

PEDIATRIC NGN NCLEX 2026 • VOL. 10 • ENDOCRINE  
HIGH-YIELD • RAPID REVIEW • NGN CLINICAL JUDGMENT



# Congenital Hypothyroidism

The **#1 preventable cause of intellectual disability**. Often silent at birth — but a positive newborn screen sets a clock: levothyroxine must start within **2 weeks of life** to protect CNS development. This module covers screening, the 6-P presentation, levothyroxine teaching click-traps, and the NGN bow-tie you'll see on test day.

**1:2,000**

LIVE BIRTHS • PRIMARY CH

**≤ 2 wks**

WINDOW TO BEGIN THERAPY



## DIAGNOSIS

### Newborn screen + confirmatory serum

Heel-stick 24–72 hr • TSH ± T4 • confirm with serum TSH/free T4



## FIRST-LINE RX

### Levothyroxine (Synthroid)

10–15 mcg/kg/day • crushed in small amount of breast milk / formula / water



## WHY SPEED?

### Brain myelination depends on T4

Damage is largely irreversible if untreated past ~6 weeks of life



## TOP CLICK-TRAP

### Never mix with soy formula

Soy, iron, calcium & fiber all decrease levothyroxine absorption

## 01 Pathophysiology • Etiology

- 1 Thyroid aplasia / hypoplasia / ectopic tissue (dysgenesis)
- 2 ↓ Production of T3 & T4
- 3 Pituitary senses low T4 → ↑↑ TSH (negative feedback fails)
- 4 Hormone deficit → impaired CNS myelination, slowed metabolism, growth arrest

### Thyroid dysgenesis

85% Aplasia • hypoplasia • ectopic

SPORADIC

### Dyshormonogenesis

10% Enzyme defects • goiter present

AR GENETIC

### Iodine deficiency

3–5% Maternal • #1 cause worldwide

PREVENTABLE

### Central (hypothalamic/pituitary)

<1% TSH low or normal w/ low T4

RARE

### SERUM TSH

↑  
Markedly elevated in primary CH

### FREE T4

↓  
Low — confirms diagnosis

### THYROID SCAN

—  
Locates ectopic tissue; not required to start Rx

## 02 Cardinal Signs • The 6 P's of CH

Signs often subtle in the first weeks — by the time the picture is "classic," irreversible damage may already be underway. Screen, don't wait.

### Prolonged jaundice

P

> 2 weeks of unconjugated hyperbilirubinemia (slow hepatic UGT maturation)

### Protruding tongue

P

Macroglossia • open mouth posture; feeding looks effortful

### Poor feeding

P

Lethargic, weak suck, sleeps through feeds, hoarse cry

### Pot belly

P

Distended abdomen + umbilical hernia (abdominal wall hypotonia)

### Puffy face

P

Myxedematous coarse features, depressed nasal bridge, dull expression

### Persistent constipation

P

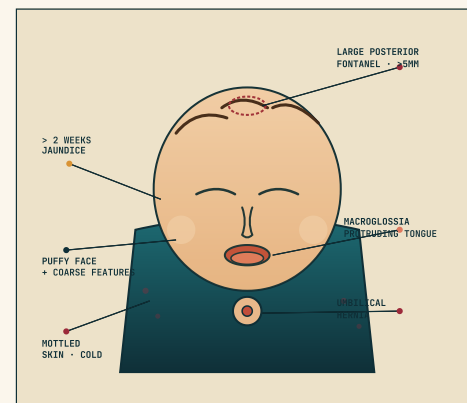
↓ GI motility • large posterior fontanel (>5 mm) • cold mottled skin • bradycardia

### "6 P's"

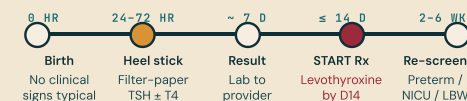
Prolonged jaundice • Protruding tongue • Poor feeding • Pot belly • Puffy face • Persistent constipation — remember: a sleepy, jaundiced, "good baby" who never cries is the click-trap.

## 03 Levothyroxine • Parent Teaching

## 05 Find It Fast • The Infant



## 06 Newborn Screening Clock



### NGN PEARL • SCREENING

Preterm, sick, or low-birthweight infants — and those transfused within 48 hr of screen — require a **repeat screen at 2–6 weeks**. A single normal early screen does *not* rule out CH in these populations.

## 07 NCLEX Click-Traps

~~"Wait until symptoms develop to start treatment"~~

Treat **presumptively** on a positive newborn screen. Each week of delay = measurable IQ loss.

~~"Mix the levothyroxine into the 4-oz bottle"~~

Mix in 1–2 mL only. Full bottles risk an incomplete dose if baby doesn't finish.

~~"Add the dose to the baby's soy formula"~~

Soy binds levothyroxine in the gut and ↓ absorption. Switch carrier or change formula with provider.

~~"Give iron drops & levothyroxine together — it's easier"~~

**10–15**  
MCG / KG / DAY

Start **immediately** once screen is positive — do not wait for confirmatory serum if newborn screen is unequivocally abnormal. Goal: free T4 in **upper half of normal range**; TSH suppressed. Re-check labs q1–2 mo × 6 mo, q3 mo to age 3, then q6–12 mo. Therapy is **lifelong**.

#### D0 • Administer correctly

- ✓ **Crush tablet**; mix into *small* amount (1–2 mL) of breast milk, formula, or water
- ✓ Give via **dropper or syringe** at the *same time* daily (morning preferred)
- ✓ Give on a **relatively empty stomach** when possible
- ✓ If a dose is missed, give as soon as remembered *same day*
- ✓ Monitor **TSH & free T4** per schedule — never adjust dose at home
- ✓ Report: *tachycardia, irritability, diarrhea, poor weight gain* (over-replacement) or returning 6-P signs (under-replacement)

#### DON'T • Common pitfalls

- ✗ Do **NOT** mix into *soy formula* — soy ↓ **absorption** significantly
- ✗ Do **NOT** co-administer with *iron, calcium, fiber, or antacids* — separate by ≥ 4 hr
- ✗ Do **NOT** put dose in a *full bottle* — infant may not finish & misses dose
- ✗ Do **NOT** stop medication when child “looks fine” — therapy is **lifelong**
- ✗ Do **NOT** double-up if a full day is missed — call provider
- ✗ Do **NOT** assume warmth = thermal regulation; teach swaddling & axillary checks

Separate by **≥ 4 hours**. Iron, calcium, fiber, antacids all impair absorption.

~~“He’s growing well — we can stop the medicine”~~

CH therapy is **lifelong**. Stopping = rebound hypothyroidism + cognitive risk.

~~“That sleepy, jaundiced baby is just a cold newborn”~~

Jaundice > **2 weeks** + lethargy + poor feeding = screen / re-screen for CH.

### 04 NGN Bow-Tie • Worked *Scenario*

**CASE.** A 16-day-old breastfed term infant is brought to clinic. Mother reports “she’s such a good baby — sleeps all the time and barely cries.” On exam: persistent jaundice, hoarse cry, large protruding tongue, umbilical hernia, posterior fontanel 7 mm, T 36.1 °C, HR 96. Newborn screen result is “pending — mailed back to lab.” The nurse anticipates a diagnosis of **congenital hypothyroidism**.

#### ◀ ACTIONS TO TAKE

- Draw **confirmatory serum TSH & free T4** today
- Anticipate starting **levothyroxine 10–15 mcg/kg/day** before discharge
- Teach **crush-and-mix** in 1–2 mL (no soy formula)
- Arrange follow-up labs in **2 weeks**

CONDITION MOST LIKELY

**Congenital Hypothyroidism**

MOST CONCERNED FOR

*Irreversible neuro-cognitive injury*

#### PARAMETERS TO MONITOR ▶

- Serum **TSH & free T4** trend
- **Growth chart** — length, weight, OFC
- **Developmental milestones** (Denver II / ASQ)
- **Resolution of 6 P’s** — feeding, tone, stooling

### 08 Differential *Snapshot*

|             | CONGENITAL HYPOTHYROIDISM           | DOWN SYNDROME                              |
|-------------|-------------------------------------|--------------------------------------------|
| TONGUE      | <b>Macroglossia</b> (myxedema)      | Protruding (small oral cavity)             |
| TONE        | Hypotonia + <b>delayed reflexes</b> | Hypotonia from birth                       |
| FEEDING     | Poor suck, lethargic                | Suck-swallow coordination issues           |
| LABS        | <b>↑ TSH • ↓ T4</b>                 | Karyotype: trisomy 21 (↑ CH risk → screen) |
| SKIN        | Cold, mottled, dry; jaundiced       | Normal temperature regulation              |
| REVERSIBLE? | <b>YES if treated &lt; 2 wk</b>     | No — genetic, lifelong support             |

### 09 Red Flags • *Escalate Now*

#### Prolonged jaundice

Unconjugated jaundice persisting beyond 14 days → screen / re-screen CH

#### Posterior fontanel > 5 mm

+ wide sutures = delayed bone maturation pattern

#### Caregiver mixing in soy formula

Or co-administering iron / calcium — anticipate falsely “uncontrolled” labs

#### Missed newborn screen

Home birth, NICU transfer, transfusion within 48 hr of screen, or “lost in mail”

#### Pulse < 100 in newborn

Bradycardia + hypothermia + lethargy = severe metabolic slowing

#### Signs of over-replacement

Tachycardia • irritability • diarrhea • weight loss • craniosynostosis on follow-up

### 10 NGN *Answer-Pattern Pearls*

#### RECOGNIZE CUES

“Sleepy, jaundiced, hoarse-cry, constipated newborn” = CH until proven otherwise — even with a normal newborn screen if preterm or transfused.

#### PRIORITIZE ACTION

On a positive screen, the *first nursing action* is contacting the provider and preparing to **start levothyroxine** — not waiting for a thyroid scan.

#### EVALUATE THERAPY

Best indicator of adequate replacement = **normalizing free T4** in **upper half of range** + appropriate growth + developmental milestones on track.

*If a newborn screen comes back positive, the clock is the patient.  
Two weeks. Levothyroxine. Lifelong.*