

# Drug Toxicities

Pharmacology · NGN NCLEX 2026 Test Plan

HIGH YIELD

## DEFINITION / OVERVIEW

- Drug toxicity occurs when a drug's serum level exceeds its therapeutic range, causing harmful effects
- Three high-yield drugs: Digitalis / Digoxin Lithium Theophylline
- All three share nausea & vomiting as the earliest warning sign — know the drug-specific distinguishing features
- Electrolyte imbalances (esp. low Na<sup>+</sup>) can potentiate toxicity

## TOXIC THRESHOLDS

|                            |             |
|----------------------------|-------------|
| Digitalis (Digoxin)        | > 2.0 ng/dL |
| Lithium                    | > 2.0 mEq/L |
| Theophylline (therapeutic) | 10–20       |
| Theophylline (toxic)       | > 20        |

Digitalis & Lithium both toxic at 2 — same number, different units

## SIGNS & SYMPTOMS BY DRUG

### Digitalis / Digoxin

Earliest sign: Nausea, vomiting + headache

- Yellow/green halos around lights (classic visual sign)
- Bradycardia / dysrhythmias
- Anorexia, fatigue

RED FLAG: halos bradycardia

### Lithium

Earliest sign: Nausea, vomiting + thirst

- Tremors (fine hand tremors)
- Abdominal pain, diarrhea
- Watch for low sodium — increases toxicity risk
- CNS changes: confusion, lethargy

RED FLAG: tremors hyponatremia

### Theophylline

Earliest sign: Nausea, vomiting (coffee-ground emesis)

- Tachycardia (heart)
- Tremors (muscle)
- Seizures (severe/late)
- Life-threatening — act fast

RED FLAG: tachycardia seizure

### ● PRIORITY NURSING INTERVENTIONS

Assess airway & LOC → Obtain serum level STAT →

Hold the drug

- Monitor HR, BP, respiratory rate continuously
- Assess neurological status (LOC, tremors, confusion)
- Monitor electrolytes — especially sodium (Lithium) and potassium (Digoxin)
- Obtain serum drug levels and report to HCP immediately
- Withhold the next dose until levels are clarified
- Maintain IV access — emergency drugs may be required
- For Theophylline: prepare for seizure precautions
- Document and report any new visual disturbances (Digoxin)

### ● PHARMACOLOGY

#### Digitalis / Digoxin

- Class: Cardiac glycoside — positive inotrope
- Action: Strengthens and slows the heart; increases contractility
- Antidote: Digibind (Digoxin immune Fab)
- Monitor apical pulse  $\geq 60$  before administering

#### Lithium Carbonate

- Class: Mood stabilizer
- Used for: Bipolar (manic-depressive) disorder
- Sodium-dependent: low  $\text{Na}^+$  = higher lithium retention = toxicity
- Adequate fluid and sodium intake is essential

#### Theophylline

- Class: Bronchodilator (methylxanthine)
- Used for: Asthma, COPD bronchospasm
- Narrow therapeutic index: must monitor levels closely
- Caffeine / smoking can affect serum levels

### ● NCLEX TEST TRAPS

**TRAP** Digitalis and Lithium both become toxic at level 2 — don't confuse the units (ng/dL vs. mEq/L)

**TRAP** N&V appears with ALL three toxicities — distinguish by the specific companion sign (halos → Digoxin, tremors → Lithium, tachycardia → Theophylline)

**TRAP** Digoxin toxicity causes *bradycardia* — do NOT confuse with Theophylline, which causes *tachycardia*

**TRAP** Low sodium *raises* lithium levels — low  $\text{Na}^+$  causes the kidney to reabsorb lithium instead of excreting it

**TRAP** Priority action is always to hold the drug and get a serum level — not reassure or simply "continue monitoring"

**TRAP** Theophylline toxicity is life-threatening — NCLEX will prioritize seizure safety and airway over all other actions

## ● CLINICAL JUDGMENT (NCJMM)

### RECOGNIZE CUES

Client on Digoxin reports seeing yellow/green halos and feeling nauseated; HR 52; serum level 2.4 ng/dL

### ANALYZE CUES

Serum level exceeds toxic threshold of 2.0; bradycardia and visual changes confirm Digoxin toxicity; low K<sup>+</sup> may worsen toxicity

### PRIORITY ACTION

Hold the Digoxin dose immediately → notify HCP → monitor ECG → prepare Digibind if ordered → check electrolytes (K<sup>+</sup>, Mg<sup>2+</sup>)

### EXPECTED OUTCOME

Serum level returns to therapeutic range (<2.0), visual disturbances resolve, HR stabilizes ≥60 bpm, no further dysrhythmias

## ● MEMORY BOOSTERS

### THE TOXIC "2" RULE

**DigiTWOxin** and **LiTWOum** — both toxic at a level of 2.  
Theophylline is the outlier at 20.

### N&V + WHAT ELSE?

**Digitalis = Halos** (think: "Digoxin gives you angel halos in yellow-green")

**Lithium = Tremors + Thirst** (think: "Lith shakes you up")

**Theophylline = Tachy + Tremors** (think: "Theo races away")

### LITHIUM + SODIUM CONNECTION

Na<sup>+</sup> goes DOWN → Li<sup>+</sup> goes UP. Body steals lithium when it needs sodium. Keep the patient salty!

## ● QUICK-REFERENCE SUMMARY

| Drug         | Toxic level | Key sign                        | Electrolyte                   |
|--------------|-------------|---------------------------------|-------------------------------|
| Digoxin      | >2.0 ng/dL  | Yellow/green halos, bradycardia | Low K <sup>+</sup> worsens    |
| Lithium      | >2.0 mEq/L  | Tremors, thirst, N&V            | Low Na <sup>+</sup> increases |
| Theophylline | >20         | Tachycardia, tremors, seizure   | Life-threatening              |

If the patient reports *any* new visual change, GI complaint, or tremor while on these drugs — check the level first, act second.