



American Heart Association.

AMERICAN ASSOCIATION of CRITICAL-CARE NURSES

PALS

Vital Signs in Children

These 3 tables are reproduced or modified from Hazinski MF. Children are different. In: *Nursing Care of the Critically Ill Child*. 3rd ed. Mosby; 2013:1-18, copyright Elsevier.

Normal Heart Rates*

Age	Awake rate (beats/min)	Sleeping rate (beats/min)
Neonate	100-205	90-160
Infant	100-180	90-160
Toddler	98-140	80-120
Preschooler	80-120	65-100
School-age child	75-118	58-90
Adolescent	60-100	50-90

*Always consider the patient's normal range and clinical condition. Heart rate will normally increase with fever or stress.

Normal Respiratory Rates*

Age	Rate (breaths/min)
Infant	30-53
Toddler	22-37
Preschooler	20-28
School-age child	18-25
Adolescent	12-20

*Consider the patient's normal range. The child's respiratory rate is expected to increase in the presence of fever or stress.

Data from Fleming S et al. *Lancet*. 2011;377(9770):1011-1018.

Normal Blood Pressures

Age	Systolic pressure (mm Hg)*	Diastolic pressure (mm Hg)*	Mean arterial pressure (mm Hg)†
Birth (12 h, <1000 g)	39-59	16-36	28-42‡
Birth (12 h, 3 kg)	60-76	31-45	48-57
Neonate (96 h)	67-84	35-53	45-60
Infant (1-12 mo)	72-104	37-56	50-62
Toddler (1-2 y)	86-106	42-63	49-62
Preschooler (3-5 y)	89-112	46-72	58-69
School-age child (6-9 y)	97-115	57-76	66-72
Preadolescent (10-12 y)	102-120	61-80	71-79
Adolescent (12-15 y)	110-131	64-83	73-84

*Systolic and diastolic blood pressure ranges assume 50th percentile for height for children 1 year and older.

†Mean arterial pressures (diastolic pressure + [difference between systolic and diastolic pressures/3]) for 1 year and older, assuming 50th percentile for height.

‡Approximately equal to postconception age in weeks (may add 5 mm Hg).

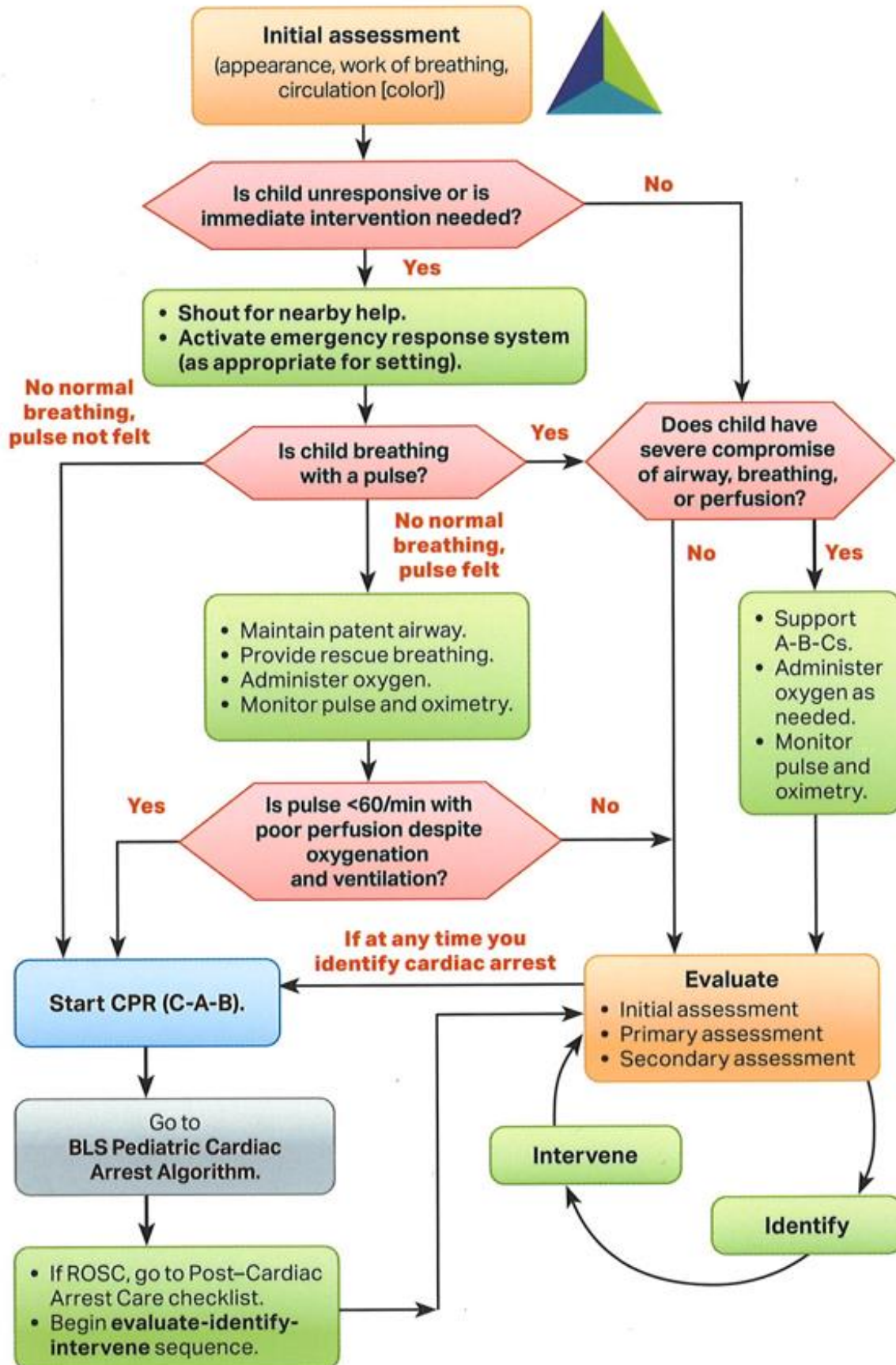
Data from Gemelli M et al. *Eur J Pediatr*. 1990;149(5):318-320; Versmold HT et al. *Pediatrics*. 1981;67(5):607-613; Haque IU, Zaritsky AL. *Pediatr Crit Care Med*. 2007;8(2):138-144; and National High Blood Pressure Education Program Working Group on High Blood Pressure in Children and Adolescents. *The Fourth Report on the Diagnosis, Evaluation, and Treatment of High Blood Pressure in Children and Adolescents*. NHLBI; 2005. NIH publication 05-5267.

Pediatric Color-Coded Length-Based Resuscitation Tape

Zone	3 kg	4 kg	5 kg	Pink	Red	Purple	Yellow	White	Blue	Orange	Green
ETT uncuffed (mm)	3.5	3.5	3.5	3.5	3.5	4.0	4.5	5.0	5.5	N/A	N/A
ETT cuffed (mm)	3.0	3.0	3.0	3.0	3.0	3.5	4.0	4.5	5.0	5.5	6.0
Lip-tip (cm)	9-9.5	9.5-10	10-10.5	10-10.5	10.5-11	11-12	12.5-13.5	14-15	15.5-16.5	17-18	18.5-19.5
Suction (F)	8	8	8	8	8	8	10	10	10	10	12
L-scope blade	1 straight	1 straight	1 straight	1 straight	1 straight	1-1.5 straight	2 straight/curved	2 straight/curved	2 straight/curved	2-3 straight/curved	2-3 straight/curved
Stylet	6 F	6 F	6 F	6 F	6 F	6 F	10 F	10 F	10 F	14 F	14 F
OPA (mm)	50	50	50	50	50	60	60	60	70	80	80
NPA (F)	14	14	14	14	14	18	20	22	24	26	26
Bag-mask device (minimum mL)	450	450	450	450	450	450	450	450-750	750-1000	750-1000	1000
ETCO ₂ detector	Ped	Ped	Ped	Ped	Ped	Ped	Ped	Adult	Adult	Adult	Adult
LMA	1	1	1	1.5	1.5	2	2	2	2-2.5	2.5	3
Tidal volume (mL)	20-30	24-40	30-50	40-65	50-85	65-105	80-130	100-165	125-210	160-265	200-330
Frequency	20-25/min	20-25/min	20-25/min	20-25/min	20-25/min	15-25/min	15-25/min	15-25/min	12-20/min	12-20/min	12-20/min

Abbreviations: ETT, endotracheal tube; F, French; LMA, laryngeal mask airway; NPA, nasopharyngeal airway; OPA, oropharyngeal airway; Ped, pediatric. Adapted from Broselow™ Pediatric Emergency Tape. Distributed by Armstrong Medical Industries Inc., Lincolnshire, IL. Copyright 2019 Vital Signs Inc. Courtesy and © Becton, Dickinson and Company. Reprinted with permission.

PALS Systematic Approach Algorithm



Recognizing Respiratory Problems Flowchart

PALS: Signs of respiratory problems					
Clinical signs		Upper airway obstruction	Lower airway obstruction	Lung tissue disease	Disordered control of breathing
Airway	Patency	Airway open and maintainable/not maintainable			
Breathing	Respiratory rate/effort	Increased			Variable
	Breath sounds	Stridor (typically inspiratory)	Barking cough Hoarseness Wheezing (typically expiratory) Prolonged expiratory phase	Grunting Crackles Decreased breath sounds	Normal
	Air movement	Decreased			Variable
Circulation	Heart rate	Tachycardia (early); bradycardia (late)			
	Skin	Pallor, cool skin (early); cyanosis (late)			
Disability	Level of consciousness	Anxiety, agitation (early); lethargy, unresponsiveness (late)			
Exposure	Temperature	Variable			
PALS: Identifying respiratory problems by severity					
Progression of respiratory distress to respiratory failure*					
Airway	Respiratory distress: open and maintainable Respiratory failure: not maintainable				
Breathing	Respiratory distress: tachypnea Respiratory failure: bradypnea to apnea				
	Respiratory distress: work of breathing (nasal flaring/retractions) Respiratory failure: increased effort progresses to decreased effort and then to apnea				
	Respiratory distress: good air movement Respiratory failure: poor to absent air movement				
Circulation	Respiratory distress: tachycardia Respiratory failure: bradycardia				
	Respiratory distress: pallor Respiratory failure: cyanosis				
Disability	Respiratory distress: anxiety, agitation Respiratory failure: lethargy to unresponsiveness				
Exposure	Variable temperature				

*Respiratory failure requires immediate intervention.

Managing Respiratory Emergencies Flowchart

Managing respiratory emergencies flowchart		
<ul style="list-style-type: none"> Airway positioning Suction as needed 	<ul style="list-style-type: none"> Oxygen Pulse oximetry 	<ul style="list-style-type: none"> ECG monitor as indicated BLS as indicated
Upper airway obstruction Specific management for selected conditions		
Croup	Anaphylaxis	Aspiration foreign body
<ul style="list-style-type: none"> Nebulized epinephrine Corticosteroids 	<ul style="list-style-type: none"> IM epinephrine (or autoinjector) Albuterol Antihistamines Corticosteroids 	<ul style="list-style-type: none"> Allow position of comfort Specialty consultation
Lower airway obstruction Specific management for selected conditions		
Bronchiolitis	Asthma	
<ul style="list-style-type: none"> Nasal suctioning Consider bronchodilator trial 	<ul style="list-style-type: none"> Albuterol ± ipratropium Corticosteroids Magnesium sulfate IM epinephrine (if severe) Terbutaline 	
Lung tissue disease Specific management for selected conditions		
Pneumonia/pneumonitis Infectious, chemical, aspiration	Pulmonary edema Cardiogenic or noncardiogenic (ARDS)	
<ul style="list-style-type: none"> Albuterol Antibiotics (as indicated) Consider noninvasive or invasive ventilatory support with PEEP 	<ul style="list-style-type: none"> Consider noninvasive or invasive ventilatory support with PEEP Consider vasoactive support Consider diuretic 	
Disordered control of breathing Specific management for selected conditions		
Increased ICP	Poisoning/overdose	Neuromuscular disease
<ul style="list-style-type: none"> Avoid hypoxemia Avoid hypercarbia Avoid hyperthermia Avoid hypotension 	<ul style="list-style-type: none"> Antidote (if available) Contact poison control 	<ul style="list-style-type: none"> Consider noninvasive or invasive ventilatory support

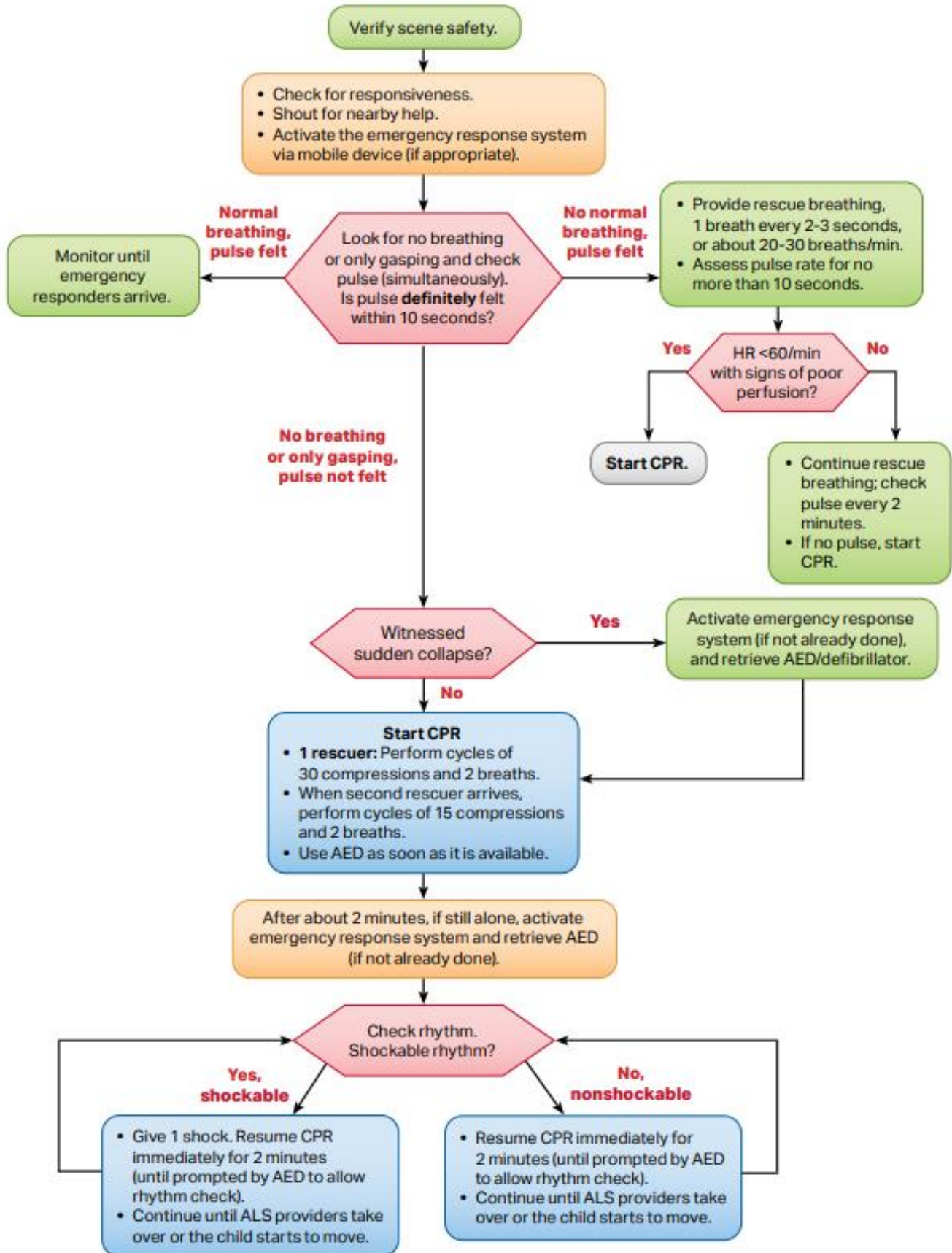
Recognizing Shock Flowchart

Clinical signs		Hypovolemic shock	Distributive shock	Cardiogenic shock	Obstructive shock
Airway	Patency	Airway open and maintainable/not maintainable			
Breathing	Respiratory rate	Increased			
	Respiratory effort	Normal to increased		Labored	
	Breath sounds	Normal	Normal (± crackles)	Crackles, grunting	
Circulation	Systolic blood pressure	Compensated shock can progress to hypotensive shock if left untreated			
	Pulse pressure	Narrow	Variable	Narrow	
	Heart rate	Increased			
	Peripheral pulse quality	Weak	Bounding or weak	Weak	
	Skin	Pale, cool	Warm or cool	Pale, cool	
	Capillary refill	Delayed	Variable	Delayed	
	Urine output	Decreased			
Disability	Level of consciousness	Irritable early, lethargic late			
Exposure	Temperature	Variable			

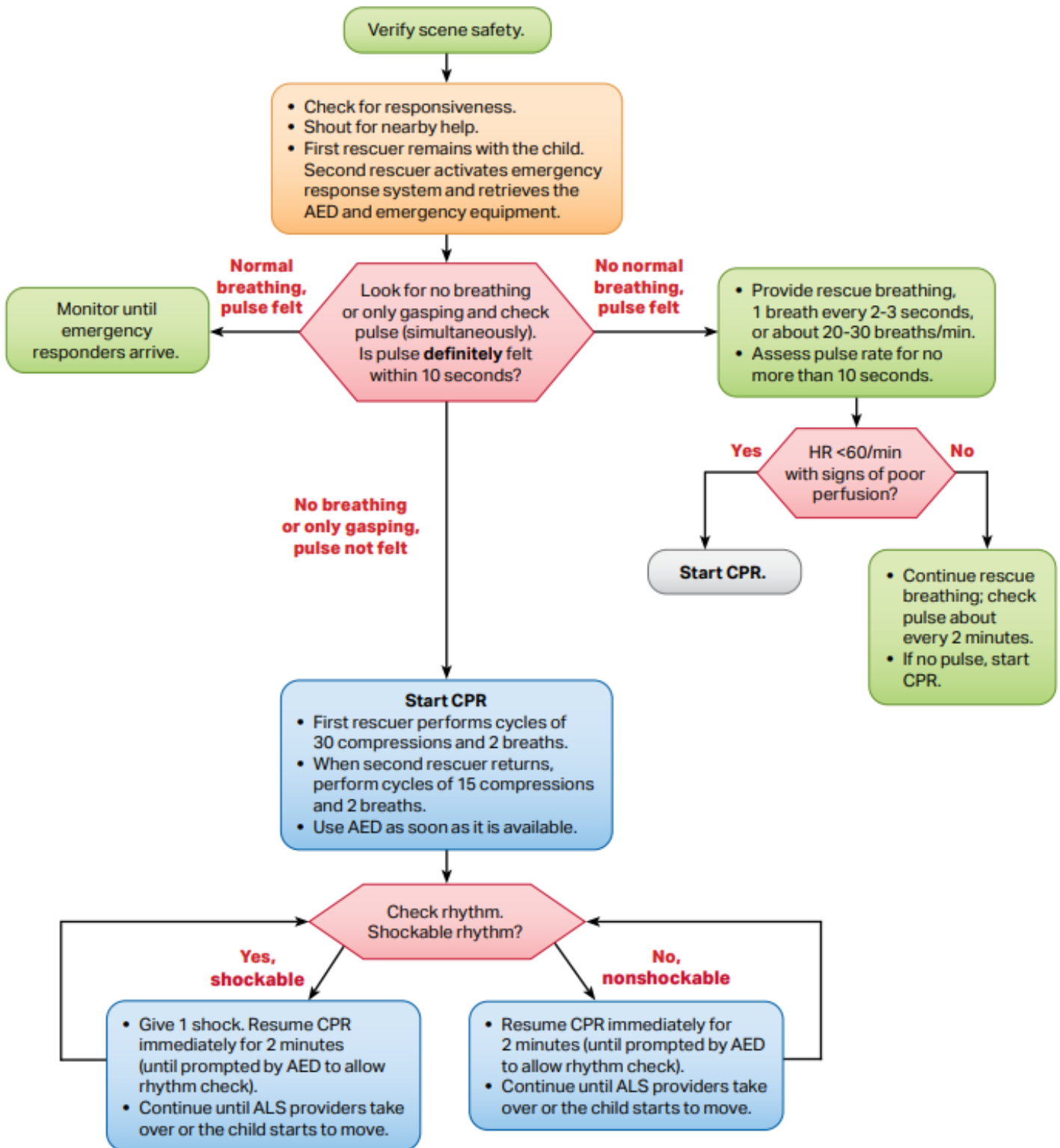
Managing Shock Flowchart

Managing shock flowchart			
<ul style="list-style-type: none"> Oxygen Pulse oximetry ECG monitor 		<ul style="list-style-type: none"> IV/IO access BLS as indicated Point-of-care glucose testing 	
<p align="center">Hypovolemic shock: Specific management for selected conditions</p>			
Nonhemorrhagic		Hemorrhagic	
<ul style="list-style-type: none"> 20 mL/kg NS/LR bolus, repeat as needed Consider colloid 		<ul style="list-style-type: none"> Control external bleeding 20 mL/kg NS/LR bolus, repeat 2 or 3x as needed Transfuse PRBCs as indicated 	
<p align="center">Distributive shock: Specific management for selected conditions</p>			
Septic	Anaphylactic	Neurogenic	
Management algorithm: <ul style="list-style-type: none"> Septic Shock 	<ul style="list-style-type: none"> IM epinephrine (or autoinjector) Fluid boluses (10-20 mL/kg NS/LR) Albuterol Antihistamines, corticosteroids Epinephrine infusion 	<ul style="list-style-type: none"> 20 mL/kg NS/LR bolus, repeat PRN Vasopressor 	
<p align="center">Cardiogenic shock: Specific management for selected conditions</p>			
Bradyarrhythmia/tachyarrhythmia		Other (eg, CHD, myocarditis, cardiomyopathy, poisoning)	
Management algorithms: <ul style="list-style-type: none"> Bradycardia Tachycardia 		<ul style="list-style-type: none"> 5 to 10 mL/kg NS/LR bolus, repeat PRN Inotropic and/or vasoactive infusion Consider expert consultation Antidote for poisoning 	
<p align="center">Obstructive shock: Specific management for selected conditions</p>			
Ductal-dependent (LV outflow obstruction)	Tension pneumothorax	Cardiac tamponade	Pulmonary embolism
<ul style="list-style-type: none"> Prostaglandin E1 Expert consultation 	<ul style="list-style-type: none"> Needle decompression Tube thoracostomy 	<ul style="list-style-type: none"> Pericardiocentesis 20 mL/kg NS/LR bolus 	<ul style="list-style-type: none"> 20 mL/kg NS/LR bolus, repeat PRN Consider thrombolytics, anticoagulants Expert consultation

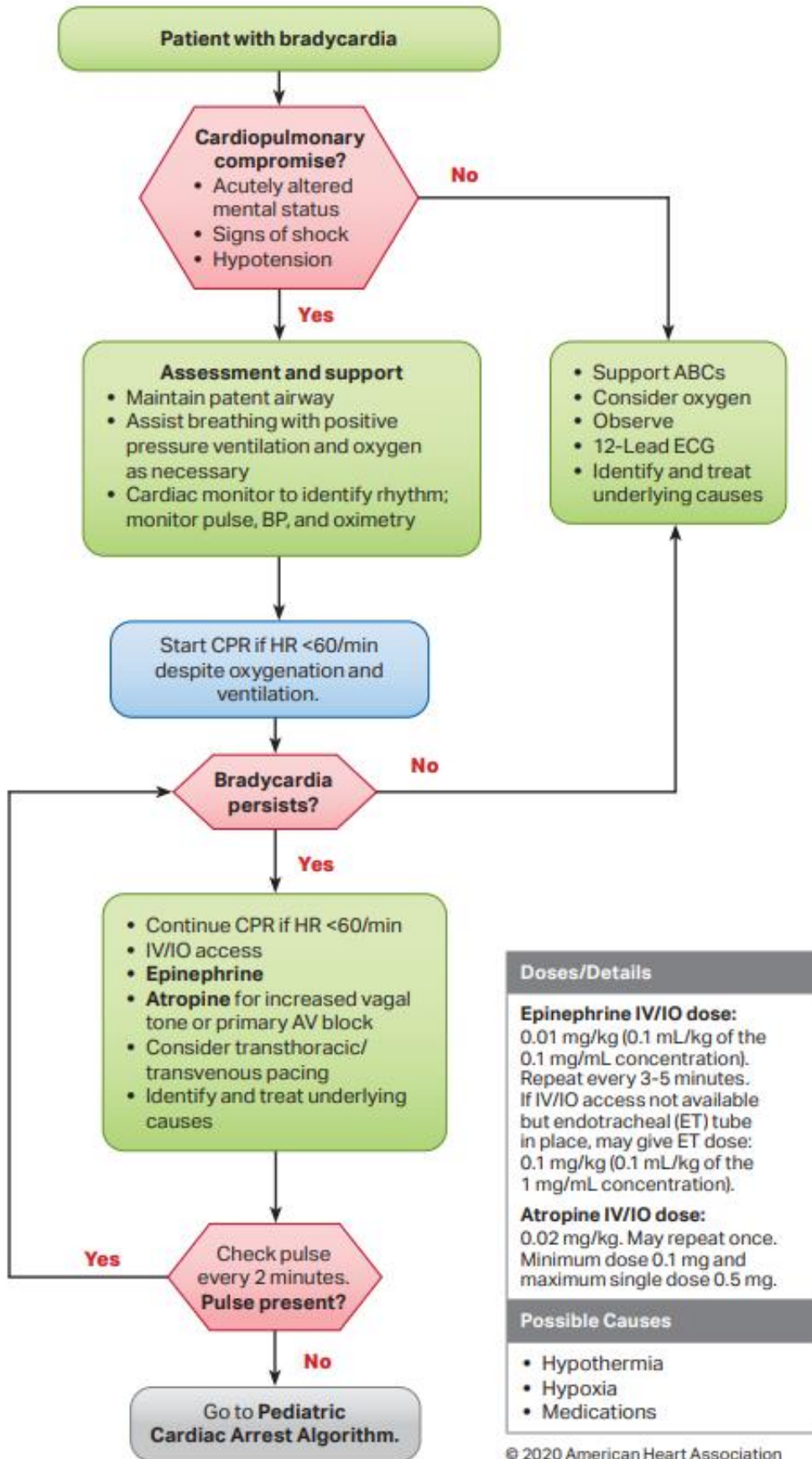
Pediatric Basic Life Support Algorithm for Healthcare Providers—Single Rescuer



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

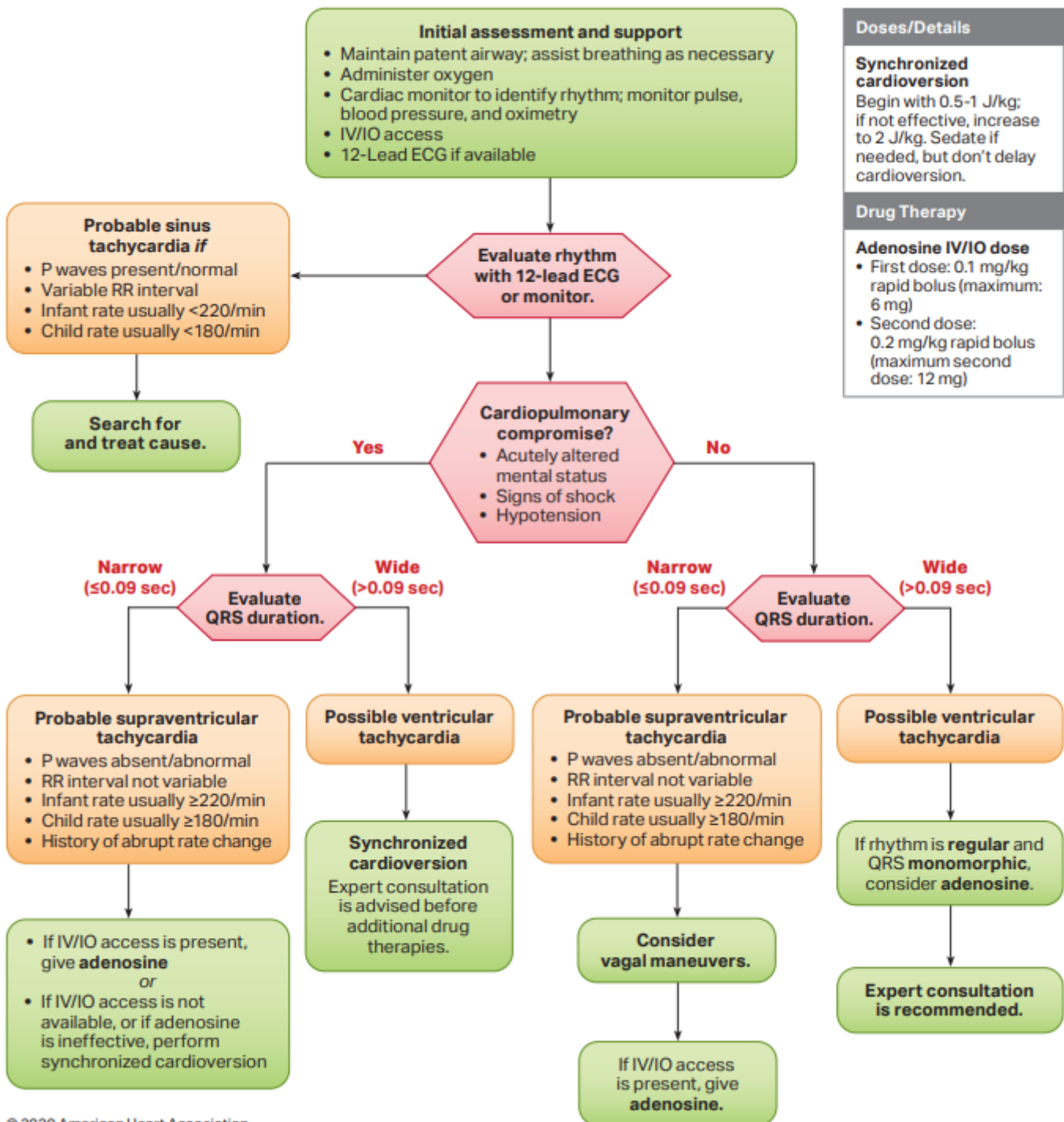


Pediatric Bradycardia With a Pulse Algorithm

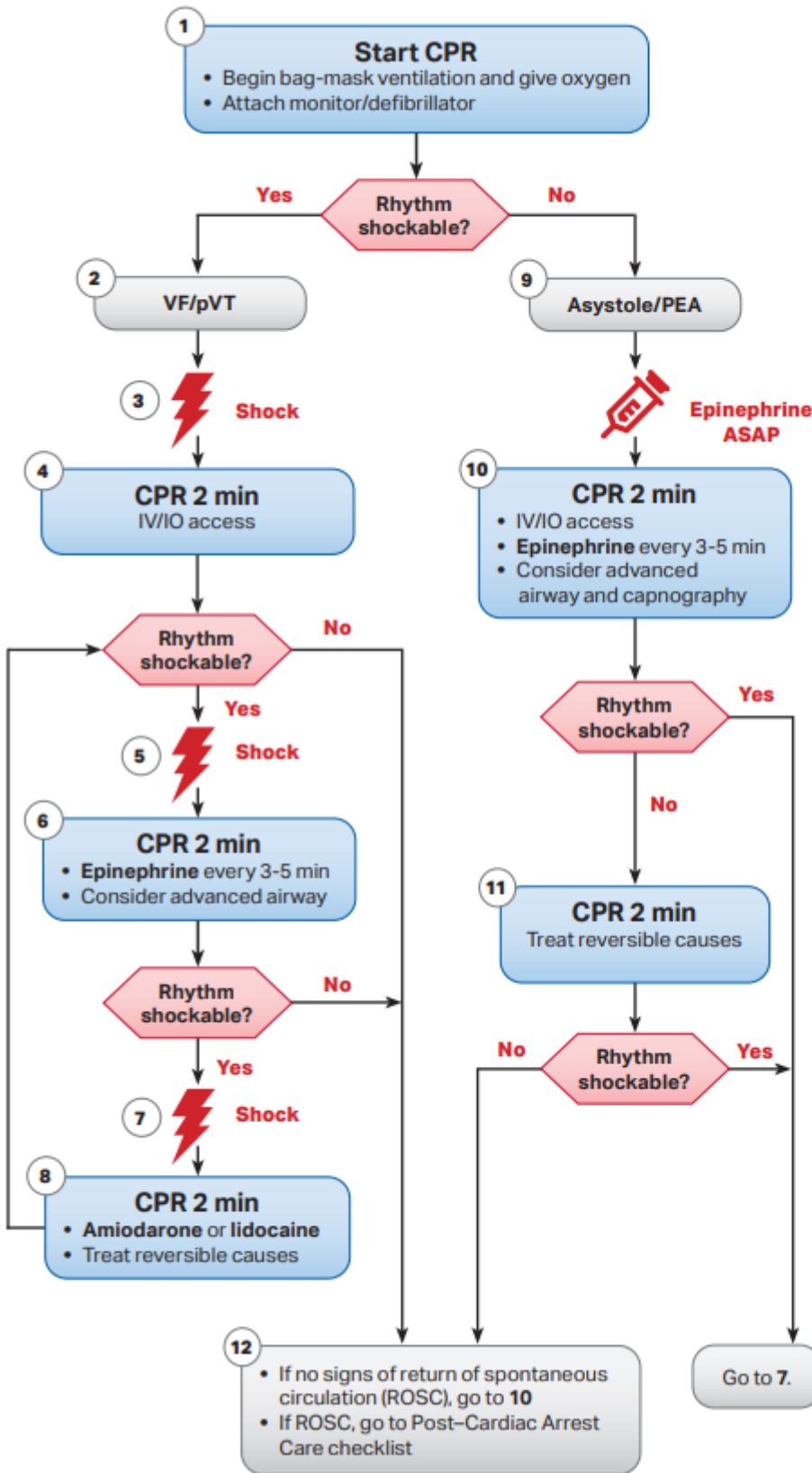


Doses/Details
<p>Epinephrine IV/IO dose: 0.01 mg/kg (0.1 mL/kg of the 0.1 mg/mL concentration). Repeat every 3-5 minutes. If IV/IO access not available but endotracheal (ET) tube in place, may give ET dose: 0.1 mg/kg (0.1 mL/kg of the 1 mg/mL concentration).</p> <p>Atropine IV/IO dose: 0.02 mg/kg. May repeat once. Minimum dose 0.1 mg and maximum single dose 0.5 mg.</p>
Possible Causes
<ul style="list-style-type: none"> • Hypothermia • Hypoxia • Medications

Pediatric Tachycardia With a Pulse Algorithm



Pediatric Cardiac Arrest Algorithm



CPR Quality
<ul style="list-style-type: none"> • Push hard (≥½ of anteroposterior diameter of chest) and fast (100-120/min) and allow complete chest recoil • Minimize interruptions in compressions • Change compressor every 2 minutes, or sooner if fatigued • If no advanced airway, 15:2 compression-ventilation ratio • If advanced airway, provide continuous compressions and give a breath every 2-3 seconds
Shock Energy for Defibrillation
<ul style="list-style-type: none"> • First shock 2 J/kg • Second shock 4 J/kg • Subsequent shocks ≥4 J/kg, maximum 10 J/kg or adult dose
Drug Therapy
<ul style="list-style-type: none"> • Epinephrine IV/IO dose: 0.01 mg/kg (0.1 mL/kg of the 0.1 mg/mL concentration). Max dose 1 mg. Repeat every 3-5 minutes. If no IV/IO access, may give endotracheal dose: 0.1 mg/kg (0.1 mL/kg of the 1 mg/mL concentration). • Amiodarone IV/IO dose: 5 mg/kg bolus during cardiac arrest. May repeat up to 3 total doses for refractory VF/pulseless VT or • Lidocaine IV/IO dose: Initial: 1 mg/kg loading dose
Advanced Airway
<ul style="list-style-type: none"> • Endotracheal intubation or supraglottic advanced airway • Waveform capnography or capnometry to confirm and monitor ET tube placement
Reversible Causes
<ul style="list-style-type: none"> • Hypovolemia • Hypoxia • Hydrogen ion (acidosis) • Hypoglycemia • Hypo-/hyperkalemia • Hypothermia • Tension pneumothorax • Tamponade, cardiac • Toxins • Thrombosis, pulmonary • Thrombosis, coronary

Components of Post-Cardiac Arrest Care		Check
Oxygenation and ventilation		
Measure oxygenation and target normoxemia 94%-99% (or child's normal/appropriate oxygen saturation).		<input type="checkbox"/>
Measure and target Paco ₂ appropriate to the patient's underlying condition and limit exposure to severe hypercapnia or hypocapnia.		<input type="checkbox"/>
Hemodynamic monitoring		
Set specific hemodynamic goals during post-cardiac arrest care and review daily.		<input type="checkbox"/>
Monitor with cardiac telemetry.		<input type="checkbox"/>
Monitor arterial blood pressure.		<input type="checkbox"/>
Monitor serum lactate, urine output, and central venous oxygen saturation to help guide therapies.		<input type="checkbox"/>
Use parenteral fluid bolus with or without inotropes or vasopressors to maintain a systolic blood pressure greater than the fifth percentile for age and sex.		<input type="checkbox"/>
Targeted temperature management (TTM)		
Measure and continuously monitor core temperature.		<input type="checkbox"/>
Prevent and treat fever immediately after arrest and during rewarming.		<input type="checkbox"/>
If patient is comatose apply TTM (32°C-34°C) followed by (36°C-37.5°C) or only TTM (36°C-37.5°C).		<input type="checkbox"/>
Prevent shivering.		<input type="checkbox"/>
Monitor blood pressure and treat hypotension during rewarming.		<input type="checkbox"/>
Neuromonitoring		
If patient has encephalopathy and resources are available, monitor with continuous electroencephalogram.		<input type="checkbox"/>
Treat seizures.		<input type="checkbox"/>
Consider early brain imaging to diagnose treatable causes of cardiac arrest.		<input type="checkbox"/>
Electrolytes and glucose		
Measure blood glucose and avoid hypoglycemia.		<input type="checkbox"/>
Maintain electrolytes within normal ranges to avoid possible life-threatening arrhythmias.		<input type="checkbox"/>
Sedation		
Treat with sedatives and anxiolytics.		<input type="checkbox"/>
Prognosis		
Always consider multiple modalities (clinical and other) over any single predictive factor.		<input type="checkbox"/>
Remember that assessments may be modified by TTM or induced hypothermia.		<input type="checkbox"/>
Consider electroencephalogram in conjunction with other factors within the first 7 days after cardiac arrest.		<input type="checkbox"/>
Consider neuroimaging such as magnetic resonance imaging during the first 7 days.		<input type="checkbox"/>

Drugs Used in PALS

Drug	Indications/dosages
Adenosine	SVT <ul style="list-style-type: none"> • 0.1 mg/kg IV/IO <i>rapid</i> push (max 6 mg), second dose 0.2 mg/kg IV/IO <i>rapid</i> push (max 12 mg)
Albuterol	Asthma, anaphylaxis (bronchospasm), hyperkalemia <ul style="list-style-type: none"> • MDI: 4 to 8 puffs via inhalation q 20 minutes PRN with spacer (or ET if intubated) • Nebulizer: 2.5 mg/dose (wt <20 kg) or 5 mg/dose (wt >20 kg) via inhalation q 20 minutes PRN • Continuous nebulizer: 0.5 mg/kg per hour via inhalation (max 20 mg/h)
Amiodarone	SVT, VT (with pulses) <ul style="list-style-type: none"> • 5 mg/kg IV/IO <i>load</i> over 20 to 60 minutes (max 300 mg), repeat to daily max 15 mg/kg (2.2 g in adolescents) Pulseless arrest (ie, VF/pulseless VT) <ul style="list-style-type: none"> • 5 mg/kg IV/IO <i>bolus</i> (max 300 mg), repeat to daily max 15 mg/kg (2.2 g in adolescents)
Atropine sulfate	Bradycardia (symptomatic) <ul style="list-style-type: none"> • 0.02 mg/kg IV/IO (max single dose 0.5 mg), may repeat dose once in 3 to 5 minutes, max total dose child 1 mg, max total dose adolescent 3 mg • 0.04 to 0.06 mg/kg ET Toxins/overdose (eg, organophosphate, carbamate) <ul style="list-style-type: none"> • <12 years: 0.05 mg/kg IV/IO initially; then repeated and doubling the dose every 5 minutes until muscarinic symptoms reverse • ≥12 years: 1 mg IV/IO initially; then repeated and doubling the dose every 5 minutes until muscarinic symptoms reverse
Calcium chloride 10%	Hypocalcemia, hyperkalemia, hypermagnesemia, calcium channel blocker overdose <ul style="list-style-type: none"> • 20 mg/kg (0.2 mL/kg) IV/IO <i>slow</i> push during arrest, repeat PRN
Calcium gluconate	Hypocalcemia, hyperkalemia, hypermagnesemia, calcium channel blocker overdose <ul style="list-style-type: none"> • 60 mg/kg (0.6 mL/kg) IV/IO <i>slow</i> push during arrest; repeat PRN
Dexamethasone	Croup <ul style="list-style-type: none"> • 0.6 mg/kg PO/IM/IV (max 16 mg) Asthma <ul style="list-style-type: none"> • 0.6 mg/kg PO/IM/IV every 24 hours (max 16 mg)
Dextrose (glucose)	Hypoglycemia <ul style="list-style-type: none"> • 0.5 to 1 g/kg IV/IO (D₂₅W 2 to 4 mL/kg; D₁₀W 5 to 10 mL/kg)
Epinephrine	Pulseless arrest, bradycardia (symptomatic) <ul style="list-style-type: none"> • 0.01 mg/kg (0.1 mL/kg of the 0.1 mg/mL concentration) IV/IO q 3 to 5 minutes (max single dose 1 mg) • 0.1 mg/kg (0.1 mL/kg of the 1 mg/mL concentration) ET q 3 to 5 minutes Hypotensive shock <ul style="list-style-type: none"> • 0.1 to 1 mcg/kg per minute IV/IO infusion (consider higher doses if needed) Anaphylaxis <ul style="list-style-type: none"> • IM autoinjector 0.3 mg (for patient weighing ≥30 kg) or IM junior autoinjector 0.15 mg (for patient weighing 10 to 30 kg) • 0.01 mg/kg (0.01 mL/kg of the 1 mg/mL concentration) IM q 15 minutes PRN (max single dose 0.3 mg) • 0.01 mg/kg (0.1 mL/kg of the 0.1 mg/mL concentration) IV/IO q 3 to 5 minutes (max single dose 1 mg) if hypotensive • 0.1 to 1 mcg/kg per minute IV/IO infusion if hypotension persists despite fluids and IM injection Asthma <ul style="list-style-type: none"> • 0.01 mg/kg (0.01 mL/kg of the 1 mg/mL concentration) subcutaneously q 15 minutes (max 0.3 mg or 0.3 mL) Croup <ul style="list-style-type: none"> • 0.25 to 0.5 mL <i>racemic</i> solution (2.25%) mixed in 3 mL NS via inhalation • 3 mg (3 mL of the 1 mg/mL concentration) epinephrine mixed with 3 mL NS (which yields 0.25 mL <i>racemic</i> epinephrine solution) via inhalation

Drugs Used in PALS (continued)

Drug	Indications/dosages
Etomidate	RSI <ul style="list-style-type: none"> • 0.2 to 0.4 mg/kg IV/IO infused over 30 to 60 seconds (max 20 mg) will produce rapid sedation that lasts for 10 to 15 minutes
Hydrocortisone	Adrenal insufficiency <ul style="list-style-type: none"> • 2 mg/kg IV bolus (max 100 mg)
Ipratropium bromide	Asthma <ul style="list-style-type: none"> • 250 to 500 mcg via inhalation q 20 minutes PRN × 3 doses
Lidocaine	VF/pulseless VT, wide-complex tachycardia (with pulses) <ul style="list-style-type: none"> • 1 mg/kg IV/IO bolus • Maintenance: 20 to 50 mcg/kg per minute IV/IO infusion (repeat bolus dose if infusion initiated > 15 minutes after initial bolus) • 2 to 3 mg/kg ET
Magnesium sulfate	Asthma (refractory status asthmaticus), torsades de pointes, hypomagnesemia <ul style="list-style-type: none"> • 25 to 50 mg/kg IV/IO <i>bolus</i> (max 2 g) (pulseless VT) <i>or</i> over 10 to 20 minutes (VT with pulses) <i>or</i> <i>slow</i> infusion over 15 to 30 minutes (status asthmaticus)
Methyl-prednisolone	Asthma (status asthmaticus), anaphylactic shock <ul style="list-style-type: none"> • Load: 2 mg/kg IV/IO/IM (max 60 mg); only use acetate salt IM • Maintenance: 0.5 mg/kg IV/IO q 6 hours (max 120 mg/d)
Milrinone	Myocardial dysfunction and increased SVR/PVR <ul style="list-style-type: none"> • Loading dose: 50 mcg/kg IV/IO over 10 to 60 minutes followed by 0.25 to 0.75 mcg/kg per minute IV/IO infusion
Naloxone	Narcotic (opiate) reversal <ul style="list-style-type: none"> • Total reversal required (for narcotic toxicity secondary to overdose): 0.1 mg/kg IV/IO/IM/subcutaneous bolus q 2 minutes PRN (max 2 mg) • Total reversal <i>not</i> required (eg, for respiratory depression associated with therapeutic narcotic use): 1 to 5 mcg/kg IV/IO/IM/subcutaneously; titrate to desired effect • Maintain reversal: 0.002 to 0.16 mg/kg per hour IV/IO infusion
Nitroglycerin	Heart failure, cardiogenic shock <ul style="list-style-type: none"> • Initiate at 0.25 to 0.5 mcg/kg per minute IV/IO infusion; titrate by 1 mcg/kg per minute q 15 to 20 minutes as tolerated. Typical dose range 1 to 5 mcg/kg per minute (max 10 mcg/kg per minute) • In adolescents, start with 5 to 10 mcg <i>per minute</i> (not per kilogram per minute) and increase to max 200 mcg <i>per minute</i>
Nitroprusside	Cardiogenic shock (ie, associated with high SVR), severe hypertension <ul style="list-style-type: none"> • 0.3 to 1 mcg/kg per minute initial dose; then titrate up to 8 mcg/kg per minute PRN
Norepinephrine	Hypotensive (usually distributive) shock (ie, low SVR and fluid refractory) <ul style="list-style-type: none"> • 0.05 to 2 mcg/kg per minute IV/IO infusion; titrate to desired effect
Prostaglandin E₁ (PGE₁)	Ductal-dependent congenital heart disease (all forms) <ul style="list-style-type: none"> • 0.05 to 0.1 mcg/kg per minute IV/IO infusion initially; then 0.01 to 0.05 mcg/kg per minute IV/IO
Sodium bicarbonate	Metabolic acidosis (severe), hyperkalemia <ul style="list-style-type: none"> • 1 mEq/kg IV/IO <i>slow</i> bolus Sodium channel blocker overdose (eg, tricyclic antidepressant) <ul style="list-style-type: none"> • 1 to 2 mEq/kg IV/IO bolus until serum pH is >7.45 (7.50 to 7.55 for severe poisoning) followed by IV/IO infusion of 150 mEq NaHCO₃/L solution titrated to maintain alkalosis
Vasopressin	Catecholamine-resistant hypotension <ul style="list-style-type: none"> • 0.0002 to 0.002 unit/kg per minute (0.2 to 2 milliunits/kg per minute) continuous infusion