Summary of High-Quality CPR Components for BLS Providers *updated Oct. 2020*

Component	Adults and Adolescents	Children (Age 1 Year to Puberty)	Infants (Age Less Than 1 Year, Excluding Newborns)
Scene safety	Make sure the environment is safe for rescuers and victim		
Recognition of cardiac arrest	Check for responsiveness No breathing or only gasping (ie, no normal breathing) No definite pulse felt within 10 seconds (Breathing and pulse check can be performed simultaneously in less than 10 seconds)		
Activation of emergency response system	If you are alone with no mobile phone, leave the victim to activate the emergency response system and get the AED before beginning CPR Otherwise, send someone and begin CPR immediately; use the AED as soon as it is available	***Witnessed collapse*** Follow steps for adults and adolescents on the left ***Unwitnessed collapse*** Give 2 minutes of CPR Leave the victim to activate the emergency response system and get the AED Return to the child or infant and resume CPR; use the AED as soon as it is available	
Compression-ventilation ratio *without advanced airway*	***1 or 2 rescuers*** 30:2	***1 rescuer*** 30:2 ***2 or more rescuers*** 15:2	If you notice signs of poor perfusion in an infant despite adequate rescue breathing (that is, despite effective oxygenation and ventilation) and the heart rate is **60/min or less**, **start CPR** (compressions and breaths).
Compression-ventilation ratio *with advanced airway*	Continuous chest compressions at a rate of **100-120 per minute** For **Adults**, give **1 breath** every **6 seconds** (10 breaths/min) For **Infants/Children**, give **1 breath** every **2 to 3 seconds** (20 to 30 breaths/min)		
Compression rate	100-120/min		
Compression depth	At least 2 inches (5 cm)* *but no more than 2.4 inches (6 cm)*	At least one third AP diameter of chest About 2 inches (5 cm)	At least one third AP diameter of chest About 1½ inches (4 cm) *AP = anteroposterior (from front to back)*
Hand placement	2 hands on the lower half of the breastbone (sternum)	2 hands or 1 hand (optional for very small child) on the lower half of the breastbone (sternum)	***1 OR 2 Rescuers (*updated 2020)*** Single rescuers may compress the sternum with **2 fingers OR 2 thumbs** placed just below the nipple line (mammary line). *If the correct depth **cannot** be achieved, a rescuer may use the **heel** of **1 hand**.*
Chest recoil	Allow full recoil of chest after each compression; do not lean on the chest after each compression		
Minimizing interruptions	Limit interruptions in chest compressions to less than 10 seconds		

Rescue Breathing for Adults	Rescue Breathing for Infants and Children
• Give 1 breath every 6 seconds (about 10 breaths per minute).	• Give 1 breath every 2 to 3 seconds (20 to 30 breaths per minute).
• Give each breath in 1 second. • Each breath should result in visible chest rise. • Check the pulse about every 2 minutes.	

Rescue breathing is giving breaths to an unresponsive victim who **has a pulse** but is **not breathing**. You may provide rescue breathing by using a **barrier device** (eg, **pocket mask**) or **bag-mask device**.

If emergency equipment is not available, the rescuer may provide breaths by using the **mouth-to-mouth** or **mouth-to-mouth-and-nose technique (for infants)**.

Basic Life Support Study Guide

SCENE SAFETY, RESPONSIVENESS AND ASSESSMENT

Scene safety

Make sure the scene is safe for you and the victim.

Check for responsiveness

Tap the victim's shoulders. Shout, "Are you OK?"

If the victim is not responsive, activate the emergency response system via mobile device. Get the AED or send someone to do so.

Assess for breathing and a pulse

To minimize delay in starting CPR, you may assess breathing and pulse at the same time. This should take no more than 10 seconds.

- To check for breathing, scan the victim's chest for rise and fall for no more than 10 seconds.
  - **If the victim is not breathing or is only gasping:** Be prepared to begin high-quality CPR. Gasping is not normal breathing and is a sign of cardiac arrest.
- To perform a pulse check on an adult, feel for a carotid pulse.

Follow these steps to find and feel for the carotid pulse:

- Locate the trachea (on the side closest to you), using 2 or 3 fingers.
- Slide those fingers into the groove between the trachea and the muscles at the side of the neck, where you can feel the carotid pulse.
- Feel for a pulse for at least 5 but no more than 10 seconds. If you do not definitely feel a pulse, begin CPR, starting with chest compressions.

CRITICAL COMPONENTS OF CHEST COMPRESSIONS: ADULTS

Place the victim on a firm, flat surface, such as a floor or backboard.

- **Rate:** 100 to 120/min.
- **Depth:** At least 2 inches (5 cm).
- **Hand placement:** 2 hands on the lower half of the breastbone.
- **Chest recoil:** Allow complete recoil; do not lean on the chest.
- **Minimizing interruptions:** Limit interruptions to less than 10 seconds.

CHEST COMPRESSION FEEDBACK DEVICE

Feedback devices can monitor CPR and provide real-time feedback for aspects such as

- Rate
- Depth
- Recoil

HOW TO OPEN THE AIRWAY FOR BREATHS

Step 1

Place one hand on the victim's forehead, and push with your palm to tilt the head back.

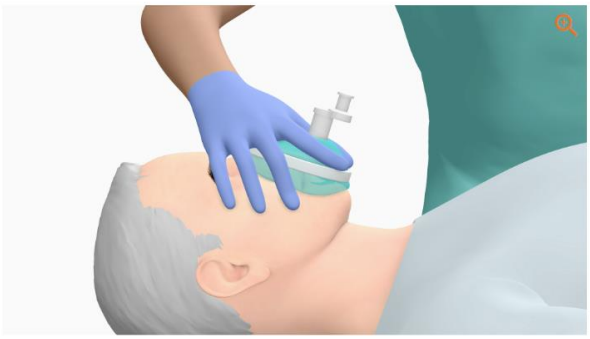
Step 2

Place fingers of the other hand under the bony part of the lower jaw, near the chin.

Step 3

Lift the jaw to bring the chin forward.

HOW TO USE A POCKET MASK



Step 1

- Position yourself at the **victim's side**.
- **Place the pocket mask on the victim's face**, using the **bridge of the nose** as a guide for correct positioning.

Step 2

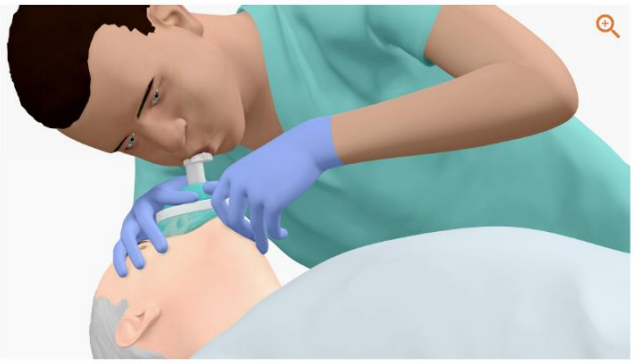
- **Seal the mask against the face**.
- Using your hand that is closer to the top of the victim's head, place your **index finger and thumb** along the top **edges of the mask**.
- Place the **thumb** of your **other hand** along the bottom edge of the mask.

Step 3

- Place the **remaining fingers of your second hand** along the **bony margin of the jaw** and **lift the jaw**.
- Perform a **head tilt—chin lift** to open the airway.

Step 4

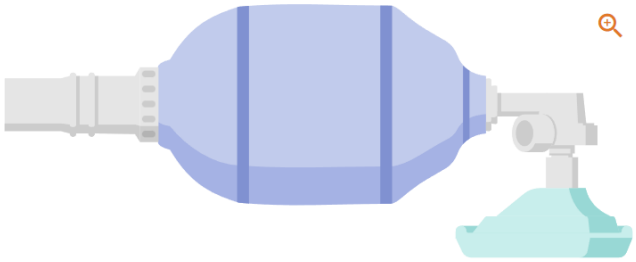
- While you lift the jaw, **press firmly and completely** around the outside edge of the mask to **seal the pocket mask** against the face.



Step 5

- Deliver each breath over **1 second**.
- Enough to make the victim's **chest rise**.

BAG-MASK DEVICE



A bag-mask device:

- Provides positive-pressure ventilation.
- Consists of a bag attached to a face mask.
- May include a 1-way valve.

Position yourself directly above the victim's head.

Step 1

- Place the mask on the victim's face, using the bridge of the nose as a guide for correct position.

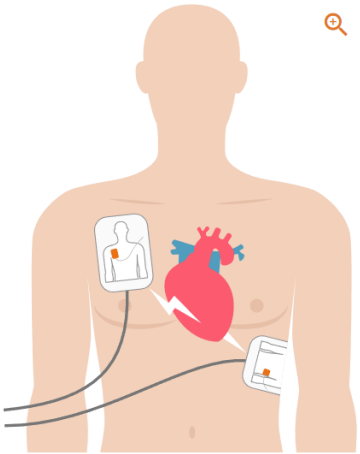
Step 2

- Use the **E-C clamp technique**.
  - Perform a **head tilt**.
  - Place the mask on the face with the **narrow portion at the bridge of the nose**.
  - Use the **thumb and index finger of one hand to make a "C"** on the side of the mask, pressing the edges of the mask to the face.
  - Use the **remaining fingers to lift the angles of the jaw**, open the airway, and press the face to the mask.

Step 3

- **Squeeze the bag** to give breaths while watching for **chest rise**
- Deliver each breath over **1 second**
- **If there are 2 rescuers:**
  - **Rescuer 1:** Positioned directly above the victim, opens the airway and positions the bag-mask device.
  - **Rescuer 2**: Positioned at the victim's side, squeezes the bag.

WHY AN AED IS NEEDED



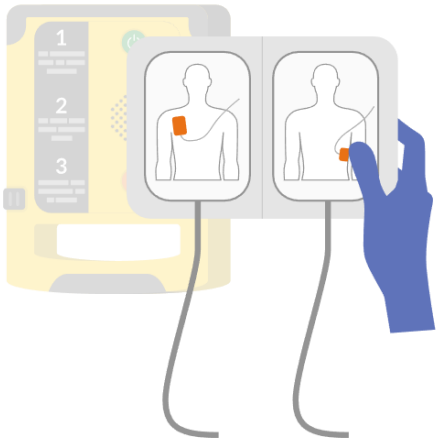
- Two **life-threatening arrhythmias** that can cause cardiac arrest are **pulseless ventricular tachycardia** (pVT) and **ventricular fibrillation** (VF).
- Death usually follows unless a normal heart rhythm and pulse are restored within minutes.

An **AED** is a device that **analyzes the heart rhythm** to identify the presence of an **arrhythmia** that can be corrected by a shock.

- Lightweight, portable device.
- Simple to operate.
- Uses voice prompts, lights, and on-screen messages.

Step 1

- **Power on the AED** if needed.
- Follow the **prompts.**



Step 2

- Choose **adult pads** for victims **8 years of age and older**.
- **Attach the adhesive AED pads** to the victim's **bare chest.**

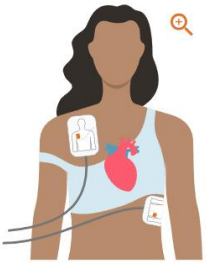
Step 3

- When the AED prompts you, **clear the victim during analysis**. Be sure that **no one is touching the victim**.
- Some AEDs will tell you to push a button to allow the AED to begin analyzing; others will do that automatically.
- The AED **may take a few seconds to analyze**.

Step 4

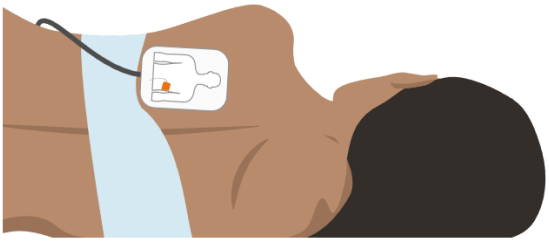
- **If the AED advises a shock:**
  - It will charge and then tell you again to clear the victim.
  - **Clear the victim** before delivering the shock.
  - Press the **shock button**.
  - After any shock delivery, **immediately resume CPR**.
- **If no shock is needed:**
  - **Immediately resume CPR**, starting with **compressions**

AED PAD PLACEMENT: ADULTS AND CHILDREN 8 YEARS AND OLDER



Anterolateral Placement

- Place one pad directly **below the right collarbone**.
- Place the other pad to the **side of the left nipple**, with the top edge of the pad a few inches below the armpit.



Anteroposterior Placement

- Place one pad in the **center of the chest** (anterior) and the other pad in the **center of the victim's back** (posterior).

Or

- Place one pad on the **left side of the chest**, between the **left side of the victim's breastbone and nipple**. Place the other pad on the **left side of the victim's back**, next to the spine.

When 2 or more rescuers are present,

- One rescuer should **continue chest compressions** while the other **operates the AED**.

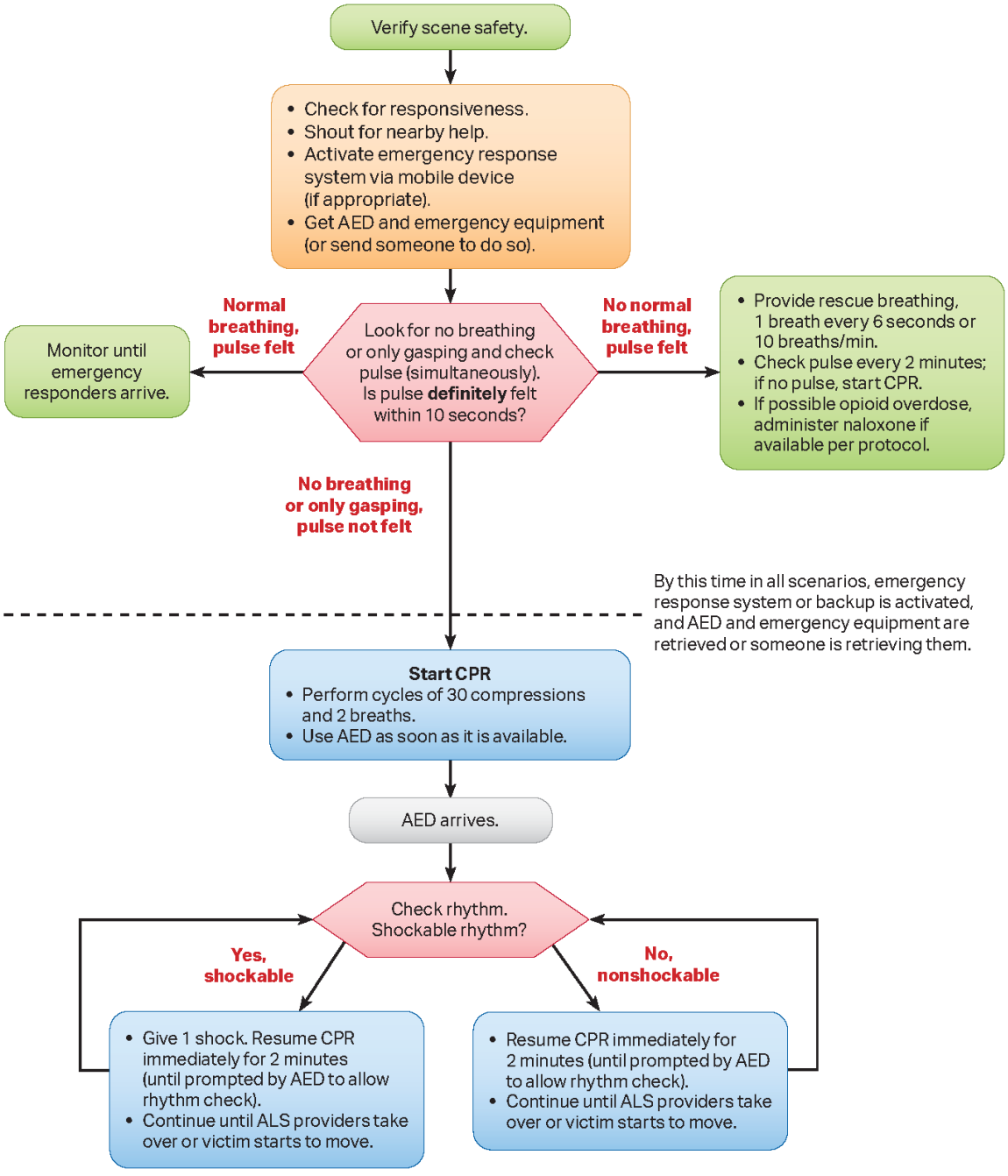
Rescuers should continue high-quality CPR

- **Until the AED delivers a prompt** to clear the victim for analysis.

If no shock is advised,

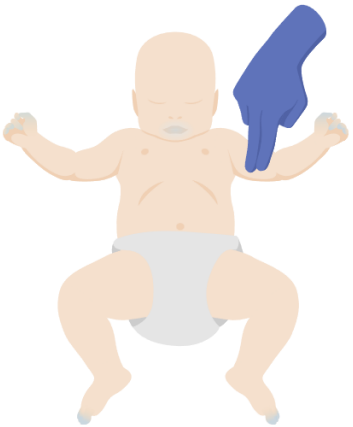
- **Immediately resume CPR**, starting with chest compressions.

Adult Basic Life Support Algorithm for Healthcare Providers



PEDIATRIC CHAIN OF SURVIVAL

PULSE CHECK: INFANTS AND CHILDREN



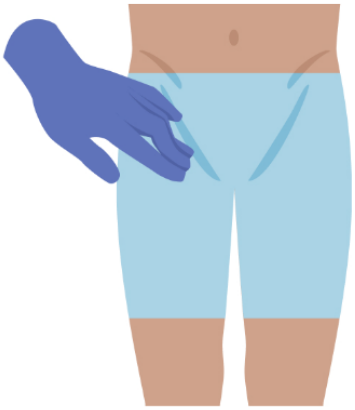
Follow these steps to check the brachial artery pulse in an infant.

Step 1

- **Place 2 or 3 fingers on the inside of the upper arm**, between the elbow and shoulder.

Step 2

- Then press the fingers to attempt to **feel the pulse for at least 5 but no more than 10 seconds**.
- **If you do not feel a pulse within 10 seconds, or the heart rate is 60/min or less, begin high-quality CPR**, starting with chest compressions.



To perform a pulse check in a child, feel for a carotid or femoral pulse.

Follow these steps to check the femoral artery pulse.

Step 1

- **Place 2 or 3 fingers in the inner thigh**, midway between the hip bone and the pubic bone and just below the crease where the leg meets the torso.

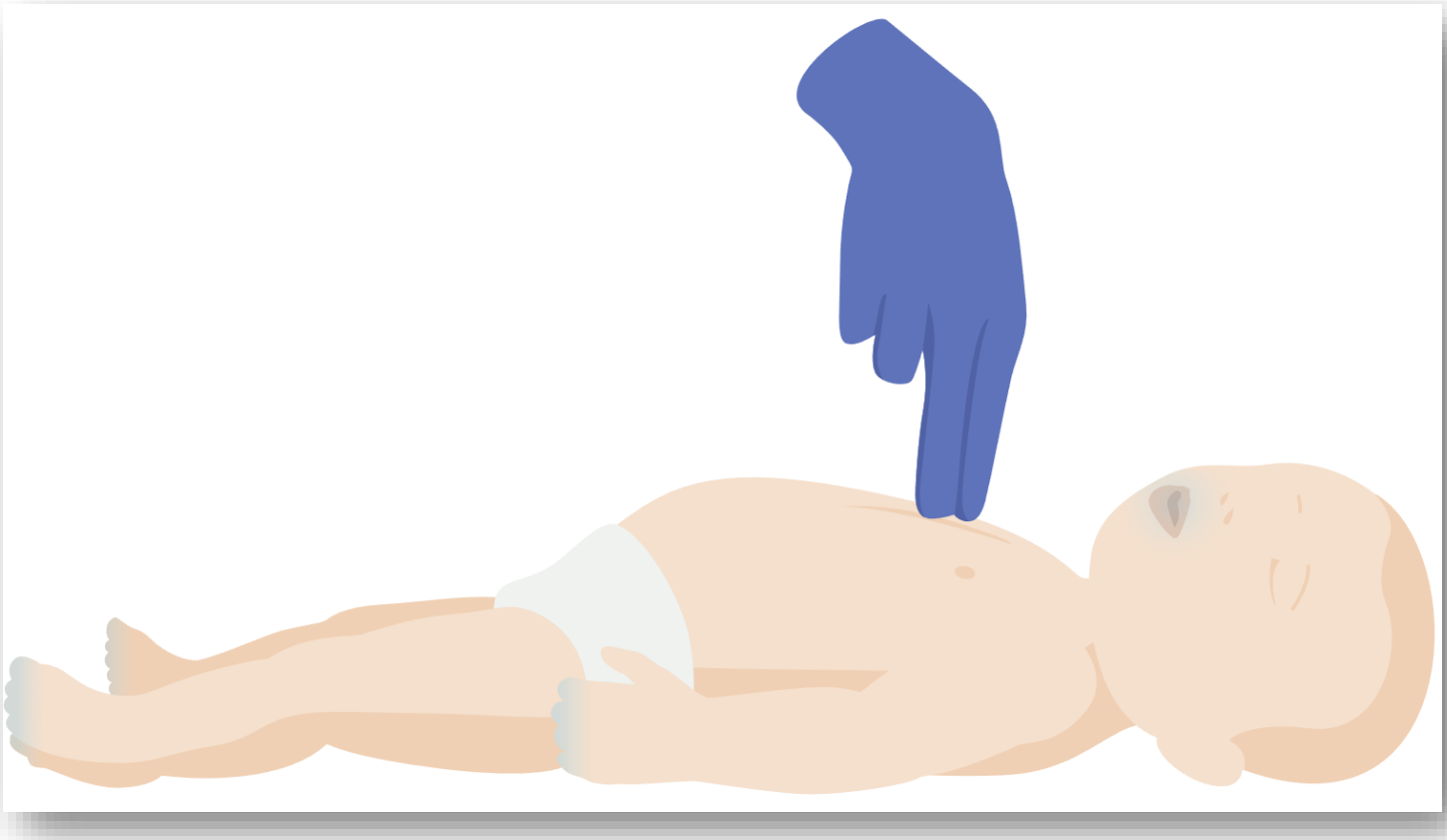
Step 2

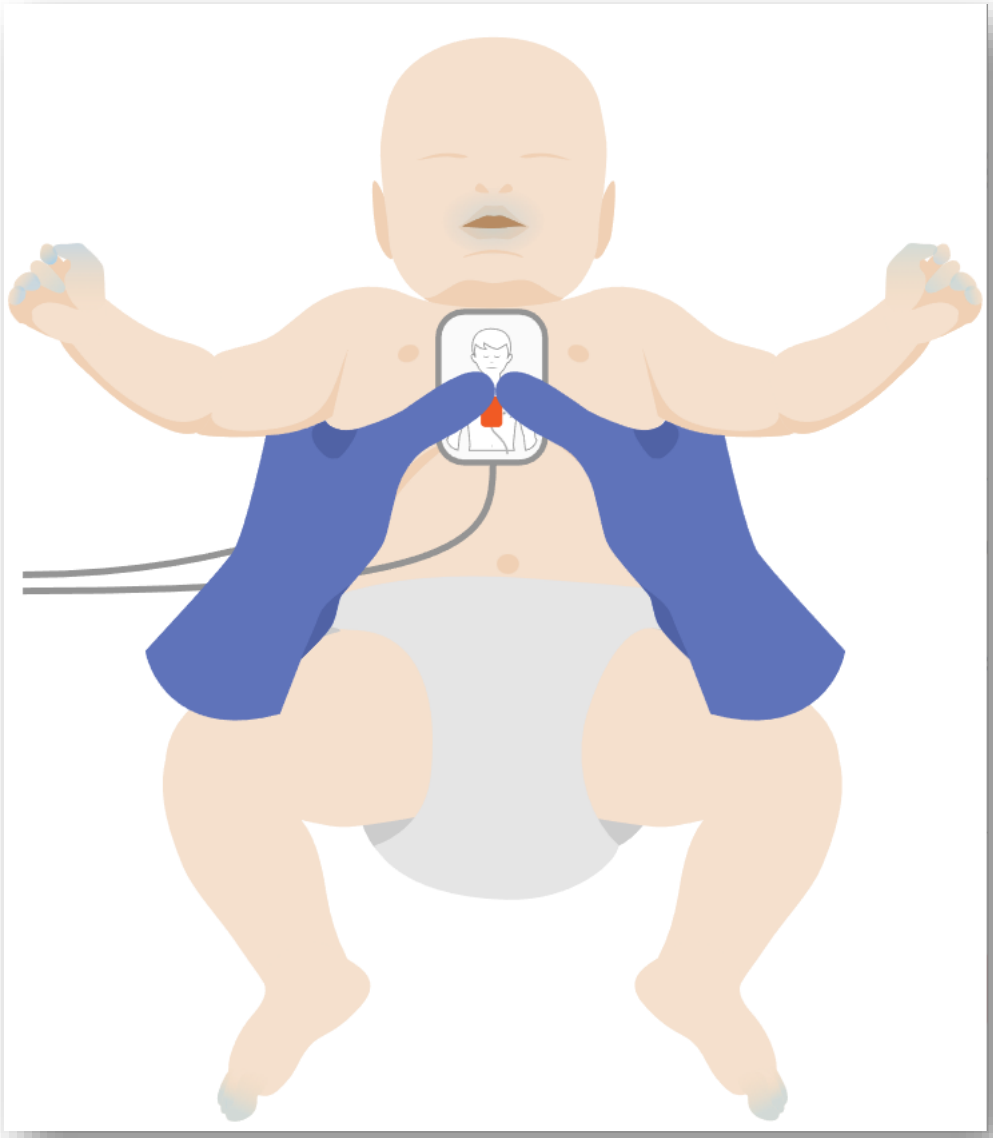
- **Feel for a pulse for at least 5 but no more than 10 seconds**.
- **If you do not feel a pulse** within 10 seconds, or the heart rate is 60/min or less **begin high-quality CPR**, starting with chest compressions.

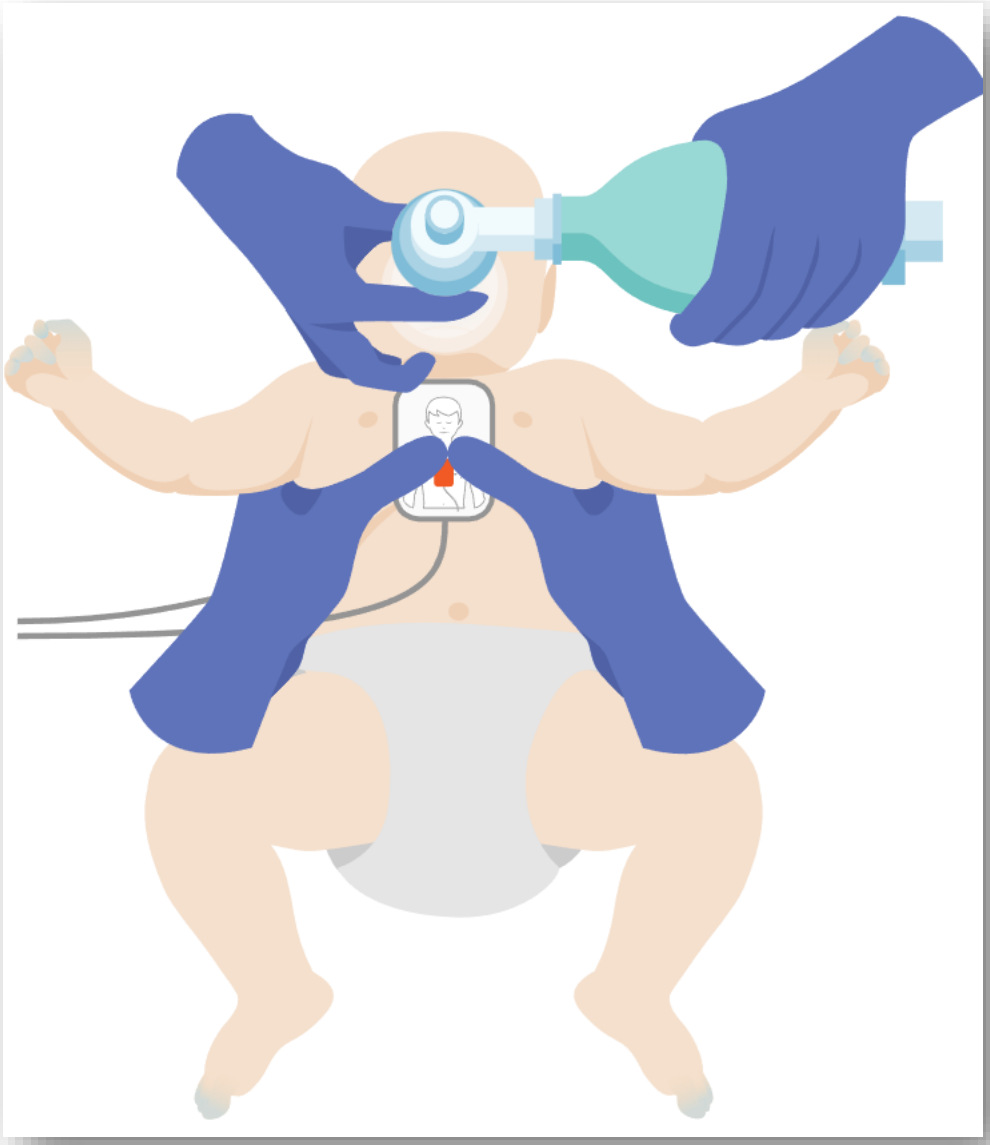
- **Rate:** 100 to 120/min.
- **Depth:** Approximately 2 inches (5 cm).
- **Hand Placement:** 2 hands or 1 hand on the lower half of the breastbone.
- **Chest Recoil**: Allow complete recoil; do not lean on the chest.
- **Minimizing Interruptions:** Limit interruptions to less than 10 seconds.

CRITICAL COMPONENTS OF CHEST COMPRESSIONS: INFANTS

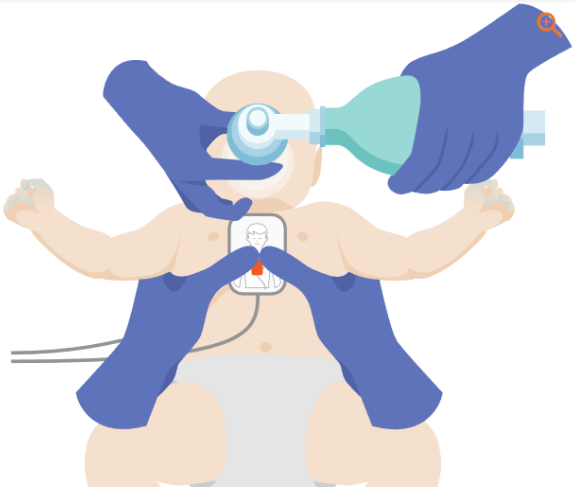
- **Rate**: 100 to 120/min.
- **Depth:** Approximately 1½ inches (4 cm).
- **Hand placement:**
  - **1 rescuer places 2 fingers in the center of the chest**, just below the nipple line.
  - **2 rescuers use the 2 thumb—encircling hands technique** in the center of the chest, just below the nipple line.
  - **1 rescuer may also use the 2 thumb—encircling hands technique or the heel of 1 hand**.
- **Chest recoil:** Allow complete recoil; do not lean on the chest.
- **Minimizing interruptions**: Limit interruptions to **less than 10 seconds**.







COMPRESSION-TO-VENTILATION RATIO: INFANTS AND CHILDREN



- Ratio for **1 rescuer** is **30:2**.
- Ratio for **2 or more rescuers** is **15:2**.

WITNESSED VS UNWITNESSED COLLAPSE: CHILDREN AND INFANTS

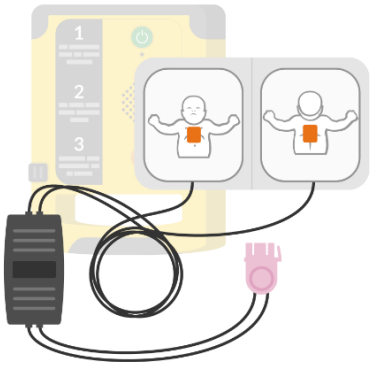
Witnessed Collapse

- If you are **alone** with **no mobile phone**, **leave the victim** to activate the emergency response system and get the AED before beginning CPR. Use the AED as soon as it is available.
- If you are **not alone**, send someone to get the AED and begin CPR immediately. Use the AED as soon as it is available.

Unwitnessed Collapse

- If you are **alone,** start CPR with cycles of 30:2.
- If you are **not alone**, send someone to get the AED and begin CPR immediately. Use the AED as soon as it is available.
- After about 2 minutes, if you are still alone, activate the emergency response system and get an AED if not already done.
- Use the AED as soon as it is available.

AED PAD PLACEMENT: INFANTS AND CHILDREN LESS THAN 8 YEARS OF AGE



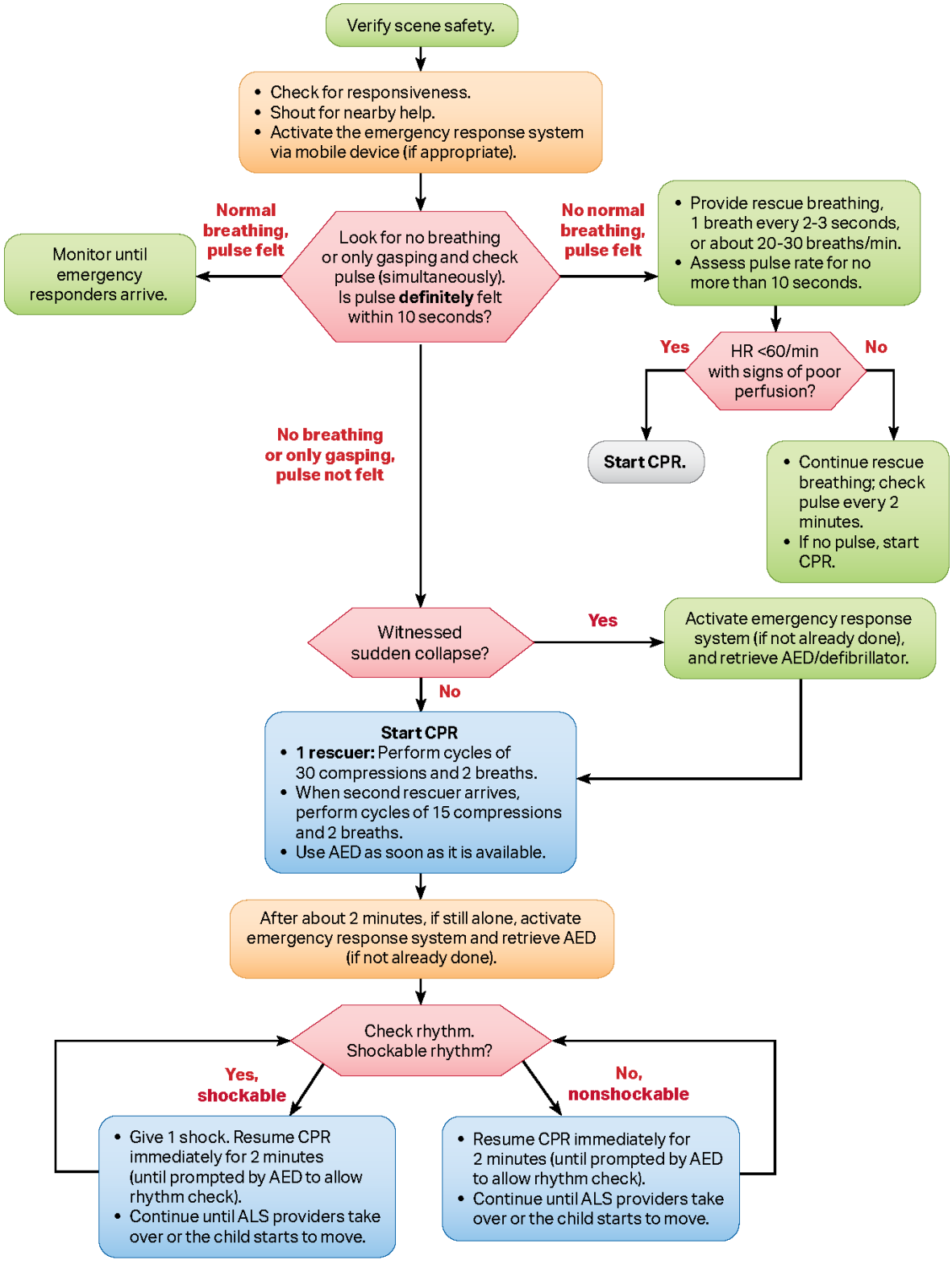
Pad Choice

- **If your AED includes smaller-sized pads** that are designed for children under 8 years of age, **use them**.
- **If not, use the adult pads** while making sure that they don't touch or overlap.
- **Do not use the child pads for an adult**. The shock dose is too small for an adult.

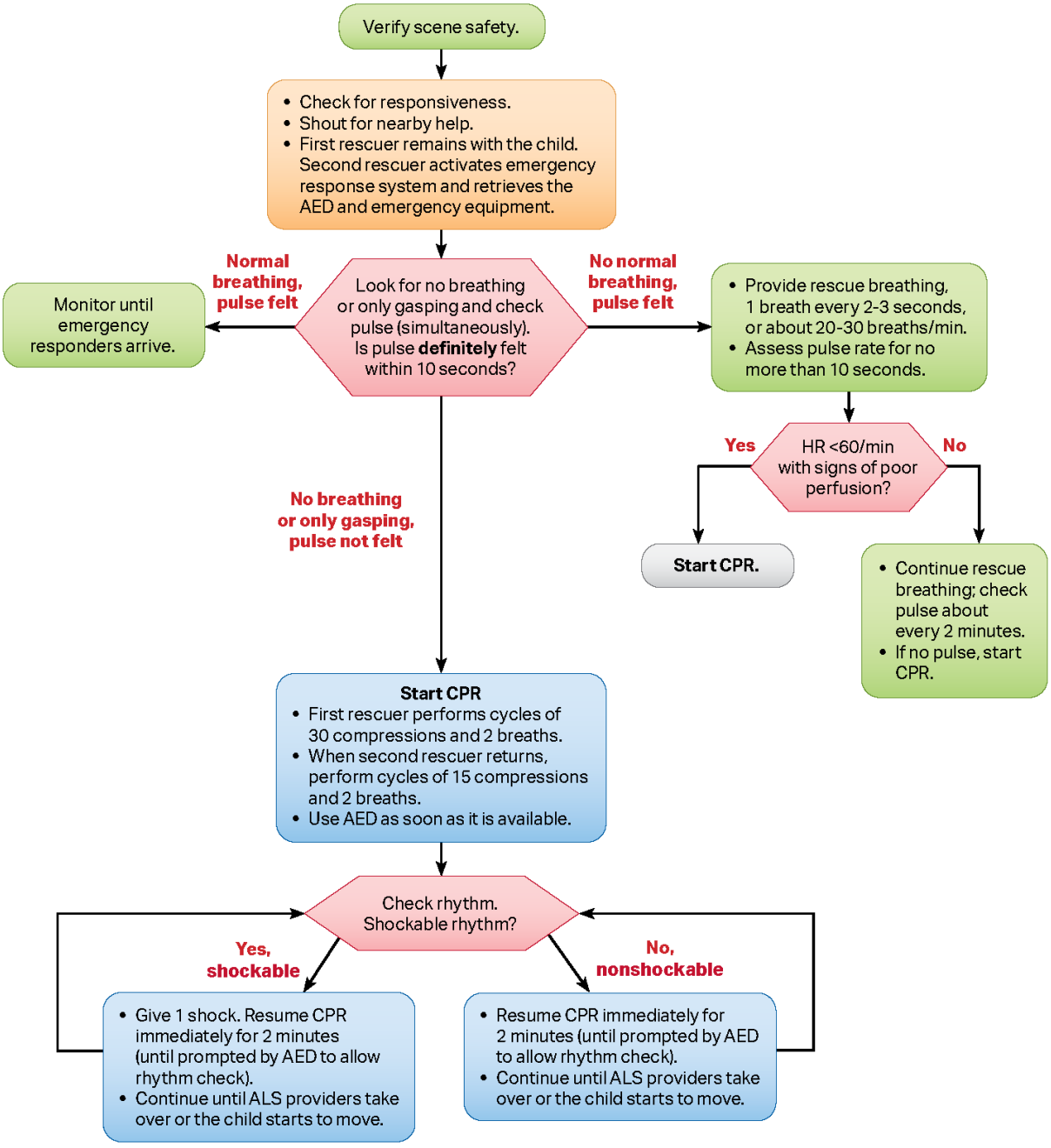
Pad Placement

- Some AED pads recommend placing one pad on the chest and one pad on the back for infants and children.
- **Follow the pictures** on the pad packages for proper placement.

Pediatric Basic Life Support Algorithm for Healthcare Providers—Single Rescuer



Pediatric Basic Life Support Algorithm for Healthcare Providers—2 or More Rescuers



AED SPECIAL CONSIDERATIONS

Hairy Chest

- **If your AED has 1 set of pads and a razor**, quickly shave the area and then apply the pads.
- **If your AED has 2 sets of pads**, use the first set to remove the hair. Apply the first set of pads, press them down so they stick as much as possible, and quickly pull them off. Then apply the new, second set of pads.

Water

- If someone is lying in water, **quickly move the victim to a dry area.**
  - If the victim is lying in snow or a small puddle, use the AED.
- If the chest is covered with water or sweat, **wipe the chest before attaching the pads**.

Transdermal Medicine Patch

- Do not place the pad directly over a medicine patch.
- **Take the patch off and quickly wipe the chest** before you put on the pad.

MOUTH-TO-MOUTH BREATHS: ADULTS, CHILDREN, AND INFANTS

- Mouth-to-mouth breathing is a quick and effective way to provide oxygen to a victim **when a barrier mask is not available**.
- Each breath you take contains 21% oxygen. When you provide a rescue breath, **the air you breathe into a victim contains about 17% oxygen**.

Step 1

- Hold the victim's airway open with a **head tilt—chin lift**.
- **Pinch the nose** closed with your thumb and index finger.

Step 2

- **Take a regular breath** and seal your lips around the victim's mouth, creating an airtight seal.
- **Give 1 breath and blow for 1 second**.
- **Watch for the chest to rise** as you give each breath.

- Mouth-to-mouth breathing is a quick and effective way to provide oxygen to a victim **when a barrier mask is not available**.
- Each breath you take contains 21% oxygen. When you provide a rescue breath, **the air you breathe into a victim contains about 17% oxygen**.

MOUTH-TO-MOUTH-AND-NOSE BREATHING: INFANTS

Step 1

Open the infant's airway with a **head tilt—chin lift**.

Step 2

Place your mouth over the infant's mouth and nose to create an airtight seal.

Step 3

Give one breath, blowing for about 1 second. Watch for the chest to rise as you give the breath.

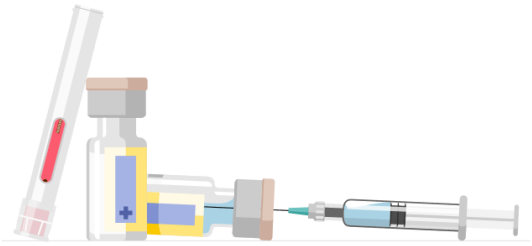
ADVANCED AIRWAYS

A laryngeal mask airway, supraglottic airway device, and endotracheal tube are types of advanced airways.

When an advanced airway is in place:

- Perform continuous compressions at **100 to 120/min**
- Give **1 breath every 6 seconds** for **adults**
- Give **1 breath every 2 to 3 seconds** for a **child** or **infant**
- **No pauses in compressions** to give breaths

OPIOID-ASSOCIATED LIFE-THREATENING EMERGENCY

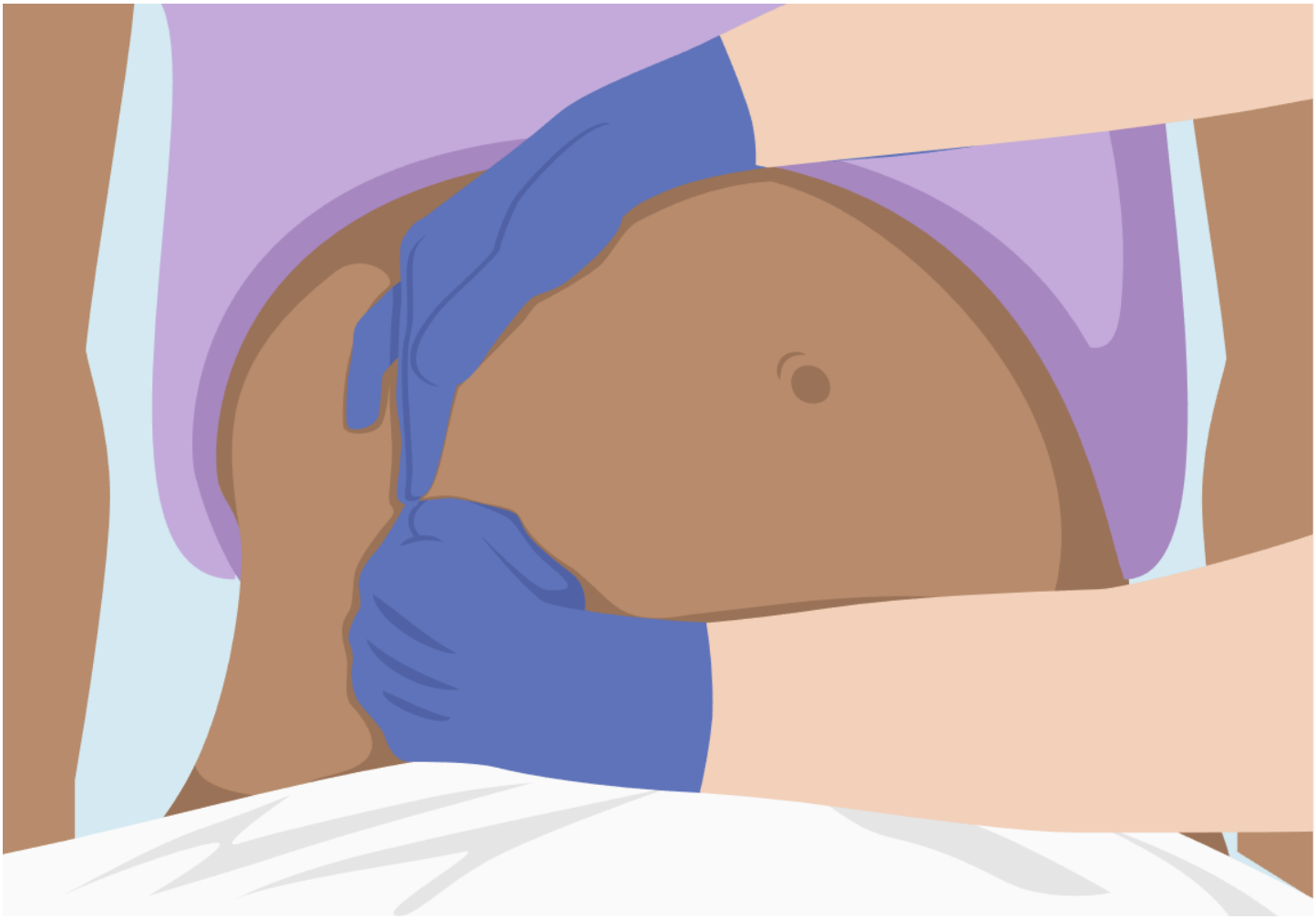


- **Opioid-associated life-threatening emergency is a condition that can cause a person to stop breathing but still have a pulse.**
- **Naloxone is a medication that can temporarily reverse the effects of opioid overdose.**
  - **Common routes of administration for naloxone** include intravenous, intramuscular, and intranasal.
- **For a person who is unresponsive and not breathing normally but has a pulse:**
  - Give 1 rescue breath **every 6 seconds in an adult**.
  - Give 1 rescue every **2 to 3 seconds in a child or infant**.
  - Then, if your local protocol allows, give naloxone. Don't delay breaths to give naloxone.

CARDIAC ARREST IN A PREGNANT PATIENT

High-quality CPR can increase the mother's and the infant's chance of survival.

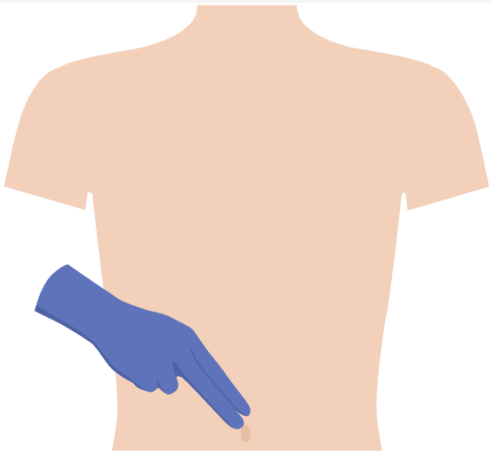
- **Perform compressions and use an AED** as you would for any cardiac arrest victim. Shock from the AED will not harm the infant.
- **If additional rescuers are present and rescuers are trained**, perform **continuous lateral uterine displacement**, in addition to high-quality BLS.
- **If the woman is revived**, place her on her left side. This may help improve blood flow to her heart and therefore, to the infant.



SIGNS OF CHOKING: ADULTS AND CHILDREN

- With a severe airway obstruction, the victim will show **signs of poor air exchange and difficulty breathing** such as
  - Silent cough
  - Inability to speak or breathe
  - Cyanosis (turning blue)
- An **adult or older child may clutch the neck with both hands**, making the universal choking sign. If the victim nods that they are choking, you must act.

ABDOMINAL THRUSTS: ADULTS AND CHILDREN



Step 1

- **Stand or kneel behind the victim** and **place your arms around the victim's waist**; with one hand, **locate the navel**.

CHOKING IN OBESE AND PREGNANT VICTIMS

If the victim is too large for you to wrap your arms around the waist:

- **Wrap your arms** around his or her chest
- **Perform chest thrusts** instead of abdominal thrusts

CHOKING: UNRESPONSIVE ADULTS OR CHILDREN

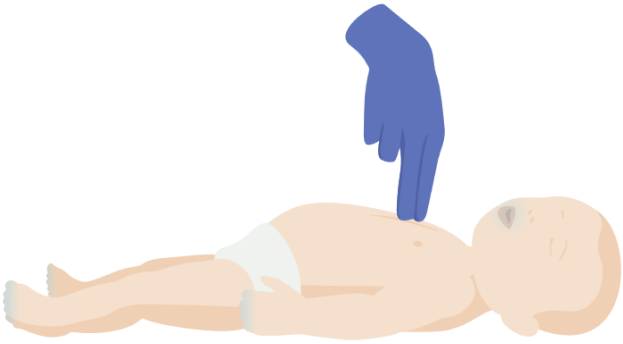
- If a choking victim becomes unresponsive, send someone to **activate the emergency response system**.
- **Lower the victim** to the ground.
- **Perform CPR with 1 exception:** each time you open the airway to give breaths, look for the obstructing object.
- If you see an object that can be easily removed, carefully remove with your fingers. **Do not do a blind finger sweep**.

CHOKING IN INFANTS

Step 1

- First **sit or kneel** with the infant in your lap.
- **Hold the infant facedown** and resting on your forearm, with the head slightly lower than the chest.
- **Support the head and jaw** with your hand.

RELIEF OF CHOKING: UNRESPONSIVE INFANT



If the infant becomes unresponsive:

- Shout for help and send someone to activate the emergency response system.
- Place the infant on a hard, flat surface.
- **Begin CPR with 1 exception: each time you open the airway to give breaths, look for the obstructing object**.
- If you see an object that can be easily removed, carefully remove it with your fingers. Do not do a blind finger sweep.
- If you are alone, after 2 minutes or 5 cycles of CPR, activate the emergency response system.

That's all! 😊

You're now ready for your hands-on skills session.