of times to give total of 2 breaths that make chest rise**. If either breath does not make chest rise, try again to open airway and give a breath. Very important to make sure rescue breaths are effective (make chest rise)!
5. **Check pulse** (take at least 5 seconds and no more than 10 seconds).
 - use 2-3 fingers of 1 hand to check **carotid pulse** between trachea and muscles at side of neck
 - if DO feel a definite pulse, give 1 breath every 3 seconds. Recheck pulse every 2 minutes.
6. If do NOT definitely feel a pulse **OR** pulse is <60 with signs of poor perfusion such as poor color, perform **5 cycles of compressions and ventilations (30:2 ratio)**
 - remove clothing from victim's chest
 - put heel of 1 hand on center of victim's chest between the nipples
 - may use heel of other hand on top of first hand for larger children
 - **push hard & fast (100/minute)**; press straight down **1/3 to 1/2 depth of the chest** with each compression
 - after each compression, allow chest to recoil and re-expand completely
 - deliver compressions at **rate of 100/minute**
 - **do NOT interrupt chest compression often or for long**
 - continue 30:2 until AED arrives, ALS providers take over, or victim starts to move
7. Give 5 cycles of CPR *before* using AED:
 - **Shockable rhythm**: give 1 shock, resume CPR immediately for 5 cycles, check rhythm again
 - **No shockable rhythm**: resume CPR for 5 cycles, check rhythm every 5 cycles

• **2-RESCUER CPR FOR ADULTS AND CHILDREN**

Compression:ventilation ratio: ADULT = 30:2, CHILD = 15:2



Rescuer 1:

- Initiates CPR and directs 2nd rescuer to activate EMS/get AED
- Performs chest compressions
- Counts out loud
- Pauses after cycle of compressions to allow 2nd rescuer to deliver breaths.
- Switches duties with 2nd rescuer every 5 cycles or 2 minutes, taking <5 seconds to switch

Rescuer 2:

- Activates EMS/gets AED
- Maintains open airway
- Gives breaths
- Monitors 1st rescuer's chest compression technique
- Switches duties with 1st rescuer every 5 cycles or 2 minutes, taking <5 seconds to switch

- **AUTOMATED EXTERNAL DEFIBRILLATOR (AED)**



Early defibrillation is critical:

1. Most common initial rhythm in witnessed sudden cardiac arrest is ventricular fibrillation (VF). With VF, heart quivers and does not pump blood.
2. Most effective treatment for VF is electrical defibrillation
3. Probability of successful defibrillation decreases quickly over time
4. VF deteriorates to asystole if not treated
5. Without CPR, chance of survival from VF cardiac arrest declines by 7%-10% without defibrillation.

AED operation:

- a. Use AEDs only when victim has **all 3 findings**: no response, no breathing, no pulse
- b. **Power on AED** (activates voice prompts).
- c. **Attach electrode pads** to victim's bare chest:
 - choose correct pads (adult vs child): use **child pads for children < 8 years** of age if available.
Do not use child pads for victims 8 years and older.
 - peel backing and place 1 electrode on upper-right side of bare chest, to right of breastbone and below collar bone.
 - place other pad to left of nipple, a few inches below left arm pit.
 - attach AED connecting cables to AED
- d. **"Clear" victim and analyze rhythm:**
 - Be sure no one is touching victim during analysis
 - AED will tell if shock is needed
- e. **If AED advises shock, it will tell you to clear the victim:**
 - clear victim before shock: be sure no one is touching victim in order to avoid injury to rescuers
 - loudly state "I'm clear, you're clear, everybody's clear"
 - press **shock** button
 - will produce a sudden contraction of victim's muscles
- f. As soon as AED gives shock, **begin CPR starting with chest compressions.**
 - Do not recheck to see if there is a pulse
- g. **After 5 cycles (2 minutes) of CPR, repeat analysis.**
- h. **NOTE** - Use AED when it arrives with the following exceptions:
 - **Child with unwitnessed, out-of-hospital arrest**: complete 5 cycles (about 2 minutes) of CPR before attaching/using AED
 - **Adult with unwitnessed, out-of-hospital arrest & EMS call-to-arrival time >4 to 5 minutes**: EMS may complete 5 cycles (2 minutes) of CPR before use of AED
 - **Adult with arrest likely due to asphyxia** (e.g., drowning): complete 5 cycles (about 2 minutes) of CPR before attaching/using AED

Infants less than 1 year old: no current evidence to recommend use of AED

Special situations:

Water:

1. Conducts electricity well
2. Water on the chest can provide direct path of energy from one electrode pad to the other (arcing) and can decrease the effectiveness of the shock delivered to heart.
3. If victim on snow or in small puddle, okay to use AED.
4. **Dry the victim's chest** before using the AED.

Transdermal medications:

1. AED electrodes should not be placed directly on top of a transdermal medication patch (nitroglycerin, nicotine, analgesics, hormone replacements, antihypertensives).
2. Patch may block delivery of energy from electrode pad to heart and may cause burns to skin.
3. **Remove the patch and wipe the area clean** before placing AED electrode pad.

Implanted pacemakers/Implanted cardiac defibrillators (ICD):

1. Usually located on the left side of the upper chest or abdomen.
2. About the size of a pack of cards.
3. Forms a lump under the skin with a scar over it.
4. **Do not place AED electrode over these devices** - may reduce the effectiveness of defibrillation.
5. Place the pad at least 1 inch (2.5 cm) away from the implanted device.
6. If the ICD is delivering shocks to the patient (the patient's muscles contract in a manner like that observed during external defibrillation), allow 30 to 60 seconds for the ICD to complete the treatment cycle.
7. Occasionally, the analysis and shock cycles of automatic ICDs and AEDs will conflict.

• 1-RESCUER INFANT CPR (< 1 year old)

1. Assess for **responsiveness**.

- Tap bottom of victim's foot and shout "Are you all right?"
- If no response, **shout for help**.

2. If someone responds, **send person to activate EMS**.

3. **Open airway** and **check breathing** (take at least 5 seconds and no more than 10 seconds).

- Use **head tilt-chin lift**
- **Look** for chest to rise & fall; **listen** for air during exhalation; **feel** for flow of air on your cheek

4. If not adequate breathing, **give 2 breaths**.

- **1 second per breath**; watch for **chest rise**; use less air than for larger children
- Rescuers **may need to try a couple of times to give total of 2 breaths that make chest rise**. If either breath does not make chest rise, try again to open airway and give a breath. Very important to make sure rescue breaths are effective (make chest rise)!

5. **Check pulse** (take at least 5 seconds and no more than 10 seconds).

- use 2-3 fingers of 1 hand to check **brachial pulse** on inside of upper arm, between infant's elbow and shoulder.
- if DO feel a definite pulse, give 1 breath every 3 seconds. Recheck pulse every 2 minutes.



6. If you do NOT definitely feel a pulse **OR** pulse is <60 with signs of poor perfusion such as poor color, perform **5 cycles of compressions and ventilations (30:2 ratio)**

- remove clothing from victim's chest
- draw an imaginary line between the nipples. Place **2 fingers on breastbone just below this line**. Do not press on xiphoid process.
- press breastbone down about **1/3 to 1/2 depth of the chest**
- after each compression, allow chest to recoil and re-expand completely
- deliver compressions at **rate of 100/minute**
- **do NOT interrupt chest compression often or for long**
- continue 30:2 until ALS providers take over, or victim starts to move

7. If alone, give 5 cycles of CPR before activating EMS and return to provide CPR.

If alone and you've witnessed a sudden collapse, activate EMS and return to provide CPR.

If infant is small and not injured, carry infant to telephone so you can quickly resume CPR.

- **2-RESCUER CPR FOR INFANTS**

Compression:ventilation ratio = 15:2



1. Compressions provided with **2 thumb-encircling hands technique**
2. Place both thumbs side by side in center of infant's chest on breastbone, just below imaginary line between the nipples.
3. Do not press on the xiphoid.
4. Encircle infant's chest and support back with fingers of both hands.
5. Press breastbone down about **1/3 to 1/2 depth of the chest**
6. After each compression, completely release pressure on chest and allow chest to fully recoil.
7. Deliver compressions at **rate of 100/minute**.
8. After every 15 compressions, pause briefly for second rescuer to open airway and give 2 breaths.
9. Switch roles every 2 minutes.

- **CHOKING**

1. Early recognition of foreign-body airway obstruction (FBAO), or choking, is key to survival.
2. Distinguish choking from fainting, stroke, heart attack, seizure, drug overdose, or other causes of respiratory failure.
3. Foreign bodies may cause either mild or severe airway obstruction.

MILD Airway Obstruction:

- **Signs:** good air exchange; person is responsive and can cough forcefully; may wheeze between coughs
- **Rescuer actions:** as long as good air exchange, encourage spontaneous coughing and breathing efforts; do not interfere with victim's attempts to cough; stay with victim and monitor status; if mild airway obstruction persists, activate EMS.

SEVERE Airway Obstruction:

- **Signs:** poor/no air exchange; weak, ineffective cough or no cough; high-pitched noise while inhaling or no noise at all; increased respiratory difficulty; possible cyanosis (blue coloration of the skin); unable to speak; clutching the neck with thumb and fingers, making the universal choking sign; unable to move air
- **Rescuer actions:** ask victim if he/she is choking; if victim nods "yes" and cannot talk, severe airway obstruction is present; activate EMS.

- **RELIEF OF CHOKING IN ADULTS AND CHILDREN OVER 1 YEAR OF AGE**

RESPONSIVE victim:

1. Use abdominal thrusts (Heimlich maneuver)
2. Stand or kneel behind victim & wrap arms around victim's waist
3. Make a fist with 1 hand and place the thumb side against the victim's abdomen, in the midline, slightly above navel and well below breastbone.
4. Grasp fist with other hand and press fist into victim's abdomen with a quick upward thrust.
5. Repeat thrusts until object is expelled or victim becomes unresponsive.
6. Give each new thrust with a separate, distinct movement to relieve obstruction.
7. If find a responsive choking victim lying down, perform abdominal thrusts with person lying down.

Choking victim responsive at first, but then BECOMES UNRESPONSIVE:

1. If ADULT, activate EMS, open airway, remove object *if you see it*, and begin CPR.
2. If CHILD, open airway, remove object *if you see it*, and begin CPR. After about 5 cycles or 2 minutes of CPR, activate the EMS if not already done.

For both ADULT and CHILD victims, every time airway is opened to give breaths, open victim's mouth wide and look for objects. **If you see it**, remove it. **If you do not see it**, keep doing CPR.

Choking victim UNRESPONSIVE when first encountered:

1. You do not know that an airway obstruction exists.
2. Activate EMS and start CPR.

Actions after relief of choking:

1. Obstruction is relieved if you: 1) feel air movement and see the chest rise when you give breaths; and/or 2) see and remove a foreign body from the victim's pharynx.
2. After relief of choking, continue with procedures for CPR as indicated (e.g., give 2 breaths, check for pulse, etc.).

NOTE: Abdominal thrusts may cause damage to internal organs. A person who has received abdominal thrusts should be examined by a healthcare provider.

- **RELIEF OF CHOKING IN INFANTS**

RESPONSIVE infant victim:

1. Kneel or sit with infant in your lap.
2. Hold infant face down with head slightly lower than chest, resting on your forearm.
3. Support infant's head & jaw with your hand, taking care not to compress the soft tissues of the infant's throat. Rest your forearm on your lap or thigh to support infant.
4. Deliver up to 5 back slaps forcefully between infant's shoulder blades, using heel of hand.
5. After 5 back slaps, place free hand on infant's back, supporting back of infant's head with palm (cradling infant between your hands). Turn infant as a unit while carefully supporting head and neck. Hold infant on back with your forearm resting on your thigh. Keep infant's head lower than trunk.
6. Provide up to 5 chest thrusts in same location as chest compressions (just below nipple line). Deliver thrusts at rate of 1 per second.
7. Repeat sequence of 5 back slaps & 5 chest thrusts until object removed or infant becomes unresponsive.

Infant choking victim responsive at first, but BECOMES UNRESPONSIVE:

1. If infant becomes unresponsive, *stop back slaps* and *begin CPR*.
2. Pressure of chest compressions from CPR may be able to relieve the obstruction.
3. Do not perform blind finger sweeps in infants in order to avoid pushing the object further into the airway.

UNRESPONSIVE infant victim:

1. Place infant on firm, flat surface.
2. Open airway, remove object *if you see it*.
3. Begin CPR with 1 extra step: each time you open the airway, look for the object. Remove it if you see it.
4. After about 5 cycles (about 2 minutes) of CPR, activate EMS.

- **SPECIAL CONSIDERATIONS**

Scene Safety

- Ensure that rescuer and victim are in a safe location (e.g., out of a burning building)
- In case of trauma, do not move victim unless necessary to ensure victim or rescuer safety

Infectious Disease

- risk of getting an infectious disease during CPR is very low
- OSHA requires healthcare workers to use standard precautions in the workplace if possibility of exposure to blood/body fluids (e.g., barrier device, bag/mask, gloves, goggles)

Jaw Thrust

- If suspect cervical spine injury, open airway using jaw thrust *without* head extension
- Move victim only if necessary to ensure safety or provide CPR (movement may cause paralysis)
- If necessary to move victim, turn head, neck, and torso as a unit (“logroll”) to avoid flexing or twisting neck/back.

Agonal Gasps

- May happen in first few minutes after cardiac arrest
- Gasps are not adequate – give the victim breaths

Recovery Position

- Use recovery position to manage unresponsive victims who have adequate breathing
- Roll victim onto his/her side and position to maintain open airway
- Recovery position allows fluid (e.g., mucus, vomitus) to drain without blocking airway
- Check breathing often. If stops, get AED and start CPR.
- *Not recommended for infants and small children*; may block airway if head not adequately supported

• CHAIN OF SURVIVAL: ADULT

1ST link – Early Access – (call 911 or the EMS access number)

2nd link – Early CPR

3rd link – Early Defibrillation

4th link – Early Advanced Life Support

• CHAIN OF SURVIVAL: PEDIATRIC

1st link – Prevention of injuries or arrest

2nd link – Early CPR

3rd link – Early Access (call 911 or the EMS access number)

4th link – Early Advanced Care

• WHAT IS A HEART ATTACK? (myocardial infarction/MI)

1. Area of heart deprived of blood flow/oxygen for longer than 20-30 minutes
2. Heart muscle dies
3. Can result from several causes: 1) severe narrowing of coronary artery by cholesterol plaque, 2) cracking of plaque with formation of blood clot over it, leading to blockage, 3) arterial spasm that blocks blood flow.
4. Heart muscle that does not receive sufficient oxygen (ischemia) may develop abnormal electrical rhythms, such as ventricular fibrillation (VF).
5. Cardiac arrest most often happens within 4 hours after onset of symptoms of heart attack.

• SIGNS AND SYMPTOMS OF HEART ATTACK

1. Uncomfortable pressure, squeezing, indigestion, fullness, tightness, aching, crushing, constricting, oppression, or heaviness are all ways to describe the chest discomfort or pain.
2. Pain is usually located in the center of the chest behind the breast bone and may spread to the shoulder, arm, neck, jaw, or back.
3. Other signs may be nausea, vomiting, shortness of breath, and weakness.
4. Pain may be mild, severe, or may occur without warning, and may be ignored.
5. Discomfort lasts more than 15-20 minutes.
6. Discomfort not relieved (or only partially relieved) by rest or nitroglycerin.
7. ATYPICAL heart attack:
 - a. May occur more often in the elderly, people with diabetes, women
 - b. In atypical MI, may have only vague symptoms or only weakness, shortness of breath, lightheadedness

- People may deny they are having a heart attack and will wait for hours before seeking help. After complaining of chest pains lasting more than a few minutes, EMS system should be accessed.

- **CARDIAC ARREST**

1. Circulation ceases and vital organs do not get enough oxygen.
2. Appearance of cardiac arrest victim: 1) unresponsive, 2) not breathing, 3) no pulse
3. May have agonal gasps early in cardiac arrest but they are not adequate breathing.
4. It is imperative to start CPR IMMEDIATELY on a victim of cardiac arrest, as brain death will begin within 4 to 6 minutes.

- **COMMON WARNING SIGNS OF A STROKE**

1. Sudden weakness or numbness of the face, arm or leg, especially on one side of the body.
2. Sudden confusion, trouble speaking or understanding.
3. Sudden trouble seeing in 1 or both eyes.
4. Sudden trouble walking, dizziness, loss of balance or coordination.
5. Sudden severe headache with no known cause.

SUMMARY/COMPARISON OF PROCEDURES

| CPR | Adult and Older Child (puberty + older) | Child (1 yr – puberty) | Infant (1 yr old) |
|--|--|--|---|
| Establish unresponsiveness - Activate EMS | EMS as soon as victim found | EMS after giving 5 cycles of CPR | |
| Open airway - Use head tilt/chin lift | Head tilt-chin lift (suspected trauma: jaw thrust) | | |
| Check breathing - If not breathing: give 2 breaths that make chest rise | Open airway: look, listen, feel Take at least 5 seconds and no more than 10 seconds | | |
| First 2 breaths | Give 2 breaths (1 second each) | | |
| Check pulse At least 5 seconds and no more than 10 seconds | Carotid pulse (if no pulse, start CPR) | Carotid pulse (if no pulse or pulse <60 with poor perfusion, start CPR) | Brachial pulse (if no pulse or pulse <60 with poor perfusion, start CPR) |
| Start CPR | | | |
| Compression location | Center of breastbone between nipples | | Just below nipple line on breastbone |
| Compression method | Heel of 1 hand, other hand on top (or 1 hand for small victims) | | 2 fingers (2 thumb-encircling hands for 2 rescuer) |
| Compression depth | 1½ - 2 inches | 1/3 – ½ depth of chest | |
| Compression rate | 100 per minute | | |
| Compression:ventilation ratio | 30:2 (1 or 2 rescuer) | 30:2 (1 rescuer) 15:2 (2 rescuer) | |