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

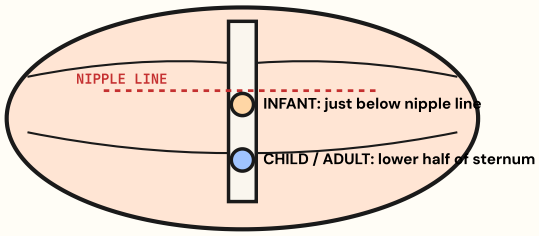
THE HYPOXIC CASCADE

Respiratory distress → Respiratory failure → Hypoxemia & hypercarbia → Bradycardia HR < 60 → Pulseless arrest

- **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 ⅓ of sternum, just below nipple line	Just below nipple line	Lower ½ of sternum	Lower ½ of sternum	Lower ½ of sternum
DEPTH	⅓ AP diameter of chest (~1.5 in / 4 cm)	**~1.5 in (4 cm) — ⅓ AP diameter**	~2 in (5 cm) — ⅓ AP diameter	~2 in (5 cm) — ⅓ AP diameter	~2 in (5 cm) — ⅓ 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)
	(shoulder roll)	**NOT hyperextend**			
AED USE	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_1) ↑ coronary & cerebral perfusion; β-effects ↑ 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 → ↑ 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, ↓ 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 **⅓ 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

★ **C**ompressions first (push hard, push fast)
★ **A**irway second (open airway)
★ **B**reathing 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

★ **B**rachial — infants < 1 yr
★ **A**nywhere usable (femoral OK) — small children
★ **C**arotid — 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 ≈ ⅓ AP diameter of the chest.

100-120

The Universal Rate

PUSH

High-Quality CPR Checklist

★ **P**ush 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

★ **U**p — full recoil (don't lean)

★ **S**peed: 100–120 / min

★ **H**old 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, SpO_2 78%, capillary refill 5 sec.**

STEP 1 Recognize Cues

Unresponsive infant · apneic · **HR < 60 with poor perfusion** (mottled, prolonged CRT, ↓ SpO_2) · 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% O_2 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, SpO_2 > 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 ≈ ⅓ 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.

DIANE'S NGN NCLEX 2026 VISUAL STUDY LIBRARY · CPR ACROSS THE LIFESPAN
Sources: AHA 2020 (with 2024–2025 updates) · NRP 8th Ed · Saunders · ATI · PALS Provider Manual