

NGN NCLEX 2026 • EMERGENCY / RESUSCITATION

CPR Across the Lifespan

Newborn • Infant • Toddler • Preschool • School-Age • Adolescent

VISUAL STUDY LIBRARY • HIGH-YIELD PEDIATRIC & ADOLESCENT BLS REFERENCE

 **SOURCE DISCLOSURE:** This topic is not present in Diane's uploaded study notes. Content sourced from: AHA 2020 Guidelines for CPR & ECC (with 2024–2025 focused updates), AAP Neonatal Resuscitation Program (NRP) 8th Edition, Saunders Comprehensive Review for the NCLEX-RN (10th ed.), ATI RN Adult Medical-Surgical Nursing, and Pediatric Advanced Life Support (PALS) Provider Manual.

01

Definition & Overview

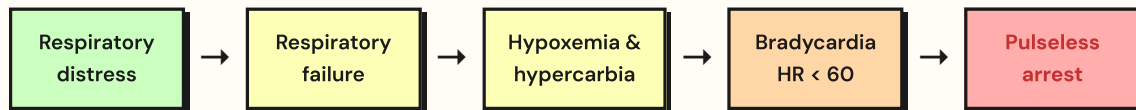
WHAT IT IS • WHY IT MATTERS

- ▶ **CPR (Cardiopulmonary Resuscitation)** is the emergency procedure combining **chest compressions** and **rescue breathing** to maintain perfusion to the brain and vital organs when a patient is in cardiac arrest (pulseless and not breathing normally).
- ▶ **Pediatric arrest is overwhelmingly RESPIRATORY in origin** — hypoxia → bradycardia → asystole. This contrasts with adults, where arrest is usually a primary cardiac event (V-fib/V-tach). This is why **airway management and ventilation are critical in pediatrics**.
- ▶ **Why age-specific technique matters:** chest size, sternum location, hand size relative to body, pulse-check site, and physiologic reserve differ across the lifespan. Using adult technique on an infant can cause rib fractures and pneumothorax; using infant technique on an adolescent is ineffective.

02

Pathophysiology of Pediatric Arrest

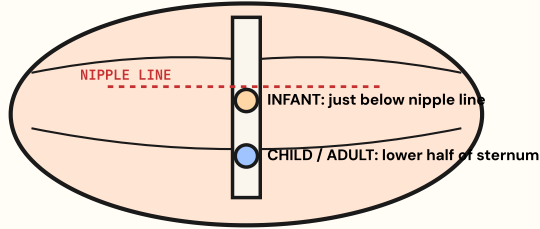
THE HYPOXIC CASCADE



- ▶ **In a child, bradycardia + poor perfusion = start CPR.** Don't wait for full pulselessness — by the time pulse is lost, brain injury is imminent.
- ▶ **Time-to-injury:** brain ischemia begins within **4 seconds of arrest**; permanent neurologic damage at **4–6 minutes** without CPR.
- ▶ **Quality of compressions = survival.** High-quality CPR can double or triple survival rates.

Pediatric Chest Anatomy — Compression Landmarks

Chest Compression Landmarks



Infant compressions go **just below the nipple line**; child/adult compressions go on the **lower half of the sternum**.

03

CPR Parameters by Age Group

MASTER COMPARISON TABLE • MEMORIZE THIS

PARAMETER	NEWBORN (delivery room)	INFANT (< 1 year)	TODDLER (1–3 yr)	PRESCHOOL (3–5 yr)	SCHOOL- AGE (5–12 yr)
PULSE CHECK SITE	Umbilical cord (preferred) or brachial	Brachial or femoral	Carotid or femoral	Carotid or femoral	Carotid
START CPR IF	HR < 60 after 30 sec PPV	HR < 60 with poor perfusion	HR < 60 with poor perfusion	HR < 60 with poor perfusion	Unresponsive + no normal breathing + no pulse in 10 sec
HAND PLACEMENT	2 thumbs encircling (preferred) or 2 fingers	2 thumbs encircling (2 rescuers) OR 2 fingers (1 rescuer)	1 hand, heel on sternum (2 hands if needed for size)	1 or 2 hands depending on body size	2 hands, heel of one hand on sternum
COMPRESSION SITE	Lower 1/3 of sternum, just below nipple line	Just below nipple line	Lower 1/2 of sternum	Lower 1/2 of sternum	Lower 1/2 of sternum
DEPTH	1/3 AP diameter of chest (~1.5 in / 4 cm)	~1.5 in (4 cm) — 1/3 AP diameter	~2 in (5 cm) — 1/3 AP diameter	~2 in (5 cm) — 1/3 AP diameter	~2 in (5 cm) — 1/3 AP diameter
RATE	120 events/min (90 comp + 30 breaths)	100–120 / min	100–120 / min	100–120 / min	100–120 / min
COMPRESSION : VENTILATION RATIO	3 : 1 (newborn ONLY)	30 : 2 (1 rescuer) 15 : 2 (2 HCP)	30 : 2 (1 rescuer) 15 : 2 (2 HCP)	30 : 2 (1 rescuer) 15 : 2 (2 HCP)	30 : 2 (1 rescuer) 15 : 2 (2 HCP)
AIRWAY POSITION	Sniffing / neutral	Sniffing — slight extension, do	Head-tilt / chin-lift	Head-tilt / chin-lift	Head-tilt / chin-lift

PARAMETER	NEWBORN (delivery room)	INFANT (< 1 year)	TODDLER (1–3 yr)	PRESCHOOL (3–5 yr)	SCHOOL- AGE (5–12 yr)
AED USE	(shoulder roll)	NOT hyperextend			
	Not typically used	Pediatric pads + dose attenuator preferred. Adult pads OK if peds unavailable	Pediatric pads < 8 yr / < 25 kg	Pediatric pads < 8 yr / < 25 kg	Adult pads ≥ 8 yr / ≥ 25 kg
RESCUE BREATH (no compressions)	Per NRP protocol	1 breath every 2–3 sec (20–30/min)	1 breath every 2–3 sec	1 breath every 2–3 sec	1 breath every 2–3 sec
CHOKING (FBAO)	—	5 back blows + 5 chest thrusts (NO abdominal thrusts)	Heimlich (abdominal thrusts)	Heimlich (abdominal thrusts)	Heimlich (abdominal thrusts)

 **CRITICAL NCLEX PEARL:** The **3:1 ratio is for NEWBORNS ONLY** (delivery room resuscitation). Every other pediatric age uses **15:2 (two HCPs)** or **30:2 (single rescuer)**. Confusing these is a top NCLEX trap.

04

Priority Nursing Interventions

C-A-B SEQUENCE • HIGH-QUALITY CPR • PRIORITY ORDER

BLS Sequence — In Order

- ▶ **1. Verify scene safety.** Don't become a second victim.
- ▶ **2. Check responsiveness.** Tap and shout. For infant: tap heel.
- ▶ **3. Activate emergency response.** Call code / 911 / get AED. (If alone with unwitnessed pediatric arrest: **2 minutes of CPR first, then call.**)
- ▶ **4. Check pulse + breathing simultaneously** — no more than 10 seconds.
- ▶ **5. Begin C-A-B** (Compressions → Airway → Breathing).
- ▶ **6. Attach AED/defibrillator** as soon as available.

High-Quality CPR — 5 Components

- ▶ **PUSH HARD** — adequate depth for age
- ▶ **PUSH FAST** — 100–120 / min
- ▶ **FULL CHEST RECOIL** — don't lean on chest
- ▶ **MINIMIZE INTERRUPTIONS** — < 10 sec for pulse checks, defib, intubation
- ▶ **AVOID EXCESSIVE VENTILATION** — causes gastric distension & ↓ venous return

 **ROTATE COMPRESSORS EVERY 2 MINUTES** (or sooner if fatigued). Compression quality drops sharply after 1–2 minutes even when the rescuer doesn't feel tired.

BRADYCARDIA + POOR PERFUSION = START CPR (peds). If HR < 60 in a child or infant with signs of poor perfusion (mottling, weak pulses, altered LOC) despite oxygenation and ventilation, begin compressions. **Do NOT wait for asystole.**

05

Pharmacology — Code Drugs

ACLS / PALS MEDICATIONS

Epinephrine

CATECHOLAMINE · α + β AGONIST

Mechanism: Vasoconstriction (α) $\uparrow$ coronary & cerebral perfusion; β -effects $\uparrow$ HR + contractility.

Use: Every cardiac arrest rhythm (VF, pVT, asystole, PEA, bradycardia).

PEDS: 0.01 mg/kg IV/IO q 3–5 min

ADULT: 1 mg IV/IO q 3–5 min

Nursing: Give as fast IV push followed by 20 mL flush; raise extremity. Causes tachycardia, HTN, tissue necrosis if extravasation.

Amiodarone

CLASS III ANTIARRHYTHMIC

Mechanism: Blocks K^+ channels; prolongs action potential & refractory period.

Use: Shock-refractory VF / pulseless VT (after 3rd shock + epi).

PEDS: 5 mg/kg IV/IO bolus

ADULT: 300 mg IV/IO; may repeat 150 mg

Nursing: Watch QT prolongation, hypotension, pulmonary toxicity, thyroid effects long-term.

Atropine

ANTICHOLINERGIC

Mechanism: Blocks vagal tone $\rightarrow$ $\uparrow$ HR via SA & AV nodes.

Use: Symptomatic bradycardia (esp. AV block). **No longer routine in PEA/asystole.**

PEDS: 0.02 mg/kg (min 0.1 mg)

ADULT: 1 mg IV q 3–5 min, max 3 mg

Nursing: Dry mouth, blurred vision, urinary retention, tachycardia, mydriasis. Use with caution in elderly.

Naloxone (Narcan)

OPIOID ANTAGONIST

Mechanism: Competitive opioid receptor antagonist.

Use: Suspected opioid-related respiratory arrest.

PEDS: 0.1 mg/kg IV/IM/IN (max 2 mg)

ADULT: 0.4–2 mg IV/IM/IN q 2–3 min

Nursing: Short half-life (30–90 min) — may need repeat doses. Watch for acute withdrawal: agitation, vomiting, HTN, tachycardia.

Sodium Bicarbonate

ALKALINIZING AGENT

Mechanism: Buffers metabolic acidosis.

Use: Hyperkalemia, TCA overdose, prolonged arrest with documented acidosis. **Not routine in CPR.**

PEDS: 1 mEq/kg IV/IO

ADULT: 1 mEq/kg IV/IO

Nursing: Incompatible with calcium & catecholamines — **flush line.** Causes hypernatremia & alkalosis if overused.

Magnesium Sulfate

ELECTROLYTE / ANTIARRHYTHMIC

Mechanism: Membrane stabilizer; corrects hypomagnesemia.

Use: Torsades de pointes, suspected hypomagnesemia.

PEDS: 25–50 mg/kg IV/IO (max 2 g)

ADULT: 1–2 g IV in 10 mL D5W

Nursing: Watch for hypotension, $\downarrow$ DTRs, respiratory depression — antidote is calcium gluconate.

06

NCLEX Test Traps

COMMON MISTAKES · WRONG vs RIGHT

✗ WRONG

"Check the carotid pulse on a 6-month-old."

✓ RIGHT

For **infants < 1 year**, check the **brachial pulse** (inner upper arm). Carotid is too difficult to palpate on a short, chubby infant neck.

✗ WRONG

"Use a 3:1 compression-to-ventilation ratio on an infant."

✓ RIGHT

3:1 is NEWBORN only (delivery room). After the newborn period: **30:2 single rescuer, 15:2 two HCPs**.

✗ WRONG

"Hyperextend the infant's head to open the airway."

✓ RIGHT

Use the **sniffing position** — neutral with slight extension. Hyperextending an infant's neck **occludes the airway** because of their large occiput and short trachea.

✗ WRONG

"AEDs can't be used on children."

✓ RIGHT

AEDs **can and should** be used on children > 1 year. Use **pediatric pads/dose attenuator if < 8 yr or < 25 kg**. If pediatric pads unavailable, use adult pads — **any shock is better than no shock**.

✗ WRONG

"Perform abdominal thrusts on a choking 6-month-old."

✓ RIGHT

For an **infant < 1 year: 5 back blows + 5 chest thrusts**. NO abdominal thrusts (risk of liver/spleen injury).

✗ WRONG

"Witness an unresponsive child collapse alone — start CPR for 2 minutes before calling for help."

✓ RIGHT

Witnessed sudden collapse (suggesting cardiac cause): **CALL FIRST, then CPR**. The "2 minutes first" rule applies only to **unwitnessed** pediatric arrest where respiratory cause is likely.

✗ WRONG

"Continue compressions on a child with HR of 70 and poor perfusion — they still have a pulse."

✓ RIGHT

Start compressions if HR < 60 with signs of poor perfusion despite oxygenation. A pediatric pulse alone doesn't mean adequate cardiac output.

✗ WRONG

"Pause compressions every 30 seconds to check the pulse."

✓ RIGHT

Minimize interruptions. Pulse checks ≤ 10 seconds, and only at rhythm checks (every 2 minutes). Every interruption drops coronary perfusion pressure.

✗ WRONG

"Compress the chest 2 inches on a 6-month-old."

✓ RIGHT

Infant depth ≈ 1.5 in (4 cm) — about $\frac{1}{3}$ the **AP diameter** of the chest. 2 in is for children & adolescents.

Patient & Family Education

07

PREVENTION • BYSTANDER RESPONSE • POST-ARREST

Prevention & Recognition

- ▶ **Safe sleep:** back to sleep, firm mattress, no loose bedding, no co-sleeping (↓ SIDS risk in < 1 yr).
- ▶ **Choking prevention:** no hot dogs, whole grapes, popcorn, nuts, hard candy in children < 4 yr. Cut food into pieces smaller than a pea.
- ▶ **Pool/water safety:** constant supervision; drowning is a leading cause of pediatric arrest.
- ▶ **Medication & chemical safety:** locked cabinets, Poison Control number posted (1-800-222-1222).
- ▶ **Recognize warning signs:** grunting, retractions, nasal flaring, cyanosis, lethargy — call 911 or seek emergency care immediately.

Bystander CPR Teaching

- ▶ **Hands-only CPR is taught to laypersons for adults/adolescents** — push hard, push fast in the center of the chest to the beat of "Stayin' Alive."
- ▶ **For children & infants:** conventional CPR (compressions + breaths) is preferred because of the respiratory cause.
- ▶ **Know where the AED is** at home, work, gym, school. Public-access AEDs save lives.
- ▶ **Take a Heartsaver/BLS course.** All parents, daycare providers, coaches, & teachers should be certified.
- ▶ **Post-arrest debrief:** survivors of cardiac arrest may have anxiety, PTSD, cognitive deficits. Refer for follow-up & counseling.

08

Memory Boosters & Mnemonics

PATTERN RECOGNITION • QUICK RECALL

C-A-B

The Order of CPR

- ★ Compressions first (push hard, push fast)
- ★ Airway second (open airway)
- ★ Breathing third (rescue breaths)

Replaced old A-B-C in 2010 to reduce delay to compressions.

3 · 15 · 30

The Ratio Rule

- ★ **3:1** — Newborn (delivery)
- ★ **15:2** — Pediatric, 2 HCPs
- ★ **30:2** — Anyone, 1 rescuer / adult always

B-A-C

Pediatric Pulse Sites

- ★ Brachial — infants < 1 yr
- ★ Anywhere usable (femoral OK) — small children
- ★ Carotid — children > 1 yr & adults

1.5 / 2 / 2-2.4

Compression Depth (inches)

- ★ **1.5 in** (4 cm) — Infant
- ★ **2 in** (5 cm) — Child
- ★ **2-2.4 in** (5-6 cm) — Adolescent / Adult

All ≈ 1/3 AP diameter of the chest.

100-120

The Universal Rate

PUSH

High-Quality CPR Checklist

- ★ Push hard (full depth)

- ★ All ages (except newborn) = **100–120 compressions / min**
- ★ Beat of "Stayin' Alive" (Bee Gees) ≈ 103 bpm
- ★ Or "Baby Shark," "Crazy in Love" — same tempo

- ★ Up — full recoil (don't lean)
- ★ Speed: 100–120 / min
- ★ Hold breaths — minimize interruptions, avoid over-ventilation

09

NCJMM Clinical Judgment Scenario

NEXT-GENERATION NCLEX · 6-STEP MODEL

 **SCENARIO:** A 10-month-old infant is brought to the ED by EMS after being found unresponsive in his crib. Mother reports she fed him a bottle, put him down for a nap on his side, and returned 90 minutes later to find him blue and not breathing. EMS began bag-mask ventilation. On arrival: **unresponsive, apneic, brachial pulse ≈ 50 bpm, mottled skin, SpO₂ 78%, capillary refill 5 sec.**

STEP 1 Recognize Cues

Unresponsive infant · apneic · **HR < 60 with poor perfusion** (mottled, prolonged CRT, ↓ SpO₂) · history of unwitnessed event during sleep · respiratory cause likely.

STEP 2 Analyze Cues

Bradycardia + poor perfusion in an infant = **functional cardiac arrest** per PALS. The hypoxic cascade is in motion. This is not "wait and see" — the brain is being injured every second.

STEP 3 Prioritize Hypotheses

Top priority: **impending/actual cardiac arrest from hypoxia**. Consider SIDS, suffocation, sepsis, intracranial event — but the immediate threat is loss of perfusion.

STEP 4 Generate Solutions

Begin **infant CPR immediately at 15:2 (2 HCPs)** · compressions **just below nipple line, ~1.5 in depth, 100–120/min** · maintain **sniffing-position airway** · provide **100% O₂ via BVM** · establish IV/IO · attach monitor & pediatric AED pads · prepare **epinephrine 0.01 mg/kg IV/IO**.

STEP 5 Take Action

Start chest compressions with **2-thumb encircling technique** · ventilate with BVM at **1 breath every 2–3 sec during pulseless arrest** · push **epinephrine 0.01 mg/kg IV/IO q 3–5 min** · check rhythm every 2 minutes · rotate compressors · obtain blood glucose & labs · notify PICU.

STEP 6 Evaluate Outcomes

Reassess every 2 min: **return of pulse, perfusion, SpO₂ > 94%, capillary refill < 2 sec, palpable brachial pulse > 60 bpm**. ROSC achieved → begin **post-cardiac-arrest care** (targeted temperature management, glucose control, neuroprotective support, family-centered debrief). Document interventions, times, & team responses.

10

Quick-Fire Summary Card

THE 10 THINGS TO REMEMBER ON EXAM DAY

1. **Pediatric arrest is RESPIRATORY** — fix the airway first (after starting compressions).
2. **HR < 60 + poor perfusion = start CPR** in infants/children.
3. **Brachial pulse** for infant; **carotid** for child/adult.
4. **3:1 ratio = NEWBORN only**. 15:2 for peds 2–HCP. 30:2 for single rescuer or adolescent/adult.
5. **Compression depth $\approx \frac{1}{3}$ AP diameter** (1.5 in infant, 2 in child, 2–2.4 in adolescent/adult).
6. **Rate: 100–120/min** for everyone except newborn.
7. **Sniffing position** for infant airway — never hyperextend.
8. **AEDs work on kids > 1 yr** — peds pads preferred < 8 yr / < 25 kg.
9. **Infant choking = back blows + chest thrusts** (NO abdominal thrusts).
10. **Epinephrine = the universal code drug**. 0.01 mg/kg peds, 1 mg adult, q 3–5 min.

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