

NCLEX-RN · 2026 TEST PLAN

CLINICAL JUDGMENT · NGN / NCJMM

RAPID REVIEW · <60 SEC

Digoxin / Lanoxin

*Cardiac Glycoside · Positive Inotrope · Negative Chronotrope ·
Cardiovascular System*

⚠ HIGH-ALERT MEDICATION

NARROW THERAPEUTIC INDEX

THERAPEUTIC 0.5–2.0 NG/ML

ANTIDOTE: DIGOXIN IMMUNE FAB

Drug Overview

§ 01 · INDICATIONS

WHY WE GIVE IT

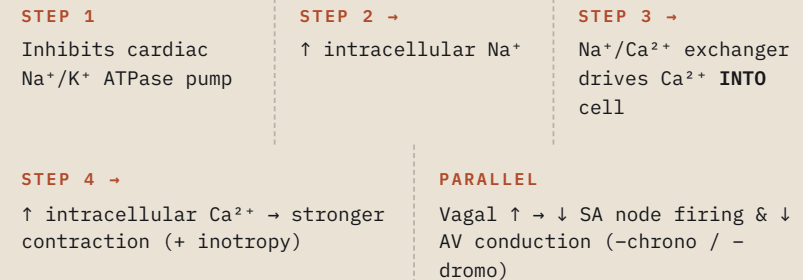
- **Heart failure** (HFrEF / systolic dysfunction) — symptom relief, add-on therapy
- **Atrial fibrillation & flutter** — rate control
- **Paroxysmal SVT** — rhythm conversion/rate control

HIGH-YIELD CLINICAL CONTEXT

- **Not first-line** for HF — used after ACEi/ARB/ARNI + β -blocker + diuretic + SGLT2i
- Improves **symptoms**, not mortality, in HF
- **High-alert medication** — 2-nurse verification per facility policy
- Narrow therapeutic window = **0.5–2.0 ng/mL** (HF target 0.5–0.9)

Mechanism of Action

§ 02 · PHYSIOLOGY



*Net effect: a **slower, stronger** heart.*

KEY PHYSIOLOGY TRIO

- **Positive inotrope** → stronger squeeze → $\uparrow$ stroke volume, $\uparrow$ CO
- **Negative chronotrope** → slower SA node → $\downarrow$ HR
- **Negative dromotrope** → slower AV conduction → rate control in AFib

Therapeutic Effects

§ 03 · WHAT WORKING LOOKS LIKE

HEMODYNAMIC WINS

- ↑ Cardiac output & stroke volume
- Controlled heart rate (especially in AFib with RVR)
- ↓ Ventricular filling pressures → ↓ preload sx

CLINICAL IMPROVEMENT

- ↓ Dyspnea on exertion, ↓ orthopnea
- ↓ Crackles, ↓ peripheral edema, ↓ JVD
- Weight loss from diuresis · ↑ exercise tolerance
- Improved ejection fraction over time

THERAPEUTIC RANGE	0.5 – 2.0 ng/mL
HF TARGET	0.5 – 0.9 ng/mL
TOXIC LEVEL	> 2.0 ng/mL

Side Effects & Toxicity § 04 · ADVERSE REACTIONS

COMMON (OFTEN EARLY TOXICITY)

- Fatigue · weakness · dizziness · headache
- **N / V / anorexia** — earliest GI sign of toxicity
- Diarrhea

🚨 SERIOUS — DIG TOXICITY

- **Yellow-green halos around lights** (classic NCLEX cue)
- **Blurred vision · photophobia · altered color perception**
- **Bradycardia < 60 bpm · heart block (1°, 2°, 3°)**
- **Dysrhythmias: PVCs, bigeminy, VT, V-fib**
- **Confusion · delirium (especially elderly)**
- **Hyperkalemia in acute overdose (K⁺ can't enter cells)**

TOXIC > 2.0 NG/ML

HYPOK⁺ POTENTIATES

RENAL ↓ → ACCUMULATION

Priority Nursing Considerations

§ 05 · ASSESS · MONITOR · HOLD · NOTIFY

→ ASSESS & MONITOR

- **Apical pulse × 1 FULL minute** before every dose (not radial, not 30 sec)
- Rhythm via telemetry/ECG — watch for scooped ST, new dysrhythmia
- Serum dig level, K⁺, Mg²⁺, Ca²⁺, BUN/Cr
- Daily weight · I&O · edema · lung sounds
- Mental status (elderly — confusion = toxicity until proven otherwise)
- Visual changes — ask about halos/blurred vision

→ HOLD THE DOSE IF

ADULT HR < 60

CHILD HR < 70

INFANT HR < 90–110

ANY TOXICITY SIGN

DIG LEVEL > 2.0

K⁺ < 3.5

→ CONTRAINDICATIONS

- Ventricular fibrillation
- 2°/3° AV block *without* pacemaker
- Wolff-Parkinson-White (WPW) syndrome
- Acute MI · hypersensitivity
- Caution: renal impairment, elderly, electrolyte imbalance

→ KEY DRUG INTERACTIONS

- **↑ Dig levels:** amiodarone, quinidine, verapamil, diltiazem, macrolides
- **↑ Toxicity risk:** loop & thiazide diuretics (via hypoK⁺)
- **K⁺ concerns:** ACEi / ARB / spironolactone = hyperK⁺ risk
- **↓ Absorption:** antacids, cholestyramine (separate by 2 hrs)
- **↓ Dig levels:** St. John's Wort, rifampin

Labs & Diagnostics

§ 06 · NUMBERS TO KNOW

DIGOXIN LEVEL	0.5 – 2.0 ng/mL
POTASSIUM	3.5 – 5.0 mEq/L
MAGNESIUM	1.5 – 2.5 mg/dL
CALCIUM (TOTAL)	9.0 – 10.5 mg/dL
BUN / CREATININE	10–20 / 0.6–1.2

WHAT ABNORMAL RESULTS MEAN

- **Low K⁺** → more dig binds to myocardium → **toxicity at "normal" dig levels**
- **Low Mg²⁺** → potentiates toxicity (often co-occurs with hypoK⁺)
- **High Ca²⁺** → ↑ contractility + dig = dysrhythmia risk
- **↑ BUN/Cr** → renal excretion ↓ → dig accumulates → dose adjust
- ECG: scooped ("Salvador Dalí") ST segment, shortened QT, PR prolongation

DRAW TIMING

- Dig level: **6–8 hrs after oral dose** OR immediately before next dose (trough)

Administration & Safety

§ 07 · ROUTE · TIMING · HIGH-ALERT

ROUTES

- **PO** — tablet, elixir (preferred chronic)
- **IV** — push slowly over ≥ 5 min; continuous ECG monitoring
- **NEVER IM** — **erratic absorption, severe pain, muscle necrosis**

TIMING & CHECKS

- Same time daily · consistent with/without food
- Apical pulse × **1 full minute** pre-dose
- Hold if parameters met → document → notify HCP → **do NOT double next dose**
- Missed dose > 12 hrs: skip it

ANTIDOTE

- **Digoxin Immune Fab** (Digibind / DigiFab) — antibody fragment, binds dig
- Indicated for: dig > 10 ng/mL, K⁺ > 5 in acute tox, life-threatening dysrhythmia, or ingestion > 10 mg (adult) / > 4 mg (child)

Patient *Education*

§ 08 · TEACH BACK

MUST-KNOW

- Take at the **same time daily** — do not skip or double
- Learn to take your own **radial pulse** for 1 full minute
- Hold & call if HR < 60 or > 100
- Eat **K⁺-rich foods** if on diuretic: banana, potato, orange, spinach, avocado, tomato
- Avoid antacids & high-fiber foods within 2 hrs of dose
- Avoid St. John's Wort, licorice, salt substitutes (contain KCl)

WHEN TO SEEK HELP IMMEDIATELY

- **Yellow-green halos, blurred or double vision**
- **Nausea, vomiting, loss of appetite**
- **Slow, fast, or irregular heartbeat · fainting**
- **Confusion or new weakness**
- **Weight gain > 2 lb in 24 hrs or > 5 lb in a week (HF worsening)**

LIFESTYLE

- Carry medical ID · keep all lab appointments
- Daily weights · low-sodium diet · fluid restriction per HCP

NCLEX Test Traps ⚠️

§ 09 · DON'T GET FOOLED

THE CLASSIC TRAPS

- Hold if apical HR < **60** in adults (NOT 50, NOT 70)
- Count apical × **1 full minute** (NOT 15-sec × 4, NOT radial)
- **HypoK⁺ = #1 toxicity trigger** — scan the stem for loop/thiazide diuretic use
- Toxicity can occur at "normal" dig levels when K⁺ is low
- **Yellow-green halos** = classic — don't accept "blurred vision" alone
- Antidote is **Digoxin Immune Fab** — NOT atropine, NOT naloxone, NOT protamine
- IV push SLOW over 5 min — never IM

PRIORITY VS. NON-PRIORITY

- **Priority sign of toxicity:** dysrhythmia > bradycardia > halos > GI
- **First action if tox suspected:** HOLD drug → check apical pulse & ECG → labs → notify
- In acute tox with hyperK⁺: **Digibind is priority** (calcium gluconate is relatively contraindicated — can precipitate dig-induced dysrhythmias)
- "Eat more bananas" only correct if patient is on K-wasting diuretic, NOT on K-sparing
- Narrow therapeutic index clubmates: **Digoxin, Lithium, Warfarin, Theophylline, Phenytoin**
- Elderly + new confusion on dig = **toxicity**, not dementia

Memory Boosters

WHAT TO CHECK BEFORE EVERY DOSE

"DIG IT"

- D** igoxin level (0.5–2.0)
- I** ntake / output · renal function
- G** et apical pulse × 1 minute
- I** ons — K^+ , Mg^{2+} , Ca^{2+}
- T** oxicity signs — halos, N/V, brady

SIGNS OF DIG TOXICITY

"SAD HEART"

- S** low heart rate (bradycardia)
- A** norexia
- D** ysrhythmias
- H** alos (yellow-green)
- E** mesis / nausea
- A** V block
- R** estlessness · confusion
- T** ired · weakness

QUICK PATTERNS

- "Slow & Strong" = the dig effect in one phrase
- "Low K + Dig = Dangerous" — the single biggest tested relationship
- Narrow-window crew: **Dig · Lithium · Warfarin · Theophylline · Phenytoin**
- Dig belongs on the same shelf as **insulin, heparin, opioids** → HIGH-ALERT

Most-Tested Drugs in *This Class*

This is a narrow class — **Digoxin is essentially THE clinical cardiac glycoside in use today.** Know it cold; know its antidote; know the historical/related agents.

DRUG	KEY USE	HALF-LIFE / CLEARANCE	NCLEX HOOK
Digoxin PRIMARY AGENT	HFrEF · AFib rate control · SVT	~36 hrs · renal excretion	Narrow window · HypoK ⁺ = tox · Apical × 1 min · Hold < 60
Digitoxin HISTORICAL	Same uses · withdrawn in US	~7 days · hepatic clearance	Longer t _{1/2} · safer in renal failure (rarely tested, know it exists)
Digoxin Immune Fab ANTIDOTE	Severe dig toxicity · lethal dysrhythmias · K ⁺ > 5 acute	Antibody fragment · renal	Brand names: Digibind · DigiFab — memorize both

KEY DIFFERENCES

- **Digoxin vs Digitoxin:** Digoxin is *renally* cleared (worry in CKD); Digitoxin was *hepatically* cleared (worry in liver dz). US uses Digoxin only.
- **Dig vs β-blockers for AFib rate control:** β-blockers are first-line; dig added when β-blockers insufficient or in HF with low EF.
- **Dig vs Amiodarone:** both slow AV node — but **amiodarone RAISES dig levels** → reduce dig dose 50% when co-administered.

★ FINAL SECTION · NGN · NCJMM

PRIORITY FRAMEWORK

Clinical Judgment *Snapshot*

When the stem names digoxin, your brain should pre-load these three answers before the question is even finished.

Q · 01

What is the #1 priority risk?

Digoxin toxicity → fatal dysrhythmia. The narrow therapeutic window (**0.5–2.0 ng/mL**) means ordinary triggers — a loop diuretic, a bout of GI losses, declining renal function — can push a stable patient into VT or V-fib.

Q · 02

What will harm the patient first?

Hypokalemia-potentiated toxicity. Low K⁺ → more dig binds the myocardium → toxicity at "therapeutic" dig levels → bradycardia → AV block → lethal dysrhythmia.

Highest-risk patient: dig + loop/thiazide diuretic, vomiting/diarrhea, or worsening renal function.

Q · 03

What is the FIRST nursing action?

In suspected toxicity:

- 1 **HOLD** the next dose
- 2 **ASSESS** apical pulse × 1 min + continuous ECG
- 3 **DRAW** dig level, K⁺, Mg²⁺, renal panel
- 4 **NOTIFY** HCP
- 5 **PREPARE** Digoxin Immune Fab (Digibind/DigiFab)