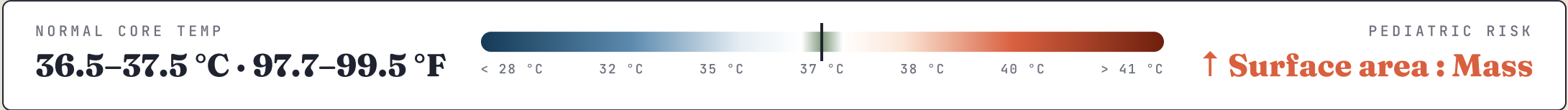


When the Body Can't Hold the Cold or the Heat

Pediatric hypothermia & hyperthermia — pathophysiology, clinical staging, complications, and stepwise management for the next-gen NCLEX clinical judgment model.

SERIES • PEDIATRIC NURSING
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Hypothermia

CORE TEMPERATURE < 36 °C / 96.8 °F

COLD STRESS

WHY KIDS ARE VULNERABLE

Neonates & infants have a **large surface-area-to-mass ratio**, thin subQ fat, immature shivering, and limited brown-fat thermogenesis. Heat is lost by **radiation, conduction, convection, evaporation** — the exact reasons we dry, wrap, cap, and skin-to-skin a newborn in the first golden minute.

SEVERITY STAGING

MILD

32–35 °C

Compensating. Shivering, tachycardia, tachypnea, peripheral vasoconstriction, pale/cool skin, mild confusion. *"The umbles"* — *stumbles, mumbles, fumbles, grumbles*.

MOD

28–32 °C

Decompensating. Shivering *STOPS*, bradycardia, bradypnea, dilated pupils, decreased LOC, J-wave (Osborn) on ECG, hypotension.

SEVERE

< 28 °C

Coma • apnea • fixed pupils • asystole risk. Patient may *"appear dead"* — never call death until **warm and dead**.

NEONATAL COLD-STRESS RED FLAGS

Acrocyanosis

Weak cry

Poor feeding

Hypoglycemia

Resp distress / grunting

Metabolic acidosis

↓ Tone

MNEMONIC

COLD

Hypothermia priorities

C

Cardiac monitor — bradycardia / J-wave

O

Oxygen — heated & humidified

L

Labs — glucose, ABG, coags (DIC)

D

Dry, wrap, gentle handling, slow rewarm

Hyperthermia

FEVER ≠ THERMOREGULATORY FAILURE

HEAT STROKE • MH

FEVER ≠ HYPERTHERMIA

Fever = hypothalamic set-point *raised* by pyrogens; antipyretics work.
Hyperthermia = thermoregulation has *failed*; antipyretics will *not* bring it down — you must physically cool.

HEAT-ILLNESS SPECTRUM

CRAMPS

≈ 37 °C

Salt & water depletion. Painful muscle cramps, sweating present, mental status intact. Rest, oral rehydration with electrolytes.

EXHAUST

38–40 °C

Profuse sweating, headache, nausea, weakness, tachycardia, *orthostasis*. Move to cool area, IV fluids if needed, cool compresses.

STROKE

> 40 °C

HOT, DRY skin • ALTERED MENTAL STATUS. Sweating stops. *True emergency* — minutes matter. Cool aggressively to 39 °C then stop.

PEDIATRIC RED FLAGS

Febrile seizure (6 mo–5 y)

Dry diapers / no tears

Sunken fontanelle

Lethargy / irritability

Tachycardia & tachypnea

Petechial rash → sepsis

MH: jaw rigidity post-anesthesia

MNEMONIC

HOT

Heat-stroke priorities

H

Hydrate — IV NS, monitor I & O

O

Off with clothes — expose & ice axillae/groin/neck

T

Temp continuously — stop cooling at 39 °C; watch for shivering

Complications you must anticipate

RECOGNIZE CUES • ANALYZE CUES • PRIORITIZE HYPOTHESES

← FROM COLD

! Hypoglycemia — shivering & cold stress burn glucose stores fast (esp. neonates).

! Metabolic acidosis — anaerobic metabolism from hypoperfusion.

! Bradydysrhythmias / V-fib — myocardium is irritable <30 °C; **HANDLE GENTLY**.

! Cold-induced coagulopathy & DIC — clotting factors fail below 34 °C.

! Rewarming shock — peripheral vasodilation drops BP; rewarm *core first*, slowly.

! Frostbite / tissue necrosis in exposed extremities.

FROM HEAT →

! Febrile seizure — typically 6 mo–5 y; protect airway, side-lying, time it.

! Rhabdomyolysis & AKI — muscle breakdown → myoglobinuria (tea-colored urine).

! DIC & multi-organ failure — heat stroke endothelial injury.

! Cerebral edema / brain injury at temps >41 °C; permanent if prolonged.

! Malignant hyperthermia — succinylcholine / halogenated anesthetics; **GIVE DANTROLENE**.

! Dehydration & hypovolemic shock — kids decompensate suddenly.

Rewarm the cold child

SLOW • 0.5–1 °C / HR

Cool the hot child

TARGET 39 °C, THEN STOP

ClinicalJudgeRN-T
NGN NCLEX HIGH-YIELD REVIEW

- 01

Stop the loss. Remove wet clothing, dry thoroughly, move to warm room (≥25 °C), cover head.
- 02

Passive rewarming (mild): warm blankets, skin-to-skin for neonates, warm room.
- 03

Active external (moderate): radiant warmer, forced-air blanket, warmed IV fluids (40–42 °C), heated humidified O₂.
- 04

Active core (severe): warm gastric / bladder / peritoneal lavage; ECMO for cardiac arrest with severe hypothermia.
- 05

Monitor. Continuous ECG, glucose q30 min, electrolytes, coags. *Handle gently — bumps trigger V-fib.*

- 01

Stop the source. Remove from heat / stop trigger drug; expose skin; ABCs first.
- 02

Fever: acetaminophen 10–15 mg/kg q4–6h *or* ibuprofen 5–10 mg/kg q6–8h (≥6 mo). **Never aspirin → Reye's.**
- 03

Heat exhaustion: cool environment, oral / IV fluids, cool damp cloths, rest.
- 04

Heat stroke: aggressive cooling — ice packs to *axillae, groin, neck, scalp*; cool-water mist + fan; cooling blanket; IV NS.
- 05

Malignant hyperthermia: stop trigger, 100% O₂, **dantrolene 2.5 mg/kg IV**, cool, treat hyperK⁺ & acidosis.

NGN Clinical Judgment — *the six-step lens*

BOW-TIE • MATRIX • TREND • HIGHLIGHT

STEP 01 Recognize cues Drop in temp · shivering then absent shivering · dry hot skin · altered LOC · jaw rigidity post-OR.	STEP 02 Analyze cues Is this fever (raised set-point) or hyperthermia (thermoreg failure)? Mild vs decompensated cold?	STEP 03 Prioritize hypotheses Heat stroke > heat exhaustion. Severe hypothermia + arrest = warm before calling. MH > sepsis if anesthesia recent.	STEP 04 Generate solutions Match intervention to severity: passive vs active rewarming · antipyretic vs physical cooling · dantrolene if MH.	STEP 05 Take action ABC → expose → measure core temp → glucose → IV access → monitor ECG → cool/warm to target then STOP.	STEP 06 Evaluate outcomes Core temp trending to 36.5–37.5 °C, LOC improving, normal HR/RR, urine output ≥1 mL/kg/hr, no shivering or seizure.
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NGN Click-Traps — *the seductively wrong answers*

READ TWICE • CLICK ONCE

- ✗

Don't rewarm fast. >1 °C/hr causes *rewarming shock* — peripheral vasodilation, hypotension, arrhythmia.
- ✗

Don't give antipyretics for heat stroke. The hypothalamus isn't the problem — they won't work. Cool physically.
- ✗

Don't warm extremities first. Cold blood returning to core drops temp further (afterdrop). Warm *trunk first*.
- ✗

Don't give aspirin to a febrile child. Reye's syndrome — encephalopathy + hepatic failure.
- ✗

Don't handle severe hypothermia roughly. Even moving the bed can trigger *V-fib* at <30 °C.
- ✗

Don't sponge with alcohol or ice water. Causes shivering & vasoconstriction → *raises* core temp; alcohol absorbs trans-dermally.
- ✗

Don't ignore "shivering stopped." In a cold child, it means *worsening*, not improvement.
- ✗

Don't forget glucose. Both cold-stressed neonates and post-seizure febrile kids run hypoglycemic.

BOTTOM LINE — *Children swing temperature faster and farther than adults because of surface-area physics. The clinical-judgment win is recognizing which way they're failing (compensating, decompensating, or arrested), and matching the rewarming or cooling strategy to that stage — gently, gradually, and with glucose, glucose, glucose on your mind.*

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