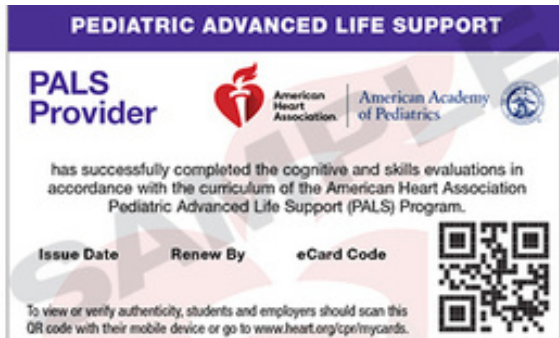


UPDATED 2025 PALS

PEDIATRIC ADVANCED LIFE SUPPORT



WHAT IS PALS?

PALS is a systematic approach to the assessment and management of critically ill or injured infants and children. It focuses on early recognition, high-quality interventions, and effective teamwork to improve outcomes.

BLS REVIEW FOR CHILD AND INFANT

Assessment Steps

- Ensure scene safety; check responsiveness.
- Activate help and obtain an AED/defibrillator.
- Check breathing and pulse together for no more than 10 seconds.
- No pulse or unsure: start CPR. Lone rescuer, unwitnessed collapse: give about 2 minutes of CPR before leaving to activate help.

High-quality Compressions

- Rate: 100–120/min; allow full recoil; pauses under 10 seconds; change compressors every 2 minutes.
- Depth: at least 1/3 chest depth – about 4 cm (1.5 in) infant and 5 cm (2 in) child.
- Infant technique: heel of 1 hand or 2 thumb-encircling hands.
- ETCO₂ can trend CPR quality, but no single cutoff should determine when resuscitation stops.

Breaths during CPR

- No advanced airway: 30:2 with 1 rescuer; 15:2 with 2 rescuers.
- Give each breath over about 1 second, only enough for visible chest rise.
- Advanced airway: continuous compressions plus 1 breath every 2–3 seconds.

Rescue Breathing with a Pulse

- Absent or inadequate breathing: give 1 breath every 2–3 seconds (20–30/min).
- Reassess the pulse about every 2 minutes.
- If HR stays below 60/min with poor perfusion despite effective oxygenation and ventilation, start CPR.

Severe Choking Infant: Repeat 5 back blows + 5 heel-of-hand chest thrusts; no abdominal thrusts. Child: repeat 5 back blows + 5 abdominal thrusts. If unresponsive, start CPR without a pulse check; remove only a visible object and never perform a blind finger sweep.

EFFECTIVE TEAM DYNAMICS

1. Clear roles and responsibilities: Team leader should clearly delegate tasks
2. Knowing your limitation: Stay in scope of practice / ask for a new role if inappropriately assigned
3. Constructive interventions: if someone is about to make a mistake address that team member immediately
4. Knowledge sharing
5. Summarizing and Re-evaluation
6. Closed loop communication: Repeat back the order
7. Mutual respect

INITIAL ASSESSMENT

PEDIATRIC ASSESSMENT TRIANGLE (PAT)

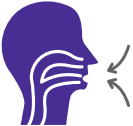
Rapid assessment of a child’s clinical status in 30–60 seconds without touching.

 APPEARANCE (TICLS) • Tone: Assess movement and muscle tone. • Interactiveness: Evaluate the child's response to people and surroundings • Consolability: Determine if the child can be comforted. • Look/Gaze: Check for normal eye contact and visual focus. • Speech/Cry: Assess the strength and quality of speech or crying.	 WORK OF BREATHING • Abnormal airway sounds (stridor, wheezing, grunting) • Abnormal positioning (tripod, sniffing) • Retractions (supraclavicular, intercostal, subcostal) • Nasal flaring or head bobbing	 CIRCULATION TO SKIN • Pallor (pale skin) • Mottling (patchy discoloration) • Cyanosis (bluish color around lips, fingers, or toes)
---	--	---

PRIMARY ASSESSMENT

ABCDE: ASSESS → INTERVENE → REASSESS

Identify and treat life-threatening problems. Perform simultaneously with interventions.

A Airway  • Check airway patency • Clear visible obstruction • Open airway: head-tilt/chin-lift	B Breathing  • Check rate & effort • Chest expansion • Provide oxygen • Assist ventilation if needed	C Circulation  • Check pulse & perfusion • Assess capillary refill • Control bleeding • Establish IV/IO access • Give fluids /medications as indicated	D Disability  • Check neurological status using AVPU/GCS • Pupil check • Blood glucose	E Exposure  • Fully expose • Prevent heat loss • Look for injuries or rashes
--	---	---	---	---

TARGETED ACTIONS

- ✓ After ROSC: prevent fever $\leq 37.5^{\circ}\text{C}$
- ✓ After ROSC: target SpO₂ 94–99%
- ✓ Post–cardiac arrest care
- ✓ Medication safety & dosing
- ✓ Closed-loop communication

AGE- & SIZE-SPECIFIC CARE

- **Infant:** younger than 1 year
- **Child:** 1 year to signs of puberty



Adjust equipment size, medication doses, and CPR technique for age and body size.

SECONDARY ASSESSMENT

SAMPLE HISTORY + FOCUSED PHYSICAL EXAM

Perform a focused history & physical exam to identify the underlying cause and guide treatment.

SAMPLE HISTORY



- S Signs & Symptoms:** Current symptoms and changes in condition.
- A Allergies:** Known drug, food, or environmental allergies.
- M Medications:** Current prescribed or over-the-counter medications.
- P Past Medical History:** Relevant medical conditions, surgeries, or illnesses.
- L Last Oral Intake:** Time and contents of the child's last food or drink.
- E Events leading up:** Events leading up to the illness or injury.

FOCUSED PHYSICAL EXAM

- 1 Head & Neck:** Check for trauma, swelling, or signs of infection.
- 2 Chest:** Assess breath sounds, chest movement, and heart/lung sounds.
- 3 Abdomen:** Check for distension, tenderness, or organ enlargement.
- 4 Extremities:** Assess pulses, capillary refill, movement, and sensation.
- 5 Skin:** Look for rashes, color changes, bruising, or dehydration signs.

RESPIRATORY

- **Respiratory distress:** Increased effort with compensation – tachypnea, retractions, nasal flaring, abnormal sounds, agitation.
- **Respiratory failure:** Inadequate oxygenation and/or ventilation – poor air movement, exhaustion, altered mental status, bradycardia, apnea, or cyanosis.
- **Act early:** Position/open/suction the airway, give oxygen as needed, and assist

COMMON RESPIRATORY PROBLEMS

Upper Airway Obstruction

- **Clues:** stridor, barking cough, hoarseness, poor air movement.
- **Causes:** croup, foreign body, anaphylaxis, edema/trauma.
- **Priorities:** keep calm; open/position/suction; oxygen; treat the cause. Use the choking pathway for FBAO.

Lower Airway Obstruction

- **Clues:** wheeze, prolonged exhalation, increased work; a silent chest is ominous.
- **Causes:** asthma, bronchiolitis.
- **Priorities:** support oxygenation/ventilation; bronchodilator for bronchospasm per protocol; reassess for fatigue

Lung Tissue Disease

- **Clues:** crackles, grunting, hypoxemia, poor compliance.
- **Causes:** pneumonia, pulmonary edema, ARDS.
- **Priorities:** oxygen; positive pressure/PEEP when indicated; treat infection or edema cause; monitor closely.

Disordered Control of Breathing

- **Clues:** slow, irregular, or absent effort.
- **Causes:** seizure, CNS injury, toxin/opioid, neuromuscular weakness.
- **Priorities:** assist ventilation; check glucose; treat seizure/toxin/cause; give naloxone when indicated.

SHOCK/ CIRCULATION: RECOGNIZE → SUPPORT → REASSESS

Recognize poor perfusion before hypotension; pediatric hypotension is a late sign. Establish IV or IO access promptly when needed and reassess after every intervention.

LOW SYSTOLIC BP SCREENING Term neonate <60; infant <70; child 1-10 years <70 + (2 x age); child over 10 years <90 mm Hg. Shock can exist above these values.

COMMON SHOCK PATTERNS

Hypovolemic / Hemorrhagic

- Control fluid loss or bleeding and support oxygen delivery.
- Use cause-directed isotonic aliquots with frequent reassessment.
- For ongoing hypotensive traumatic hemorrhage, prioritize blood products rather than repeated crystalloid when available.

Distributive / Septic

- **Septic shock:** give 10 or 20 mL/kg fluid aliquots and reassess after each bolus.
- **Fluid-refractory septic shock:** epinephrine or norepinephrine is reasonable; treat the infection promptly per protocol.
- **Anaphylaxis:** give IM epinephrine promptly per protocol and support ABCs.

Cardiogenic

- **Clues:** hepatomegaly, crackles, gallop, cardiomegaly, myocarditis or congenital disease.
- If fluid is indicated, give 5-10 mL/kg isotonic crystalloid over 10-20 minutes with careful cardiorespiratory reassessment.
- Seek expert help early; consider vasoactive/inotropic support.

Obstructive

- **Causes:** tension pneumothorax, cardiac tamponade, pulmonary embolism.
- Support airway, breathing, and circulation while immediately relieving the obstruction with condition-specific treatment.
- Do not delay definitive treatment for repeated fluid boluses.

FLUID SAFETY After every bolus, reassess HR, BP, pulses, capillary refill, mental status, urine output, lung sounds, work of breathing, hepatomegaly, and oxygenation. Slow or stop fluid if overload develops.

POST-CARDIAC ARREST PRIORITIES

Temperature / Pressure

- Monitor core temperature if comatose
- Prevent temperature >37.5 C
- Keep systolic and mean BP above the 10th percentile for age and sex

Oxygen / Ventilation

- Wean toward SpO2 94%-99%
- Avoid hypoxemia and hyperoxemia
- Target normocapnia or the child's baseline

Brain / Recovery

- Treat seizures
- Use multimodal, time-aware prognostication
- Plan rehabilitation and longitudinal follow-up

CARDIAC RHYTHM

Treat the patient, confirm a pulse, identify cardiopulmonary compromise, and use the current PALS algorithm - not the monitor alone.

	Normal sinus rhythm / sinus bradycardia Normal rate varies with age. Bradycardia is commonly caused by hypoxia. If HR <60/min with compromise despite effective oxygenation/ventilation, start CPR; give epinephrine if compromise persists. Use atropine only for increased vagal tone or primary AV block.
	Sinus tachycardia Usually gradual and variable with normal P waves; commonly due to fever, pain, hypovolemia, hypoxia, or anxiety. Treat the underlying cause.
	Supraventricular tachycardia Usually abrupt, fixed RR, absent/abnormal P waves; infant often >=220/min, child >=180/min. Stable: vagal maneuvers, then adenosine. Compromise: synchronized cardioversion 0.5-1 J/kg, then 2 J/kg; adenosine may be used if IV/IO is present.

COMMON SHOCK PATTERNS

Hypovolemic / Hemorrhagic

- Control fluid loss or bleeding and support oxygen delivery.
- Use cause-directed isotonic aliquots with frequent reassessment.
- For ongoing hypotensive traumatic hemorrhage, prioritize blood products rather than repeated crystalloid when available.

Distributive / Septic

- **Septic shock:** give 10 or 20 mL/kg fluid aliquots and reassess after each bolus.
- **Fluid-refractory septic shock:** epinephrine or norepinephrine is reasonable; treat the infection promptly per protocol.
- **Anaphylaxis:** give IM epinephrine promptly per protocol and support ABCs.

Cardiogenic

- **Clues:** hepatomegaly, crackles, gallop, cardiomegaly, myocarditis or congenital disease.
- If fluid is indicated, give 5-10 mL/kg isotonic crystalloid over 10-20 minutes with careful cardiorespiratory reassessment.
- Seek expert help early; consider vasoactive/inotropic support.

Obstructive

- **Causes:** tension pneumothorax, cardiac tamponade, pulmonary embolism.
- Support airway, breathing, and circulation while immediately relieving the obstruction with condition-specific treatment.
- Do not delay definitive treatment for repeated fluid boluses.

FLUID SAFETY After every bolus, reassess HR, BP, pulses, capillary refill, mental status, urine output, lung sounds, work of breathing, hepatomegaly, and oxygenation. Slow or stop fluid if overload develops.

POST-CARDIAC ARREST PRIORITIES

Temperature / Pressure

- Monitor core temperature if comatose
- Prevent temperature >37.5 C
- Keep systolic and mean BP above the 10th percentile for age and sex

Oxygen / Ventilation

- Wean toward SpO2 94%-99%
- Avoid hypoxemia and hyperoxemia
- Target normocapnia or the child's baseline

Brain / Recovery

- Treat seizures
- Use multimodal, time-aware prognostication
- Plan rehabilitation and longitudinal follow-up

CARDIAC RHYTHM

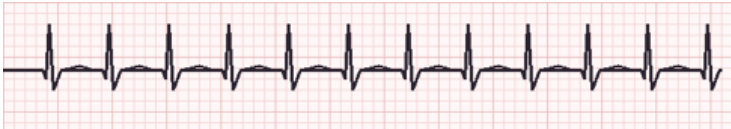
Treat the patient, confirm a pulse, identify cardiopulmonary compromise, and use the current PALS algorithm - not the monitor alone.



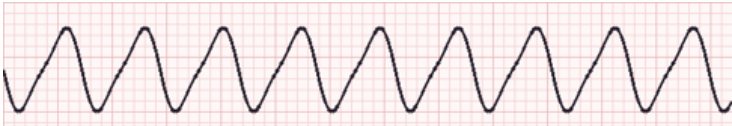
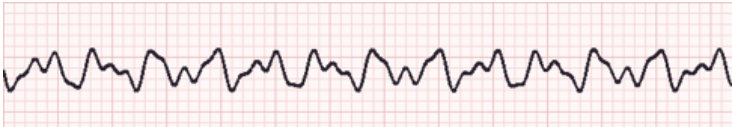
Normal sinus rhythm / sinus bradycardia
Normal rate varies with age. Bradycardia is commonly caused by hypoxia. If HR <60/min with compromise despite effective oxygenation/ventilation, start CPR; give epinephrine if compromise persists. Use atropine only for increased vagal tone or primary AV block.



Sinus tachycardia
Usually gradual and variable with normal P waves; commonly due to fever, pain, hypovolemia, hypoxia, or anxiety. Treat the underlying cause.



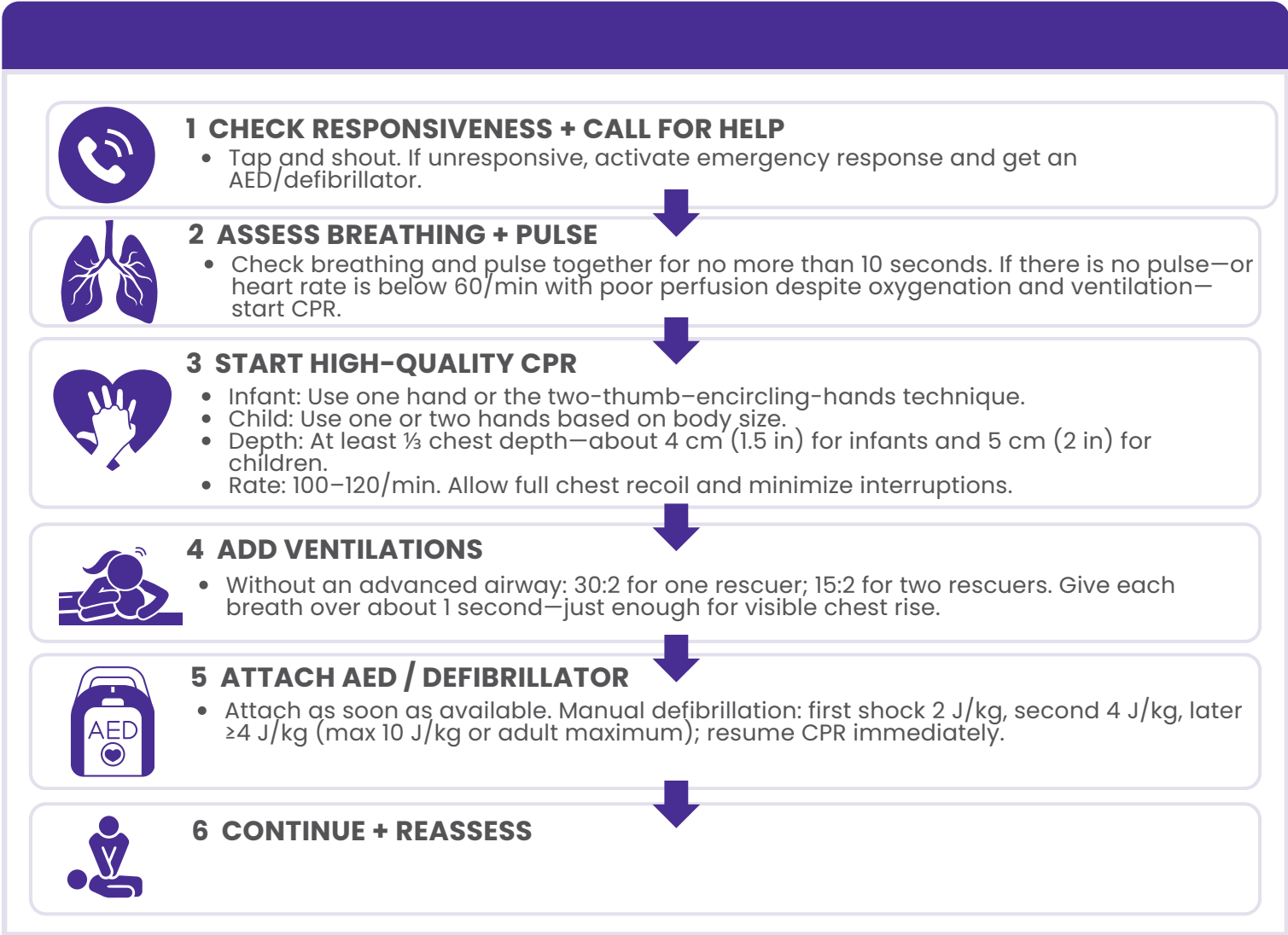
Supraventricular tachycardia
Usually abrupt, fixed RR, absent/abnormal P waves; infant often >=220/min, child >=180/min. Stable: vagal maneuvers, then adenosine. Compromise: synchronized cardioversion 0.5-1 J/kg, then 2 J/kg; adenosine may be used if IV/IO is present.

	Ventricular tachycardia Verify a pulse. With a pulse and compromise: synchronized cardioversion 0.5-1 J/kg, then 2 J/kg. No pulse: treat as shockable cardiac arrest.
	Ventricular fibrillation / pulseless VT Shockable arrest. Defibrillate rapidly; resume CPR immediately after each single shock. Use epinephrine after 2 shocks or sooner only if rapid defibrillation is not possible; consider amiodarone or lidocaine for refractory VF/pVT.
	Asystole / pulseless electrical activity Nonshockable arrest. Give epinephrine as early as possible, repeat every 3-5 minutes, continue high-quality CPR, and treat reversible causes. Never shock asystole or PEA.

PEDIATRIC CARDIAC ARREST QUICK REFERENCE

Shockable – VF / pulseless VT	Nonshockable – asystole / PEA
• Shock 1: 2 J/kg; CPR 2 minutes. • Shock 2: 4 J/kg; CPR + epinephrine every 3-5 minutes. • Later shocks: >=4 J/kg; do not exceed 10 J/kg or adult maximum. • Refractory: amiodarone 5 mg/kg or lidocaine 1 mg/kg; treat Hs and Ts.	• Give epinephrine 0.01 mg/kg IV/IO (0.1 mg/mL), max 1 mg, as early as possible. • Repeat epinephrine every 3-5 minutes; reassess rhythm about every 2 minutes. • Treat Hs and Ts; if rhythm becomes shockable, move immediately to that pathway. • With an arterial line during CPR, target DBP >=25 infant and >=30 child age 1 year or older.

KEY REMINDERS Adenosine: 0.1 mg/kg rapid IV/IO push (max 6 mg), then 0.2 mg/kg (max 12 mg). Advanced airway during CPR: 1 breath every 2-3 seconds with continuous compressions. Confirm and monitor ETT placement with exhaled CO2 detection.



OFFICIAL SOURCES

- 1. AHA/AAP 2025 Pediatric Basic Life Support
- 2. AHA/AAP 2025 Pediatric Advanced Life Support
- 3. AHA 2025 Algorithms
- 4. AHA Course Updates and PALS manual notices
- 5. Educational use only: This independent summary does not

 **REMEMBER:** Stay calm. Act fast. Teamwork saves lives.



EDUCATIONAL USE ONLY: This quick-reference guide does not replace an approved PALS/BLS course, local protocols, or clinical judgment.

