



PALS Helpful Hints — 2025 Guidelines

- Pediatric cardiac arrest commonly results from respiratory failure or shock — prioritize oxygen & perfusion.
- CPR: 100–120/min, depth 1/3 AP chest (≈2" child, 1.5" infant), full recoil, minimize interruptions.
- 2-rescuer infant/child CPR: 15:2; advanced airway → 1 breath every 3 seconds.
- Maintain SpO₂ 94–99% to avoid hypoxia & hyperoxia.
- Defibrillation dosing: 2 J/kg first → 4 J/kg → up to max adult dose per device.
- Epinephrine 0.01 mg/kg IV/IO every 3–5 min during arrest.
- Consider amiodarone or lidocaine for refractory VF/pVT per protocol.
- Bradycardia w/ signs of poor perfusion: airway/oxygen first → begin CPR if HR <60 despite ventilation → medications/pacing.
- Treat reversible causes (H's & T's). Respiratory distress & shock most common in kids.
- Post-ROSC: SpO₂ 94–99%, ETCO₂ 35–45, maintain age-appropriate BP, consider temperature management.
- Use weight-based dosing and Broselow tape for equipment & meds.
- Team dynamics: role assignment, closed-loop communication, frequent reassessment.

Pediatric Assessment Triangle (PAT)

Use visual assessment — no equipment required.

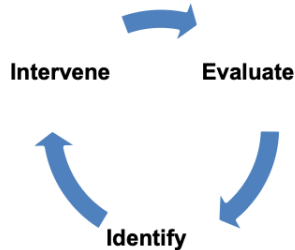
- Appearance (tone, interaction, consolability, look/gaze, speech/cry)
- Work of Breathing (abnormal breath sounds, retractions, flaring, apnea/gasping)
- Circulation to Skin (pallor, mottling, cyanosis)

Systematic Approach Algorithm

Initial Assessment

- **Appearance**
- **Work of Breathing**
- **Circulation (color)**

Evaluate – Identify - Intervene



A continuous sequence.
Determine if problem is life threatening.

EVALUATE

PRIMARY ASSESSMENT

- **Airway** – Patency, Open airway
- **Breathing** – Breath Sounds
- **Circulation** – Heart Rate, Skin
- **Disability** - Level of Consciousness
 - AVPU - alert, voice, painful, unresponsive
 - Glasgow Coma Scale, Pupils
 - Blood glucose
- **Exposure** - Temperature

SECONDARY ASSESSMENT

6 Hs 5 Ts -Search for Reversible Causes

H's	T's
H ypovolemia	T ension pneumothorax
H ypoxia	T amponade, cardiac
H ydrogen ion (acidosis)	T oxins – poisons, drugs
H ypoglycemia	T hrombosis – coronary (AMI)
H ypo /hyper kalemia	T hrombosis – pulmonary (PE)
H ypothermia	

- ♥ **Focused medical history**
- ♥ **Focused physical exam**
- ♥ **Ongoing reassessment**
 - S- Signs & symptoms (What hurts?)
 - A- Allergies
 - M- Medications
 - P- Past medical history
 - L- Last meal
 - E- Events Preceding, what happened

DIAGNOSTIC ASSESSMENT

- ABG, Venous blood gas, arterial lactate
- Central venous O₂ saturation, CVP
- CXR, ECG, Echo
- Peak expiratory flow rate

IDENTIFY

- **Type and Severity of Potential Problems**

Respiratory	Circulatory
Respiratory Distress Or Respiratory Failure	Compensated Shock Or Hypotensive Shock
Upper airway obstruction Lower airway obstruction Lung tissue disease Disordered control of breathing	Hypovolemic shock Distributive shock Cardiogenic shock Obstructive shock

Cardiopulmonary Failure Cardiac Arrest

INTERVENE

- Positioning the child to maintain a patent airway
- Activating emergency response
- Starting CPR
- Obtaining the code cart and monitor
- Placing the child on a cardiac monitor and pulse oximeter
- Administering O₂
- Supporting ventilation
- Starting medications and fluids using nebulizer, IV/IO fluid bolus

An intubated patient's condition deteriorates: consider the following possibilities (DOPE):

- Displacement of the tube from the trachea
- Obstruction of the tube
- Pneumothorax
- Equipment failure

Vital Signs in Children - Normal Ranges

Age	Systolic BP	Pulse (awake)	Respirations
Neonate	67-84	100-205	
Infant	72-104	100-190	30-53
Toddler	86-106	98-140	22-37
Preschooler	89-112	80-120	20-28
School-aged	97-115	75-118	18-25
Adolescent	110-131	60-100	12-20

Treatment of Dysrhythmias - general overview. See book for details

Bradycardia

- ♥ Maintain patent airway, assist breathing positive pressure ventilation, O₂ if needed, monitor
- ♥ ABCs, consider oxygen, observe, 12 lead, identify and treat underlying causes
- ♥ Bradycardia persists: IV/IO, Epinephrine 0.01 mg/kg, Atropine 0.02 mg/kg may repeat 1x, consider pacing, treat underlying causes
- ♥ Continuous CPR if heart rate below 60

Tachycardia with a Pulse

- ♥ Maintain patent airway, assist breathing as necessary, oxygen, monitor, pulse, BP, oximetry
- ♥ Sinus tach – treatable causes, rhythm in infants/children may be slightly regular or irregular
- ♥ SVT – asymptomatic consider vagal maneuvers and give adenosine if IV/IO present
- ♥ SVT – rhythm regular - infant rate above 220, child above 180 SVT - adenosine 0.1 mg/kg rapid bolus (max 6 mg), repeat 0.2 mg/kg rapid bolus (max 12 mg)
- ♥ No IV/IO, adenosine not successful, cardioversion
- ♥ QRS wide? - Probable V tach - 12 lead, adenosine as above, synchronized cardioversion 0.5 to 1 J/kg then 2 J/kg. Sedate if needed. Don't delay cardioversion

Pediatric Cardiac Arrest - H's T's

- CPR – If no advanced airway 15:2 compression to ventilation. If advanced airway breath every 2 – 3 seconds, bag/mask, O₂, monitor/defib
- Shockable (VF/VT) – CPR 2 min,
 - shock 2 J/kg, then 4 J/kg to max of 10 or adult dose
 - epinephrine 0.01 mg/kg repeat 3 to 5 min (max 1 mg)
 - Amiodarone 5mg/kg repeat up to 3 times or lidocaine 1 mg/kg
- Non-shockable (asystole/pea) – CPR 2 minutes
 - Epinephrine ASAP epinephrine 0.01 mg/kg repeat 3 to 5 min (max 1 mg)
 - Treat reversible causes

Respiratory - see PALS text for full details

Managing Respiratory Emergencies Flowchart		
• Airway positioning • Suction as needed	• Oxygen • Pulse Oximetry	• ECG as Indicated • BLS as indicated
Upper Airway	Croup	▪ Nebulized epinephrine ▪ Corticosteroids
	Anaphylaxis	▪ IM epinephrine (or autoinjector) ▪ Albuterol ▪ Antihistamines ▪ Corticosteroids
	Aspiration Foreign Body	▪ Allow position of comfort ▪ Specialty consultation
Lower Airway Obstruction	Bronchiolitis	▪ Nasal Suctioning ▪ Consider bronchodilator trial
	Asthma	▪ Albuterol + ipratropium ▪ Corticosteroids ▪ Magnesium sulfate ▪ IM epinephrine (if severe) ▪ Terbutaline
Lung Tissue Disease	Pneumonia/pneumonitis Infectious Chemical Aspiration	▪ Albuterol ▪ Antibiotics (if indicated) ▪ Consider noninvasive or invasive ventilatory support with PEEP
	Pulmonary edema Cardiogenic or noncardiogenic (ARDS)	▪ Consider noninvasive or invasive ventilatory support with PEEP ▪ Consider vasoactive support ▪ Consider diuretic
Disordered Control of Breathing	Increased ICP	<u>Avoid:</u> ▪ Hypoxemia ▪ Hypercarbia ▪ Hyperthermia ▪ Hypotension
	Poisoning/Overdose	▪ Antidote (if available) ▪ Contact poison control
	Neuromuscular disease	▪ Consider noninvasive or invasive ventilatory support

Signs of compensated shock include (poor perfusion, NORMAL systolic BP)

- Tachycardia
- Increased SVR
 - Skin - cold, pale, mottled, diaphoretic
 - Peripheral circulation - delayed capillary refill
 - Pulses - weak peripheral pulses, narrowed pulse pressure
- Increases renal and splanchnic vascular resistance (redistribution of blood flow)
 - Kidney - decreased urine output, oliguria
 - Intestine - vomiting, ileus
- Cerebral auto regulation - brain, altered mental status, anxiety, coma
- **Normal blood pressure**

Signs of decompensated shock include

As compensatory mechanisms fail, signs of inadequate end-organ perfusion develop. In addition to the above, these signs include

- Depressed mental status, decreased urine output
- Metabolic acidosis, Tachypnea, Weak central pulses
- **Hypotension**

The most common cause of shock is hypovolemia, one form of which is hemorrhagic shock. Distributive and cardiogenic shock are seen less often.

- Capillary refill time alone is not a good indicator of circulatory volume, but a capillary refill time of >2 seconds is a useful indicator of moderate dehydration when combined with a decreased urine output, absent tears, dry mucous membranes, and a generally ill appearance.
- Tachycardia also results from other causes (e.g., pain, anxiety, fever).
- Pulses may be bounding in anaphylactic, neurogenic, and septic shock.

In compensated shock, blood pressure remains normal; it is low in decompensated shock. Hypotension is a systolic blood pressure less than the 5th percentile of normal for age.

Pediatric Cardiac Arrest Medications

Medication	Dose	Remarks
Epinephrine	Pulseless arrest, symptomatic bradycardia 0.01 mg/kg IV/IO q 3 to 5 min Symptomatic Brady – 0.01 mg/kg	Doses vary for other conditions and situations
Atropine	Bradycardia - 0.02 mg/kg IV/IO q 3 to 5 min 0.04 to 0.06 mg/kg ET	Child max 1 mg total dose Adolescent max 3 mg total dose
Adenosine	SVT 0.1 mg/kg IV/IO rapid push max 6 mg Repeat 0.2 mg/kg max 12	Rapid push closest port followed by fluid bolus 5-10 ml NS
Amiodarone	SVT, VT with pulse 5 mg/kg IV/IO Pulseless arrest 5 mg/kg IV/IO Total 15 mg/kg, max single dose 300 mg	load over 20-60 min may produce prolonged QT
Naloxone	0.1 mg/kg IV/IO/IM bolus q 2 min	max 2 mg ½ life is short, repeated dosing May wake up agitated
Lidocaine	VF/ Pulseless VT 1 mg/kg IV/IO bolus. 2 to 3 mg/kg ET	Maintain 20 to 50 mcg/kg/min
Dextrose Glucose	0.5 to 1 g/kg IV/IO	Use bedside glucose check to confirm hypoglycemia
Magnesium Sulfate	Asthma refractory 25 to 50 mg/kg IV/IO Pulseless V-tach Torsades 25 – 50 mg/kg	Max 2 G May cause bradycardia

Managing Shock Flowchart

Managing shock flowchart			
• Oxygen • Pulse oximetry • ECG monitor		• IV/IO access • BLS as indicated • Point-of-care glucose testing	
Hypovolemic shock: Specific management for selected conditions			
Nonhemorrhagic		Hemorrhagic	
• 20 mL/kg NS/LR bolus, repeat as needed • Consider colloid		• Control external bleeding • 20 mL/kg NS/LR bolus, repeat 2 or 3x as needed • Transfuse PRBCs as indicated	
Distributive shock: Specific management for selected conditions			
Septic	Anaphylactic		Neurogenic
Management algorithm: • Septic Shock	• IM epinephrine (or autoinjector) • Fluid boluses (10-20 mL/kg NS/LR) • Albuterol • Antihistamines, corticosteroids • Epinephrine infusion		• 20 mL/kg NS/LR bolus, repeat PRN • Vasopressor
Cardiogenic shock: Specific management for selected conditions			
Bradyarrhythmia/tachyarrhythmia		Other (eg, CHD, myocarditis, cardiomyopathy, poisoning)	
Management algorithms: • Bradycardia • Tachycardia		• 5 to 10 mL/kg NS/LR bolus, repeat PRN • Inotropic and/or vasoactive infusion • Consider expert consultation • Antidote for poisoning	
Obstructive shock: Specific management for selected conditions			
Ductal-dependent (LV outflow obstruction)	Tension pneumothorax	Cardiac tamponade	Pulmonary embolism
• Prostaglandin E1 • Expert consultation	• Needle decompression • Tube thoracostomy	• Pericardiocentesis • 20 mL/kg NS/LR bolus	• 20 mL/kg NS/LR bolus, repeat PRN • Consider thrombolytics, anticoagulants • Expert consultation