NCLEX-RN • 2026 TEST PLAN • NGN

Proton Pump Inhibitors

The "-prazoles"

CLASS: Antisecretory / Gastric Acid Suppressant SYSTEM: Gastrointestinal PREGNANCY: Category C (most)

01 Drug Overview — Why We Give It

- **GERD** — first-line for moderate-severe reflux & erosive esophagitis
- **Peptic Ulcer Disease (PUD)** — gastric & duodenal ulcers
- **H. pylori eradication** — part of triple therapy (PPI + clarithromycin + amoxicillin)
- **Zollinger-Ellison Syndrome** — hypersecretory state
- **Stress ulcer prophylaxis** — ICU patients, mechanical ventilation, burns
- **Upper GI bleed** — IV pantoprazole is drug of choice
- **NSAID-induced ulcer prevention** — especially elderly / chronic NSAID users
- **Barrett's esophagus** — reduces progression risk

02 🟥 Mechanism of Action

→ PPI enters bloodstream & reaches **gastric parietal cells**

→ Activated in the acidic environment of the **secretory canaliculi**

→ **Irreversibly binds** to the H^+/K^+ ATPase enzyme ("proton pump")

→ Blocks the **FINAL step** of hydrogen ion secretion into the stomach

→ ↓↓↓ **Gastric acid production** (up to 99% suppression)

→ Mucosa heals & acid-related damage resolves

⚠️ **KEY FACT:** PPIs block the *final common pathway* of acid production — making them **more potent** than H2 blockers (which only block one receptor). Full effect takes **3–5 days**; not for immediate relief.

03 Therapeutic Effects — How You Know It's Working

- **↓ Heartburn & epigastric pain** — within days to 1 week
- **Resolution of reflux symptoms** — less regurgitation, less dysphagia
- **Healing of ulcers** — typically within 4–8 weeks
- **↓ GI bleeding** — stabilizing H&H, no melena / hematemesis
- **Negative H. pylori breath test / stool antigen** after eradication therapy
- **Improved endoscopic findings** — healed esophagitis on repeat EGD

04 🟩 Side Effects & Adverse Reactions

✅ Common (mild)

- Headache (most common)
- Diarrhea or constipation
- Nausea, flatulence
- Abdominal pain
- Dizziness
- Rash

🚨 Serious / Life-Threatening

- **C. difficile infection** → toxic megacolon
- **Hypomagnesemia** → arrhythmias, seizures, tetany
- **Acute interstitial nephritis** → AKI
- **Bone fractures** (hip, wrist, spine) — long-term
- **Vitamin B12 deficiency** — macrocytic anemia
- **Community-acquired pneumonia**
- **Rebound acid hypersecretion** (if stopped abruptly)
- **Stevens-Johnson Syndrome** (rare)

⚠️ **TOXICITY RED FLAGS:** Muscle cramps, tremors, tetany, Chvostek/Trousseau signs, new arrhythmia = **check Magnesium IMMEDIATELY**. New watery diarrhea + fever in hospitalized pt on PPI = **think C. diff**.

05 Priority Nursing Considerations

- **ASSESS** → baseline GI symptoms, stool pattern, bone health history
- **MONITOR** → Mg, Ca, B12, renal function, CBC (long-term)
- **MONITOR** → for new diarrhea (C. diff), muscle cramps (low Mg), bruising
- **HOLD & NOTIFY** → severe diarrhea, signs of anaphylaxis, AKI, seizures
- **NOTIFY** → if taking clopidogrel, warfarin, methotrexate, digoxin, phenytoin
- **EDUCATE** → short-term use preferred; deprescribe when possible

✓ GIVE

- ✓ 30–60 min BEFORE first meal
- ✓ For GERD, PUD, H. pylori therapy
- ✓ IV pantoprazole for active GI bleed
- ✓ Short-term (4–8 weeks) ideal

✕ HOLD / CONTRAINDICATIONS

- ✕ Hypersensitivity to "-prazoles"
- ✕ Concurrent **rilpivirine** (HIV med)
- ✕ Caution: severe hepatic impairment
- ✕ Reassess if pt on clopidogrel
- ✕ Suspected C. diff — notify MD

⚠ KEY DRUG INTERACTIONS:

- **Clopidogrel (Plavix)** → ↓ antiplatelet effect (especially omeprazole) — use pantoprazole instead
- **Warfarin** → ↑ INR / bleeding risk
- **Digoxin** → ↑ digoxin level → toxicity
- **Methotrexate** → ↑ MTX toxicity
- **Iron, ketoconazole, atazanavir** → ↓ absorption (need acid)

06 Labs & Diagnostics

LAB	NORMAL RANGE	WATCH FOR	WHY IT MATTERS
Magnesium	1.5–2.5 mEq/L	< 1.5 (CRITICAL)	Arrhythmia, seizure, tetany
Calcium	8.5–10.5 mg/dL	< 8.5	Low absorption → fracture risk
Vitamin B12	200–900 pg/mL	< 200	Macrocytic anemia, neuropathy
BUN / Creatinine	BUN 7–20 / Cr 0.6–1.2	Rising values	Acute interstitial nephritis / AKI
CBC (H&H)	Hgb 12–17	Macrocytosis, anemia	B12 / iron deficiency
LFTs (AST/ALT)	< 40 U/L	Elevations	Hepatic metabolism concern
H. pylori testing	Negative	Positive breath test / stool Ag	Hold PPI 1–2 wks before test

07 Administration & Safety

- **TIMING:** PO — **30–60 minutes BEFORE meals** (best in AM before breakfast). Acid pumps need to be active for the drug to bind.
- **SWALLOW WHOLE:** Do NOT crush, chew, or split delayed-release capsules/tablets
- **FEEDING TUBE:** May open capsule & sprinkle beads on applesauce (do not chew beads) — check formulation
- **IV (pantoprazole):** Push slowly over 2 min OR infuse over 15 min. Flush line before & after (incompatible with many drugs)
- **IV for GI bleed:** Often given as continuous infusion after bolus
- **H. pylori triple therapy:** PPI + 2 antibiotics × 10–14 days
- **DURATION:** Aim for shortest effective duration (4–8 weeks); re-evaluate long-term need
- **DO NOT STOP ABRUPTLY:** Taper to prevent rebound hypersecretion

08 🟦 Patient Education

- **TAKE** 30–60 minutes before your first meal of the day, at the same time daily
- **SWALLOW WHOLE** — do not crush, chew, or split
- **REPORT IMMEDIATELY:** muscle cramps / twitching / spasms (low Mg), persistent watery diarrhea (C. diff), black/tarry stools (GI bleed), decreased urine output (AKI)
- **BONE HEALTH:** weight-bearing exercise, adequate Ca & vitamin D, avoid smoking
- **LIFESTYLE:** elevate HOB 30°, avoid eating 3 hrs before bed, lose weight, avoid triggers (caffeine, alcohol, spicy, fatty, chocolate, mint)
- **DON'T STOP ABRUPTLY** — rebound heartburn; taper under provider guidance
- **OTC USE** should be limited to 14 days per course, not more than 3 courses/year
- **INFORM PROVIDERS** about PPI before prescribing clopidogrel or antibiotics

09 NCLEX Test Traps ⚠

- **TRAP:** "Take at bedtime" — WRONG. That's H2 blockers. PPIs go *before breakfast*.
- **TRAP:** Patient reports "still having heartburn after 1 dose" — PPIs need **3–5 days** for full effect; not rescue therapy.
- **TRAP:** Pt on **omeprazole + clopidogrel** post-MI → priority concern = stent thrombosis. Switch to **pantoprazole**.
- **TRAP:** Hospitalized pt on PPI + new watery diarrhea → priority = **contact isolation + C. diff stool test**, NOT antidiarrheals.
- **TRAP:** Pt reports "leg cramps & tingling" on long-term PPI → check **Magnesium** (not just Ca or K).
- **TRAP:** Elderly pt on chronic PPI falls & breaks hip → PPI is a **risk factor for fractures**, reassess need.
- **TRAP:** "Crush and put in feeding tube" — delayed-release capsules can be opened but beads must NOT be crushed.
- **TRAP:** Confusing **-prazole (PPI)** with **-sartan (ARB)** or **-pril (ACEi)**. Check the stem!
- **TRAP:** Abrupt discontinuation → patient returns with "worse heartburn than before" = **rebound acid hypersecretion**, not treatment failure.
- **TRAP:** H. pylori breath test scheduled → hold PPI **1–2 weeks prior** (false negative risk).

10 🟩 Memory Boosters

"-PRAZOLE" = PPI

Every drug ending in **-prazole** is a proton pump inhibitor. *Omeprazole, Pantoprazole, Lansoprazole, Esomeprazole, Dexlansoprazole, Rabeprazole.*

"BEFORE" Rule

Before breakfast, **E**mpty stomach, **F**ull glass of water, **O**nce daily, **R**emember to swallow whole, **E**valuate in 4–8 weeks.

Long-Term Risks = "FRACTURES"

- **F** **F**ractures (bone loss)
- **R** **R**enal — interstitial nephritis / AKI
- **A** **A**bsorption issues (B12, Ca, Fe, Mg)
- **C** **C**. difficile infection
- **T** **T**achy / arrhythmia (from low Mg)
- **U** **U**pper resp infection / pneumonia
- **R** **R**ebound acid (abrupt stop)
- **E** **E**nteritis (SIBO risk)
- **S** **S**tevens-Johnson (rare)

PPI vs H2 Blocker — Quick Compare

PPI: "-prazole" → stronger, before meals, 3–5 day onset, acid blocked at SOURCE

H2 blocker: "-tidine" → weaker, at bedtime, faster onset, blocks ONE receptor

💊 🟦 Most Tested Drugs in This Class

GENERIC (BRAND)	ROUTES	BEST USE	KEY NCLEX POINT
Omeprazole *(Prilosec)*	PO, OTC	GERD, PUD, H. pylori	⚠️ **MOST interaction with clopidogrel** — avoid combo
Pantoprazole *(Protonix)*	PO, **IV**	Upper GI bleed, hospitalized pts	✅ **Fewest drug interactions** — safe with clopidogrel; IV DOC for active bleed
Esomeprazole *(Nexium)*	PO, IV	Erosive esophagitis, GERD	S-isomer of omeprazole → more potent & longer-acting
Lansoprazole *(Prevacid)*	PO, ODT	GERD, PUD, pediatric use	Orally disintegrating tab — useful for dysphagia & pediatric pts
Dexlansoprazole *(Dexilant)*	PO	GERD, erosive esophagitis	Dual-release (2 peaks) — can be taken without regard to meals
Rabeprazole *(Aciphex)*	PO	GERD, PUD, H. pylori	Faster onset than omeprazole; fewer CYP interactions

FINAL • NGN CLINICAL JUDGMENT

🧠 Clinical Judgment Snapshot

#1 PRIORITY RISK

Hypomagnesemia → cardiac arrhythmias, seizures, tetany (especially after > 3 months of therapy). Mg < 1.5 mEq/L is a critical value.

WHAT WILL HARM THE PATIENT FIRST

In hospital: **C. difficile infection** + **stent thrombosis** if on clopidogrel with omeprazole. Long-term: **low Mg → lethal arrhythmia**; fractures in elderly.

FIRST NURSING ACTION — MUSCLE CRAMPS/TREMORS ON CHRONIC PPI

→ **Check serum Magnesium STAT**, place on cardiac monitor, assess Chvostek/Trousseau, notify provider. Do NOT give next dose until Mg is known.

FIRST NURSING ACTION — NEW WATERY DIARRHEA IN HOSPITALIZED PPI PATIENT

→ **Initiate contact isolation**, collect stool for C. difficile toxin, notify provider. Hold PPI per protocol; avoid antidiarrheals (can worsen toxic megacolon).

FIRST NURSING ACTION — POST-MI PT PRESCRIBED OMEPRAZOLE + CLOPIDOGREL

→ **Question the order** / notify provider. Omeprazole ↓ clopidogrel activation → stent thrombosis risk. **Recommend pantoprazole**.

FIRST NURSING ACTION — PT WANTS TO STOP PPI BECAUSE "IT'S NOT WORKING"

→ **Educate**: full effect takes 3–5 days; do NOT stop abruptly (rebound hypersecretion). Reinforce timing: 30–60 min BEFORE first meal.

Aligned with the 2026 NCLEX-RN Test Plan & NCJMM Clinical Judgment Framework • Designed for rapid review <60 sec