Pediatric Bradycardia (age <14) Administrative Guideline

History	Signs and Symptoms	Differential
• Past medical history • Foreign body aspiration • Respiratory distress • Apnea • Possible toxic exposure or ingestion • Congenital diseases • Medication (maternal or infant)	• Decreased heart rate • Delayed capillary refill or cyanosis • Mottled, cool skin • Hypotension or arrest • Altered level of consciousness	• Respiratory failure • Foreign body/secretions • Infection (croup, epiglottitis) • Hypovolemia (dehydration) • Congenital heart disease • Trauma • Hypothermia • Toxin, medication • Hypoglycemia

Bradycardia (HR<60)
causing ALOC, hypotension,
poor perfusion, or shock (usually <50 BPM)

B
Open airway
Provide supplemental oxygenation and ventilation as indicated
FSBG analysis
Search for reversible causes (see differential above)

P
IV/IO access, pulse ox, cardiac monitor
12 lead ECG (do not delay initiating treatment)

Bradycardia (HR<60)
causing ALOC, hypotension,
poor perfusion, or shock despite adequate
oxygenation and ventilation

Apneic or pulseless at any time, follow Cardiac Arrest AG

Age <28 days begin chest compressions and refer to Neonatal Resuscitation AG

<1 yr begin chest compressions and refer to Cardiac Arrest AG

Age > 1 yr

P
First line: administer **epinephrine 0.01 mg/kg (1 mg/10 mL)** IV/IO
Max single dose 1 mg
May repeat every 3-5 minutes
OR
If vagally mediated: administer **atropine sulfate: 0.02 mg/kg** IV/IO rapid push
(min dose 0.1 mg) max initial dose 1 mg
May repeat every 3-5 minutes
Max total dose 3 mg

Administer **NS/LR 20 mL/kg** IV/IO fluid bolus, assess for signs of fluid overload

Continued bradycardia
causing ALOC, hypotension,
poor perfusion, or shock (usually <50 BPM)

B Begin chest compressions

Transport according to **SAEMS Critical Pediatric Triage Protocol**
Notify receiving facility or contact Medical Direction

Education/Pearls

The majority of pediatric bradycardia is caused by respiratory failure and hypoxia. Evaluate for signs of respiratory distress in all pediatric patients. Medication overdose is also a common cause of pediatric bradycardia, often due to unintentional ingestion of parental medications; in the setting of a breastfeeding child, consider overdose or intoxication via maternal breast milk.

- Hypoglycemia, severe dehydration, and opioids may produce bradycardia. Many other agents a child ingests can cause bradycardia, often in a single dose.
- Age appropriate minimal SBP = 70 + (2 x Age in Years)

Medications:

- Epinephrine is the drug choice for persistent, symptomatic bradycardia in pediatric patients.

- Atropine:
  - Although atropine is effective in a broader range of patients and provides a greater amount of hemodynamic support, it can cause or worsen bradycardia.
  - It is **second choice in pediatric patients** unless there is evidence of increased vagal tone or a primary AV conduction block. It is safer to use epinephrine in pediatric patients.
  - Increased vagal tone can be caused by nasal or esophageal stimulation, coughing, sleep apnea, esophageal reflux, increased intracranial pressure.
  - The paradoxical effects are the reason for the minimum dose and recommendation for rapid administration.

- Transcutaneous pacing:
  - **Indicated if bradycardia is due to complete heart block or other AV blocks which are not responsive to oxygenation, ventilation, chest compressions, or medications.**
  - **Indicated with known congenital or acquired heart disease.**
  - Not indicated for asystole or bradycardia due to postarrest hypoxic / ischemic myocardial insult or respiratory failure.