2026 NGN NCLEX-RN · DAILY PHARM REVIEW

Day 13 — *GI, Renal & Electrolyte* Meds

High-Risk Drug Set

Aligned to 2026 Test Plan

Pharmacological & Parenteral Therapies · Reduction of Risk Potential · Physiological Adaptation · Fluid & Electrolyte Imbalances

00 Today's Drug Set

20 CARDS

01 **PPIs** omeprazole / pantoprazole	02 **H2 Blockers** famotidine	03 **Antacids** aluminum / magnesium / calcium
04 **Sucralfate** Carafate	05 **Ondansetron** Zofran · 5-HT3	06 **Promethazine** Phenergan
07 **Metoclopramide** Reglan	08 **Bulk-forming Lax** psyllium	09 **Osmotic Lax** PEG · lactulose
10 **Stimulant Lax** bisacodyl · senna	11 **Stool Softener** docusate	12 **Loperamide** Imodium
13 **Bismuth** Pepto-Bismol	14 **Phosphate Binders** sevelamer · Ca acetate	15 **Potassium Chloride** KCl
16 **SPS / Patiromer** Kayexalate	17 **Calcium Gluconate IV** cardioprotection	18 **Magnesium Sulfate IV** hypomagnesemia
19 **Sodium Bicarbonate** $NaHCO_3$	20 **Lactulose** hepatic encephalopathy	

01 Advanced Flashcards

APPLICATION-LEVEL

01 Proton Pump Inhibitors

omeprazole · pantoprazole · esomeprazole · lansoprazole · "-prazole"

HIGH-RISK

MECHANISM (SIMPLE)

Irreversibly blocks the H^+/K^+ ATPase "proton pump" in stomach parietal cells → no acid secretion.

WHY GIVEN

GERD, PUD, H. pylori (with antibiotics), Zollinger-Ellison, stress ulcer prophylaxis in critically ill / ventilated.

MUST-ASSESS BEFORE GIVING

Magnesium, B12, bone density history, current PPI duration, C. diff risk, kidney function (acute interstitial nephritis risk), pregnancy status.

KEY LABS / MONITORING

Magnesium, B12, creatinine, CBC; bone density on long-term use.

MOST DANGEROUS ADVERSE EFFECT

Hypomagnesemia → seizures, arrhythmias; acute interstitial nephritis; C. difficile colitis; long-term: osteoporotic fractures, rebound hyperacidity.

COMMON SIDE EFFECTS

Headache, abdominal pain, diarrhea, nausea, flatulence.

HOLD / NOTIFY PROVIDER

Mg < 1.5 mEq/L, new neuro symptoms (tetany, tremor), rising creatinine, new diarrhea (rule out C. diff), persistent reflux despite therapy.

ANTIDOTE / REVERSAL

None — discontinue and supportive care; replace electrolytes (esp. Mg).

PATIENT TEACHING

Take 30–60 min before first meal of the day; do NOT crush delayed-release capsules (open and sprinkle on applesauce is OK); short-term use preferred; calls provider if persistent diarrhea, muscle cramps, fractures.

NURSING ACTION

IV pantoprazole: dedicated line or flush before/after; do not mix with other meds. Reconcile duplicate acid-suppression therapy.

NGN CLINICAL JUDGMENT CUE

Client on long-term omeprazole presents with carpal-pedal spasms, Chvostek sign (+), and ECG showing prolonged QT. Mg = 1.1 mEq/L. → **PPI-induced hypomagnesemia. Hold PPI, replace Mg IV, monitor cardiac rhythm.**

PRIORITY Q *The nurse reviews labs for a client on omeprazole for 18 months. Which finding requires the most immediate follow-up?*

A. Hemoglobin 11.8 g/dL
B. Magnesium 1.2 mEq/L with QT prolongation on ECG
C. Vitamin B12 250 pg/mL
D. Mild bone density loss on DEXA scan

ANSWER · B

Hypomagnesemia with QT prolongation is a life-threatening complication of long-term PPI use because it can precipitate torsades de pointes. While low B12 (C) and bone loss (D) are real long-term PPI risks, they are not acutely lethal. Mild anemia (A) needs follow-up but isn't a torsades risk.

TEST-TAKING TIP

"-prazole" + long-term use = think
MAGNESIUM, B12, BONE, C.DIFF
(mnemonic: "PPI gives you the MB&Cs").

02 H2 Receptor Antagonists

famotidine · cimetidine · nizatidine · "-tidine"

COMMONLY TESTED

MECHANISM

Blocks H2 (histamine-2) receptors on parietal cells → reduces acid secretion. Weaker but faster acting than PPIs.

WHY GIVEN

GERD, PUD, mild reflux, allergic reactions (adjunct), stress ulcer prophylaxis.

MUST-ASSESS BEFORE GIVING

Renal function (dose adjust if CrCl < 50), confusion/delirium risk in older adults, drug interactions (esp. cimetidine — CYP450 inhibitor: warfarin, phenytoin, theophylline).

KEY LABS / MONITORING

BUN/creatinine, INR (cimetidine + warfarin), mental status in elderly.

MOST DANGEROUS ADVERSE EFFECT

CNS effects (confusion, agitation) in elderly/renal impairment; rare thrombocytopenia; cimetidine — gynecomastia, impotence, many drug interactions.

COMMON SIDE EFFECTS

Headache, dizziness, constipation/diarrhea.

HOLD / NOTIFY PROVIDER

New confusion in elderly, rising INR on cimetidine + warfarin, severe rash.

PATIENT TEACHING

Take at bedtime to suppress nocturnal acid; avoid smoking & alcohol; not for immediate heartburn relief (use antacid).

NGN CLINICAL JUDGMENT CUE

85-year-old on cimetidine + warfarin returns from clinic with confusion and INR 5.8. → **Cimetidine inhibits warfarin metabolism (CYP450); switch to famotidine, hold warfarin, recheck INR, fall precautions.**

PRIORITY Q *Which client teaching point is most important for a 78-year-old prescribed cimetidine?*

A. "Take this medication with meals."
B. "Report any new confusion, hallucinations, or unusual bleeding."
C. "Avoid all dairy products while taking this medication."
D. "This medication will cure your ulcer in 3 days."

ANSWER · B

Elderly clients on cimetidine are at high risk for CNS effects (confusion, hallucinations) and bleeding from warfarin/phenytoin interactions via CYP450 inhibition. A is acceptable but not most important; C is incorrect; D is false (PPIs/H2s manage, not "cure" in 3 days).

TEST-TAKING TIP

"-tidine" = H2 blocker. Cimetidine is the troublemaker — drug interactions and old-man side effects (gynecomastia, impotence). Famotidine is the safer NCLEX favorite.

03 Antacids

aluminum hydroxide · magnesium hydroxide · calcium carbonate · Maalox · Mylanta · Tums

TEACHING-HEAVY

MECHANISM

Neutralize existing gastric acid (chemical reaction). Fast onset, short duration.

WHY GIVEN

Symptomatic heartburn, GERD, mild PUD.

MUST-ASSESS BEFORE GIVING

Renal function (Mg, Al accumulate), other medications (separate by ≥ 1–2 hr — antacids reduce absorption of fluoroquinolones, tetracyclines, levothyroxine, iron, digoxin), heart failure / Na restriction.

KEY LABS / MONITORING

Phosphate, calcium, magnesium, BUN/Cr in renal patients.

MOST DANGEROUS ADVERSE EFFECT

Aluminum/Mg toxicity in renal failure; milk-alkali syndrome (Ca carbonate → hypercalcemia, alkalosis, renal failure); rebound acid with sudden stop.

COMMON SIDE EFFECTS

Aluminum → constipation. **Magnesium** → diarrhea. (Maalox combines both.) **Calcium** → constipation, hypercalcemia, kidney stones.

HOLD / NOTIFY PROVIDER

Severe constipation/diarrhea, signs of toxicity (lethargy, weakness, ↓DTRs in Mg toxicity), known kidney disease.

PATIENT TEACHING

Take 1 hr after meals & at bedtime; chew chewable tabs thoroughly; separate from other meds by 1–2 hr; don't use sodium-containing antacids if HF/HTN.

NGN CLINICAL JUDGMENT CUE

CKD client on aluminum hydroxide develops bone pain, encephalopathy, microcytic anemia. → **Aluminum toxicity (osteomalacia, dialysis encephalopathy). Discontinue aluminum-based antacid; switch to non-aluminum phosphate binder.**

PRIORITY Q *A client takes magnesium hydroxide and is also prescribed ciprofloxacin and levothyroxine. What is the priority teaching?*

A. "Take all three medications at the same time."
B. "Take the antacid 1–2 hours apart from ciprofloxacin and levothyroxine."
C. "Stop the antacid while on antibiotics."
D. "Crush the levothyroxine and mix with the antacid for better taste."

ANSWER · B

Antacids chelate/bind quinolones, tetracyclines, levothyroxine, and iron, drastically reducing their absorption. Separating by 1–2 hours preserves drug efficacy. A causes treatment failure; C is unnecessary; D combines them — exactly what we are trying to prevent.

TEST-TAKING TIP

"ALUMANTS GET CONSTIPATED, MAGMONSTERS GET DIARRHEA."

Always check kidney function — antacids accumulate when kidneys fail.

04 Sucralfate

Carafate · mucosal protectant

TEACHING-HEAVY

MECHANISM

Forms a sticky, viscous gel that adheres to ulcer base in acidic environment — physical barrier protecting from acid, pepsin, bile. Does NOT reduce acid.

WHY GIVEN

Active duodenal ulcers, stress ulcer prophylaxis, stomatitis/mucositis (some off-label).

MUST-ASSESS BEFORE GIVING

Swallowing ability, kidney function (contains aluminum — risk in CKD/dialysis), other meds (binds and reduces absorption of fluoroquinolones, warfarin, digoxin, phenytoin, levothyroxine).

KEY LABS / MONITORING

Aluminum levels in dialysis pts (long-term), drug levels of co-administered meds.

MOST DANGEROUS ADVERSE EFFECT

Aluminum toxicity in renal failure; bezoar formation; aspiration in patients with swallowing issues (tablet is large and forms thick gel).

COMMON SIDE EFFECTS

Constipation (most common), dry mouth, nausea.

HOLD / NOTIFY PROVIDER

Severe constipation, signs of bezoar (abdominal pain, distension, vomiting), worsening renal function.

PATIENT TEACHING

Take on EMPTY stomach: 1 hr before meals & at bedtime (4× daily). Separate from other meds by 2 hr. Antacids may be used but separate by 30 min.

NURSING ACTION

If giving via NG/PEG: crush thoroughly, dissolve in water, flush tube before/after — clogs tubes easily.

NGN CLINICAL JUDGMENT CUE

Postop client on sucralfate + warfarin develops INR drop from 2.4 → 1.3, with new DVT extension. → **Sucralfate binds warfarin in gut. Separate doses by 2 hr; consider alternative; re-check INR in 48–72 hr.**

PRIORITY Q *A nurse plans morning medications for a client with a duodenal ulcer: sucralfate, pantoprazole, ciprofloxacin, and breakfast tray at 0800. Order the medication administration:*

A. 0700: pantoprazole · 0700: sucralfate · 0800: ciprofloxacin · 0800: breakfast
B. 0700: pantoprazole · 0730: sucralfate · 0800: breakfast · 1000: ciprofloxacin
C. 0800: sucralfate with breakfast · 0800: pantoprazole · 0800: ciprofloxacin
D. 0700: ciprofloxacin · 0800: pantoprazole + sucralfate + breakfast

ANSWER · B

Pantoprazole goes 30–60 min before breakfast. Sucralfate needs an empty stomach (1 hr before meals). Ciprofloxacin must be separated from sucralfate by ≥ 2 hr to prevent chelation. Option A bunches sucralfate with cipro. C and D combine drugs that bind.

TEST-TAKING TIP

Sucralfate = the
"EMPTY STOMACH LONER"
— needs to be alone (no food, no other meds within 2 hr). Think of it as a sticky bandage that won't stick if food is in the way.

05 Ondansetron

Zofran · 5-HT3 serotonin receptor antagonist · "-setron"

HIGH-RISK

MECHANISM

Blocks serotonin 5-HT3 receptors in the chemoreceptor trigger zone (CTZ) and vagal afferents in the gut.

WHY GIVEN

Chemotherapy-induced nausea, post-op nausea/vomiting, hyperemesis gravidarum, gastroenteritis.

MUST-ASSESS BEFORE GIVING

Baseline ECG / QT interval, electrolytes (K, Mg), other QT-prolonging drugs (azithromycin, haloperidol, methadone, amiodarone, fluoroquinolones), liver function, serotonin agents (SSRIs/SNRIs).

KEY LABS / MONITORING

QT interval on ECG, K, Mg, LFTs.

MOST DANGEROUS ADVERSE EFFECT

QT prolongation → torsades de pointes; serotonin syndrome when combined with serotonergic drugs.

COMMON SIDE EFFECTS

Headache, constipation, dizziness, fatigue, transient LFT elevation.

HOLD / NOTIFY PROVIDER

QTc > 500 ms (or > 60 ms from baseline), Mg < 1.5 / K < 3.5, agitation + hyperreflexia + diaphoresis (serotonin syndrome), syncope/palpitations.

ANTIDOTE / REVERSAL

None for ondansetron; for torsades — magnesium sulfate IV, defibrillation, correct electrolytes.

PATIENT TEACHING

Take before nausea trigger (chemo); ODT — place on tongue, dissolves; report palpitations, fainting, severe headache.

NGN CLINICAL JUDGMENT CUE

Post-op client receives ondansetron 4 mg IV plus azithromycin and is on citalopram. Suddenly develops dizziness, ECG shows QTc 540 ms with PVCs. → **Hold ondansetron, monitor for torsades, IV Mg available, replace K, notify provider.**

PRIORITY Q *The nurse is preparing to administer ondansetron 4 mg IV push to a postoperative client. Which finding most warrants holding the dose and contacting the provider?*

A. Hemoglobin 10.2 g/dL
B. QTc interval 510 ms on telemetry
C. Two episodes of postoperative vomiting
D. Pain score of 6/10

ANSWER · B

QTc > 500 ms (or 60 ms increase from baseline) is the major torsades threshold and a contraindication to ondansetron. A is mild anemia; C is actually an indication; D is unrelated.

TEST-TAKING TIP

"-setron" → always check the **QT INTERVAL** *. Pair this with K and Mg — the three are the holy trinity of torsades prevention.*

06 Promethazine

Phenergan · phenothiazine antihistamine / antiemetic

HIGH-RISK · BLACK BOX

MECHANISM

H1-receptor blocker + anticholinergic + weak dopamine antagonist → antiemetic, sedative, antihistaminic.

WHY GIVEN

N/V, motion sickness, sedation, allergic reactions, preop adjunct.

MUST-ASSESS BEFORE GIVING

IV site patency and dilution (severe tissue injury risk), age (avoid in < 2 yr — fatal respiratory depression; black box), respiratory status, sedation level, anticholinergic burden.

KEY LABS / MONITORING

Mental status, RR, SpO2; IV site q5–10 min during infusion.

MOST DANGEROUS ADVERSE EFFECT

Severe tissue necrosis / gangrene if extravasation or accidental arterial injection (boxed warning — deep IV only, large vein, well-diluted, slow over 10–15 min); respiratory depression in children < 2; NMS/EPS (rare).

COMMON SIDE EFFECTS

Sedation, dry mouth, blurred vision, constipation, urinary retention, hypotension.

HOLD / NOTIFY PROVIDER

Age < 2, IV site burning/pain/discoloration (STOP immediately), RR < 12, deep sedation, EPS/dystonia.

PATIENT TEACHING

Avoid driving, alcohol, other CNS depressants; sip fluids for dry mouth; report any IV burning during infusion.

NURSING ACTION

Preferred: deep IM or PO. If IV: dilute, large vein, max 25 mg/mL, slow push or piggyback; never IM into deltoid for child.

NGN CLINICAL JUDGMENT CUE

During promethazine IV push the client reports severe burning at the IV site and the arm becomes pale and mottled. → **STOP injection, leave the IV catheter in place, aspirate residual drug, elevate the limb, notify provider — possible arterial injection / extravasation.**

PRIORITY Q *A nurse is administering promethazine 25 mg IV. Select the best technique to prevent severe tissue injury. (SATA)*

A. Dilute the medication in 10–20 mL of normal saline
B. Administer via a hand or wrist vein
C. Give via a large-bore IV in the antecubital fossa or central line
D. Administer over 10–15 minutes
E. Stop infusion immediately if client reports burning
F. Push rapidly to minimize discomfort

ANSWER · A, C, D, E

Promethazine IV is high-alert: dilute well, use large vein (avoid small distal veins where extravasation tracks → necrosis), infuse slowly, and stop on any burning or pain. Rapid push (F) and small distal veins (B) cause necrosis and gangrene.

TEST-TAKING TIP

Promethazine IV has a **BLACK BOX WARNING**

— gangrene risk. NCLEX favorites: contraindicated < 2 years old + extravasation precautions.

07 Metoclopramide

Reglan · prokinetic / dopamine antagonist

HIGH-RISK · BLACK BOX

MECHANISM

Blocks dopamine (D2) receptors in CTZ → antiemetic; increases GI motility & lower esophageal sphincter tone → prokinetic.

WHY GIVEN

Gastroparesis (diabetic), severe GERD, chemo-induced N/V (adjunct), small-bowel intubation.

MUST-ASSESS BEFORE GIVING

History of Parkinson's, seizures, depression, recent abdominal surgery (perforation/obstruction contraindicated), pregnancy.

KEY LABS / MONITORING

Renal function (dose reduction), neuro exam for EPS at baseline.

MOST DANGEROUS ADVERSE EFFECT

Tardive dyskinesia (irreversible) — boxed warning, especially > 12 weeks use; also acute dystonia, NMS, suicidality, depression, EPS.

COMMON SIDE EFFECTS

Drowsiness, restlessness (akathisia), diarrhea, fatigue, headache.

HOLD / NOTIFY PROVIDER

Any involuntary movements (tongue protrusion, facial grimacing, lip smacking), muscle rigidity + fever (NMS), worsening Parkinson's, depression/suicidal ideation, GI obstruction.

PATIENT TEACHING

Use shortest duration possible (< 12 weeks); report any uncontrolled movements immediately; avoid alcohol; don't use if intestinal obstruction.

NGN CLINICAL JUDGMENT CUE

Client on metoclopramide × 4 months for diabetic gastroparesis develops repetitive tongue thrusting and lip smacking. → **Tardive dyskinesia — likely irreversible. Discontinue immediately, notify provider, consider neurology consult.**

PRIORITY Q *Which assessment finding in a client on metoclopramide is most concerning and warrants immediate discontinuation?*

A. Mild drowsiness 30 minutes after dose
B. Episode of diarrhea
C. Involuntary repetitive tongue movements
D. Headache rated 3/10

ANSWER · C

Involuntary movements signal tardive dyskinesia — often irreversible. Hold the drug, notify the provider. A and D are tolerable side effects; B is expected (prokinetic).

TEST-TAKING TIP

Metoclopramide = the only antiemetic with a **TARDIVE DYSKINESIA BLACK BOX** *. Limit duration. Contraindicated in* **GI OBSTRUCTION, PHEOCHROMOCYTOMA, SEIZURE DISORDER, PARKINSON'S** *.*

08 Bulk-Forming Laxatives

psyllium (Metamucil) · methylcellulose (Citrucel) · polycarbophil

TEACHING-HEAVY · SAFEST

MECHANISM

Absorbs water in the gut → softens stool, increases bulk → mechanical stimulation of peristalsis. Mimics dietary fiber.

WHY GIVEN

Chronic constipation, IBS, diverticulosis, hemorrhoids (1st-line — safest for long-term).

MUST-ASSESS BEFORE GIVING

Swallowing ability, fluid intake, bowel obstruction (contraindicated), dysphagia, abdominal pain.

MOST DANGEROUS ADVERSE EFFECT

Esophageal / intestinal obstruction if taken with inadequate water (can swell and block esophagus → asphyxia).

COMMON SIDE EFFECTS

Bloating, flatulence, mild abdominal cramping.

HOLD / NOTIFY PROVIDER

Difficulty swallowing, chest pain after dose, severe abdominal pain/no BM × 3 days, abdominal distension.

PATIENT TEACHING

Mix with full 8 oz glass of water and follow with another full glass. Drink immediately — thickens fast. Onset 12–72 hr. Increase fiber and fluids in diet.

NGN CLINICAL JUDGMENT CUE

Older adult takes psyllium dry without water due to "tasting bad," reports chest tightness and difficulty swallowing. → **Esophageal obstruction risk. NPO, sit upright, call provider, prepare for endoscopic evaluation.**

PRIORITY Q *Which client should NOT receive psyllium?*

A. Client with chronic constipation and adequate fluid intake
B. Client with IBS-constipation
C. Client with suspected bowel obstruction
D. Pregnant client with constipation

ANSWER · C

Bowel obstruction is an absolute contraindication — bulk-forming laxatives worsen mechanical obstruction. Bulk-forming agents are actually safest in pregnancy and the first-line agents in IBS/chronic constipation.

TEST-TAKING TIP

Bulk forming = "BIG DRINK OF WATER". *NCLEX often tests fluid teaching + obstruction contraindication. Bulk-forming is the only laxative class safe long-term.*

09 Osmotic Laxatives

polyethylene glycol (MiraLAX, GoLYTELY) · lactulose · magnesium hydroxide · magnesium citrate

COMMONLY TESTED

MECHANISM

Pull water into bowel lumen via osmosis → soften stool, distend bowel → peristalsis.

WHY GIVEN

Constipation, bowel prep (PEG = GoLYTELY before colonoscopy), hepatic encephalopathy (lactulose — see Card 20), opioid-induced constipation.

MUST-ASSESS BEFORE GIVING

Renal function (Mg accumulation), volume status, electrolytes, swallowing, history of obstruction/perforation.

KEY LABS / MONITORING

Mg (if Mg-based), Na, K, BUN/Cr, hydration; lactulose — ammonia, K.

MOST DANGEROUS ADVERSE EFFECT

Severe dehydration, electrolyte imbalance (hypokalemia, hypernatremia), Mg toxicity in CKD (lethargy, ↓DTR, respiratory depression).

COMMON SIDE EFFECTS

Cramping, bloating, watery diarrhea, nausea.

HOLD / NOTIFY PROVIDER

Renal failure (no Mg agents), severe diarrhea, dehydration signs (orthostasis, ↓UO, dry mucosa).

PATIENT TEACHING

Drink plenty of fluids; PEG bowel prep — drink as ordered, expect clear/yellow watery stool to begin within 1–3 hr; report severe cramping or dizziness.

NGN CLINICAL JUDGMENT CUE

CKD stage 4 client given magnesium citrate before procedure now has lethargy, weakness, RR 9, ↓DTRs. Mg 8.5 mg/dL. → **Hypermagnesemia. Stop Mg, give IV calcium gluconate, support respirations, call provider.**

PRIORITY Q *Following a PEG-electrolyte bowel prep, which finding warrants priority intervention?*

A. Clear yellow rectal effluent
B. Heart rate 118, BP 86/52, dry mucous membranes
C. Three episodes of soft stool
D. Mild abdominal bloating

ANSWER · B

Tachycardia, hypotension, dry mucosa = volume depletion from osmotic diuresis effect. Replace fluids, recheck electrolytes. A is the goal of prep, C is expected, D is mild.

TEST-TAKING TIP

Magnesium-based osmotics + renal failure = **NEVER** *. PEG with electrolyte solution is preferred for renal patients.*

10 Stimulant Laxatives

bisacodyl (Dulcolax) · senna · castor oil

TEACHING · OVERUSE-RISK

MECHANISM

Directly stimulate intestinal smooth muscle → peristalsis; alter electrolyte/water transport in colon.

WHY GIVEN

Acute constipation, opioid-induced constipation, bowel prep.

MUST-ASSESS BEFORE GIVING

Bowel sounds, abdominal pain (rule out obstruction/appendicitis — contraindicated), pregnancy (avoid castor oil — uterotonic), electrolytes.

MOST DANGEROUS ADVERSE EFFECT

Laxative dependence with chronic use → atonic ("lazy") colon; severe hypokalemia, dehydration; melanosis coli with senna.

COMMON SIDE EFFECTS

Cramping, urgency, brownish urine (senna), nausea.

HOLD / NOTIFY PROVIDER

Severe abdominal pain, suspected obstruction, blood in stool, K < 3.5, daily use beyond 1 week.

PATIENT TEACHING

Bisacodyl PO: swallow whole, don't crush/chew, no milk or antacids within 1 hr (premature dissolution → gastric irritation). Onset PO 6–12 hr; suppository 15–60 min. Use short-term only.

NGN CLINICAL JUDGMENT CUE

Older adult uses bisacodyl daily for 6 months — reports no bowel movement without laxative; K 2.8, weakness. → **Laxative dependence + hypokalemia. Wean laxative, increase fiber/fluids, replace K, dietary consult.**

PRIORITY Q *Which is correct teaching about bisacodyl tablets?*

A. "Crush the tablet and mix with milk."
B. "Take with an antacid for stomach protection."
C. "Swallow the tablet whole — do not take within 1 hour of milk or antacids."
D. "Expect a bowel movement within 30 minutes."

ANSWER · C

Enteric coating prevents gastric irritation; milk/antacids dissolve the coating prematurely. Onset is 6–12 hr orally, not 30 min.

TEST-TAKING TIP

Stimulant laxatives are **SHORT-TERM ONLY** *. NCLEX favorite question: bisacodyl + milk/antacid = wrong combo (gastric irritation).*

11 Stool Softeners (Emollients)

docusate sodium (Colace) · docusate calcium

COMMONLY TESTED

MECHANISM

Surfactant — allows water and fat to mix into stool, softening it. Does NOT stimulate peristalsis.

WHY GIVEN

Constipation prevention when straining must be avoided: post-MI, post-op, hemorrhoids, anal fissure, pregnancy/postpartum.

MUST-ASSESS BEFORE GIVING

Bowel sounds, fluid intake, current bowel pattern, no current obstruction.

KEY LABS / MONITORING

Bowel pattern; rare electrolyte effects.

MOST DANGEROUS ADVERSE EFFECT

Generally very safe — rare allergic reactions; ineffective when used alone for established constipation (a "soft failure").

COMMON SIDE EFFECTS

Mild cramping, throat irritation (liquid).

HOLD / NOTIFY PROVIDER

Severe abdominal pain, signs of obstruction, no BM despite 1 week of use.

PATIENT TEACHING

For prevention, not rescue. Onset 1–3 days. Increase water, fiber, ambulation. Often paired with senna in opioid users (e.g., post-op).

NGN CLINICAL JUDGMENT CUE

Post-MI day 2 client states "I haven't had a BM but I don't want to strain." Heart rate jumps to 110 with Valsalva attempt. → **Administer docusate as ordered + assess for need for additional agent (senna), avoid digital disimpaction without orders, prevent vagal/cardiac stress.**

PRIORITY Q *The nurse administers docusate sodium to a post-MI client. What is the rationale?*

A. To rapidly relieve current constipation
B. To prevent straining that may trigger vagal response and dysrhythmia
C. To stimulate bowel peristalsis
D. To replace electrolytes lost from diuretics

ANSWER · B

Straining triggers a Valsalva maneuver → vagal stimulation → bradycardia, dysrhythmia, increased intracranial/intrathoracic pressure. Docusate prevents straining. A and C are wrong mechanism; D is unrelated.

TEST-TAKING TIP

Docusate is
"PREVENTION NOT RESCUE."
Onset 1–3 days. Universally paired with NCLEX cardiac, post-op, hemorrhoid, and OB scenarios.

12 Loperamide

Imodium · synthetic opioid antidiarrheal (low CNS penetration)

SAFETY-ALERT

MECHANISM

μ-opioid receptor agonist in gut wall → slows intestinal motility, increases water absorption. Does not cross BBB at therapeutic doses (no euphoria).

WHY GIVEN

Acute & chronic non-infectious diarrhea, ileostomy output reduction.

MUST-ASSESS BEFORE GIVING

RULE OUT infectious diarrhea (C. diff, salmonella, shigella, dysentery — slowing motility can cause toxic megacolon); hydration; recent antibiotics; bloody stool; fever.

KEY LABS / MONITORING

Stool C. diff PCR if recent abx, K, BUN/Cr, ECG if megadosing concerns.

MOST DANGEROUS ADVERSE EFFECT

Toxic megacolon in infectious colitis; **cardiac arrhythmias / QT prolongation** at high abusive doses (used to self-treat opioid withdrawal — FDA warning); paralytic ileus.

COMMON SIDE EFFECTS

Constipation, dizziness, dry mouth, abdominal cramping.

HOLD / NOTIFY PROVIDER

Bloody/black stool, fever, recent abx, abdominal distension, > 48 hr diarrhea without improvement, palpitations.

PATIENT TEACHING

Do NOT exceed package dose; not for diarrhea with fever or blood; replace fluids; not for children < 2; stop if no improvement in 48 hr.

NGN CLINICAL JUDGMENT CUE

Hospitalized client 8 days post-cefepime develops watery foul diarrhea × 12/day. RN questions loperamide order. → **Concern for C. difficile. Send stool PCR/toxin, hold loperamide, isolate (contact precautions w/ soap & water hand hygiene), notify provider.**

PRIORITY Q *A client recently completed clindamycin and reports 10 watery, foul-smelling stools/day with low-grade fever. Which medication order should the nurse question?*

A. Oral vancomycin 125 mg q6h
B. IV fluids — lactated Ringer's at 125 mL/hr
C. Loperamide 4 mg PO now then 2 mg after each loose stool
D. Contact precautions with soap-and-water hand hygiene

ANSWER · C

Loperamide is contraindicated in suspected C. difficile because slowing motility can precipitate toxic megacolon. A treats it; B replaces losses; D is correct isolation precautions.

TEST-TAKING TIP

Antidiarrheal +
FEVER OR BLOOD OR RECENT ANTIBIOTIC
= HOLD. Always rule out infectious/inflammatory cause first.

13 Bismuth Subsalicylate

Pepto-Bismol · antidiarrheal / mild antimicrobial

TEACHING

MECHANISM

Coats GI mucosa; binds toxins; mild antimicrobial against H. pylori & enterotoxigenic E. coli; salicylate moiety = mild anti-inflammatory.

WHY GIVEN

Mild diarrhea, traveler's diarrhea, upset stomach, H. pylori quadruple therapy.

MUST-ASSESS BEFORE GIVING

Salicylate allergy, anticoagulant use, age (avoid in children with viral illness — Reye syndrome), pregnancy (avoid), recent flu/varicella.

KEY LABS / MONITORING

Bleeding history, salicylate level if overdose suspected.

MOST DANGEROUS ADVERSE EFFECT

Reye syndrome in children/teens with viral illness (encephalopathy + hepatic failure); salicylate toxicity with overuse; bleeding when combined with anticoagulants.

COMMON SIDE EFFECTS

Black stools and black tongue (harmless); tinnitus = early salicylate toxicity sign.

HOLD / NOTIFY PROVIDER

Tinnitus, confusion, hyperventilation (salicylate toxicity), bleeding, age < 12 with fever.

PATIENT TEACHING

Black tongue/stool is expected and harmless; avoid in children with chickenpox/flu; report ringing in ears; not with aspirin or warfarin.

NGN CLINICAL JUDGMENT CUE

Client on warfarin starts bismuth for traveler's diarrhea — INR rises from 2.3 → 4.8. → **Bismuth subsalicylate has salicylate → potentiates warfarin. Hold warfarin, hold bismuth, recheck INR, fall precautions, vitamin K if bleeding.**

PRIORITY Q *A parent asks if Pepto-Bismol is OK for their 8-year-old who has chickenpox and an upset stomach. What is the nurse's best response?*

A. "Yes, give half the adult dose."
B. "No — bismuth subsalicylate contains a salicylate and can cause Reye syndrome in children with viral illness."
C. "Yes, but only one dose per day."
D. "Yes, that's the recommended treatment for chickenpox nausea."

ANSWER · B

Bismuth subsalicylate is contraindicated in children with viral illness (flu, chickenpox) — Reye syndrome risk. Same principle as aspirin in pediatrics.

TEST-TAKING TIP

Anything ending in **"SALICYLATE"**

→ think aspirin behavior: Reye, bleeding, tinnitus, salicylate toxicity.

14 Phosphate Binders

sevelamer (Renvela) · calcium acetate (PhosLo) · lanthanum (Fosrenol)

COMMONLY TESTED · CKD

MECHANISM

Bind dietary phosphate in the gut → form insoluble complex → excreted in stool → lower serum phosphate.

WHY GIVEN

Hyperphosphatemia in CKD / ESRD / dialysis — prevents renal osteodystrophy, vascular calcification, secondary hyperparathyroidism.

MUST-ASSESS BEFORE GIVING

Phosphate level, calcium level (Ca acetate ↑Ca), dietary intake, dysphagia (large tablets), constipation history.

KEY LABS / MONITORING

Phosphate (goal 3.5–5.5 in dialysis), calcium, PTH, vitamin D, Ca×P product, weekly initially.

MOST DANGEROUS ADVERSE EFFECT

Hypercalcemia (Ca acetate → cardiac arrhythmias, vascular calcification); bowel obstruction/perforation (sevelamer); aluminum toxicity if aluminum-based.

COMMON SIDE EFFECTS

Constipation, nausea, dyspepsia, decreased absorption of co-administered drugs.

HOLD / NOTIFY PROVIDER

Ca > 10.5, signs of obstruction, severe constipation.

PATIENT TEACHING

TAKE WITH MEALS (and snacks containing phosphate). Without food, they have nothing to bind. Separate other meds by 1 hr before or 3 hr after. Limit dietary phosphate (dairy, cola, nuts, processed foods).

NGN CLINICAL JUDGMENT CUE

Hemodialysis client takes calcium acetate "in the morning before breakfast on an empty stomach to remember it." Phos 7.2, Ca 11.3. → **Wrong timing! Must be with meals. Re-teach administration; risk for hypercalcemia + ongoing hyperphosphatemia.**

PRIORITY Q *The nurse is teaching a hemodialysis client about sevelamer. Which client statement indicates correct understanding?*

A. "I'll take it 1 hour before meals on an empty stomach."
B. "I'll take this with each meal and snack."
C. "I'll skip it on dialysis days."
D. "I'll take it with my levothyroxine each morning."

ANSWER · B

Phosphate binders MUST be taken with meals — they bind phosphate in food. A defeats the purpose. C — dialysis doesn't remove enough phosphate alone. D — sevelamer binds many drugs including levothyroxine; separate.

TEST-TAKING TIP

Phosphate binders = "BINDERS BIND FOOD"*. Always with meals. Calcium-based binders have a hidden trap: hypercalcemia.*

15 Potassium Chloride (KCl)

PO · IV — HIGH-ALERT MEDICATION

HIGH-RISK · NEVER PUSH

MECHANISM

Replaces intracellular cation needed for cardiac repolarization, neuromuscular function, acid-base balance.

WHY GIVEN

Hypokalemia (loop/thiazide diuretics, GI losses, DKA recovery, alkalosis), digoxin toxicity prevention.

MUST-ASSESS BEFORE GIVING

K level (current), **renal function (urine output ≥ 30 mL/hr or 0.5 mL/kg/hr REQUIRED before IV K)**, ECG (peaked T, QRS widening), IV site patency, current medications (ACEi, ARB, spironolactone — K-sparing combo).

KEY LABS / MONITORING

K (goal 3.5–5.0), Mg (can't correct K without Mg), creatinine, ECG continuously during IV replacement.

MOST DANGEROUS ADVERSE EFFECT

CARDIAC ARREST from rapid IV push or concentrated bolus — fatal hyperkalemia. **NEVER IV push, never give undiluted, never via gravity bag, never > 10 mEq/hr peripheral or 20 mEq/hr central without continuous ECG.** Tissue necrosis if extravasation.

COMMON SIDE EFFECTS

PO: GI irritation, nausea; IV: burning at site, phlebitis.

HOLD / NOTIFY PROVIDER

K > 5.0, UO < 30 mL/hr, peaked T waves, widening QRS, oliguria/anuria.

ANTIDOTE

For hyperkalemia from over-replacement: **calcium gluconate** (cardio-protective), insulin + D50, albuterol, sodium polystyrene/patiromer, dialysis.

PATIENT TEACHING

PO: take with full glass of water and food (GI irritation); don't crush extended-release; report numbness, tingling, weakness, palpitations.

NURSING ACTION

Always use IV pump; max concentration peripheral 10 mEq/100 mL, central 20 mEq/100 mL; max rate peripheral 10 mEq/hr; recheck K within 2–4 hr post-infusion; verify Mg replaced concurrently.

NGN CLINICAL JUDGMENT CUE

Nurse finds KCl 40 mEq in 250 mL D5W infusing at 200 mL/hr in a peripheral IV. Client reports burning in arm and palpitations. ECG = peaked T waves. → **STOP infusion immediately, call rapid response, ECG, draw stat K, prepare calcium gluconate, oxygen, IV access for emergent management.**

PRIORITY Q *The nurse is preparing to hang IV potassium chloride 20 mEq in 100 mL NS over 1 hour for a client with K 2.9. Which assessment finding requires the nurse to hold the infusion?*

A. Urine output 25 mL/hr × 2 hours
B. Heart rate 88 bpm regular
C. Blood pressure 132/76
D. Reports mild leg cramping

ANSWER · A

Urine output < 30 mL/hr is the absolute hold parameter for IV K — without renal excretion the K builds up rapidly causing fatal hyperkalemia. B, C, D are appropriate and consistent with mild hypokalemia.

TEST-TAKING TIP

KCl = HIGH-ALERT. NCLEX-favorite rules:
NO IV PUSH · ALWAYS PUMP · CHECK URINE · CHECK MG · MAX 10 MEQ/HR PERIPHERAL

.

16 Sodium Polystyrene Sulfonate / Patiromer

Kayexalate (SPS) · Veltassa (patiromer) · potassium binders

HIGH-RISK · HYPERKALEMIA

MECHANISM

Exchange resin: swaps Na (SPS) or Ca (patiromer) for K in the gut → K eliminated in stool. Lowers serum K over hours.

WHY GIVEN

Non-emergent hyperkalemia (e.g., K 5.5–6.5 without ECG changes); chronic hyperkalemia in CKD/ESRD on ACEi or ARB.

MUST-ASSESS BEFORE GIVING

K level, ECG, bowel sounds, recent bowel surgery, ileus/obstruction (CONTRAINDICATED), heart failure / Na restriction (SPS adds Na load), other oral meds (separate by ≥ 3 hr — binds them).

KEY LABS / MONITORING

K q2–4h, Na, Ca (patiromer), Mg, bowel function.

MOST DANGEROUS ADVERSE EFFECT

Intestinal necrosis / perforation (especially SPS with sorbitol, in postop or bowel-injury patients — FDA boxed warning); hypokalemia from over-treatment; hypomagnesemia (patiromer); fluid overload from Na load (SPS).

COMMON SIDE EFFECTS

Constipation, nausea, anorexia, hypokalemia.

HOLD / NOTIFY PROVIDER

Postop ileus, bowel obstruction/perforation suspected, K < 3.5 (over-correction), severe constipation, abdominal distension/pain.

PATIENT TEACHING

Mix powder with water (not orange/grapefruit juice for patiromer — high K). Take other meds 3 hr before or 3 hr after. Onset hours (NOT for emergencies — for life-threatening hyperkalemia use IV calcium + insulin/D50 + albuterol + dialysis).

NGN CLINICAL JUDGMENT CUE

Postop colon resection day 1 client with K 6.4 — provider orders SPS. RN questions order. → **Recent bowel surgery + SPS = high risk for intestinal necrosis. Recommend alternative (insulin/D50, calcium, dialysis); call provider.**

PRIORITY Q *A client has hyperkalemia (K 7.0) with peaked T waves and a widening QRS. Which order should the nurse give FIRST?*

A. Sodium polystyrene sulfonate 30 g PO
B. Calcium gluconate 1 g IV over 2–3 minutes
C. Lactulose 30 mL PO
D. Furosemide 40 mg PO

ANSWER · B

K 7.0 + ECG changes = EMERGENCY. Calcium gluconate stabilizes the myocardium *first* (does NOT lower K, but buys time). Then insulin + D50 shifts K intracellularly; albuterol; finally SPS or dialysis to remove K from body. SPS is too slow for this emergency.

TEST-TAKING TIP

Hyperkalemia emergency sequence:
"C BIG K DROP"
→ Calcium → Bicarb (if acidotic) → Insulin + Glucose → Kayexalate/patiromer → Dialysis. Calcium first.

17 Calcium Gluconate IV

cardioprotectant · Mg toxicity antidote · hypocalcemia rescue

HIGH-RISK · EMERGENCY

MECHANISM

Restores extracellular Ca^{2+} → raises threshold potential of cardiac myocytes (cardioprotection in hyperkalemia/hypermagnesemia); stabilizes neuromuscular function.

WHY GIVEN

Acute hyperkalemia with ECG changes, magnesium sulfate toxicity (OB), symptomatic hypocalcemia, citrate-induced hypocalcemia in massive transfusion, hydrofluoric acid burns.

MUST-ASSESS BEFORE GIVING

Cardiac rhythm/ECG, IV access patency (extravasation = severe tissue necrosis), digoxin use (Ca + dig = lethal "stone heart"), serum Ca and Mg, K level.

KEY LABS / MONITORING

Ca (ionized preferred), Mg, K, continuous ECG.

MOST DANGEROUS ADVERSE EFFECT

Bradycardia / asystole if pushed too fast; "stone heart" with digoxin (fatal cardiac contracture); severe tissue necrosis/sloughing if extravasation.

COMMON SIDE EFFECTS

Tingling, warmth, taste of chalk, mild hypotension during infusion.

HOLD / NOTIFY PROVIDER

Digoxin toxicity (give very cautiously or not at all), known hypercalcemia, ventricular fibrillation due to digitalis.

ANTIDOTE

For overcorrection → hypercalcemia: IV NS hydration, loop diuretic (furosemide promotes Ca excretion), calcitonin, bisphosphonates.

PATIENT TEACHING

N/A — emergent IV. If chronic Ca oral: take with vitamin D; spread doses; report constipation or kidney stones.

NURSING ACTION

Dilute, slow IV push 0.5–1.5 mL/min (or per protocol), continuous ECG, ensure patent IV (preferably central); 1 g IV ≈ 4.6 mEq elemental Ca; calcium **gluconate** is preferred peripherally over calcium **chloride** (chloride more irritating, more concentrated Ca).

NGN CLINICAL JUDGMENT CUE

Pre-eclamptic woman on magnesium sulfate IV develops RR 8, absent DTRs, drowsy. Mg level 9.5 mEq/L. → **Mg toxicity. STOP Mg infusion, administer calcium gluconate 1 g IV slowly, support respirations, notify provider.**

PRIORITY Q *The nurse is administering IV calcium gluconate to a client with hyperkalemia. Which concurrent medication finding requires the nurse to verify the order before administration?*

A. Pantoprazole 40 mg IV daily
B. Digoxin 0.25 mg PO daily (level 2.4 ng/mL)
C. Acetaminophen 650 mg PRN
D. Heparin SC prophylaxis

ANSWER · B

Digoxin + IV calcium = fatal cardiac contracture ("stone heart"). Especially with a digoxin level 2.4 (toxic — normal 0.5–2.0), giving calcium is contraindicated. Verify with provider. Other meds are unrelated.

TEST-TAKING TIP

Calcium gluconate is the **"MEMBRANE STABILIZER"**
— first drug in hyperkalemia with ECG changes, and the **ANTIDOTE TO MG TOXICITY**

. *Always check digoxin and patency of IV.*

18 Magnesium Sulfate IV

hypomagnesemia · torsades · pre-eclampsia (cross-ref Day 9)

HIGH-RISK

MECHANISM

Cofactor for > 300 enzymes; smooth-muscle relaxant; CNS depressant; calcium-channel modulator; required for K and Ca homeostasis.

WHY GIVEN

Symptomatic hypomagnesemia, torsades de pointes, severe asthma exacerbation, pre-eclampsia/eclampsia seizure prophylaxis, refractory hypokalemia (can't fix K without Mg).

MUST-ASSESS BEFORE GIVING

DTRs (baseline), respiratory rate, urine output, level of consciousness, renal function, ECG.

KEY LABS / MONITORING

Mg level (goal hypomagnesemia 1.8–2.5; OB therapeutic 4–7 mEq/L), Ca, K, BUN/Cr.

MOST DANGEROUS ADVERSE EFFECT

Mg TOXICITY: loss of DTRs (first sign) → respiratory depression → cardiac arrest. Hypotension, flushing.

COMMON SIDE EFFECTS

Flushing, warmth, sweating, nausea.

HOLD / NOTIFY PROVIDER

Absent DTRs, RR < 12, UO < 30 mL/hr, Mg > 7 mEq/L (OB) or > 2.5 mg/dL (general).

ANTIDOTE

Calcium gluconate 1 g IV slowly.

PATIENT TEACHING

Expect warmth/flushing with bolus; report breathing changes, muscle weakness; pre-eclampsia: this prevents seizures, not for blood pressure.

NURSING ACTION

Always IV pump; loading dose given over 15–30 min; continuous assessment q15 min initially (DTR, RR, UOP); have calcium gluconate at bedside.

NGN CLINICAL JUDGMENT CUE

Patient receiving Mg replacement for K 2.6 / Mg 1.1 develops drowsiness, RR 11, absent patellar reflex. → **Stop Mg, calcium gluconate available, support airway, recheck Mg, notify provider.**

PRIORITY Q *The first sign of magnesium toxicity the nurse should monitor for is:*

A. Diminished or absent deep tendon reflexes
B. Respiratory arrest
C. Hypotension
D. Cardiac arrest

ANSWER · A

DTRs disappear FIRST, before respiratory depression and cardiac arrest. Monitoring DTRs is the earliest warning sign and the standard nursing assessment. B, C, D are LATE/end-stage findings.

TEST-TAKING TIP

Mg toxicity sequence:
↓DTR → ↓RR → ↓BP → CARDIAC ARREST
. *Calcium gluconate at bedside whenever Mg is infusing.*

19 Sodium Bicarbonate ($NaHCO_3$)

IV emergency · oral antacid

HIGH-RISK · CODE

MECHANISM

Provides HCO_3^- → buffers H^+ → raises pH (corrects metabolic acidosis); alkalinizes urine.

WHY GIVEN

Severe metabolic acidosis (pH < 7.1), TCA overdose, ASA toxicity, hyperkalemia (shifts K intracellularly), some cardiac arrest scenarios, contrast-induced nephropathy prevention (limited).

MUST-ASSESS BEFORE GIVING

ABG, Na, K, Ca, fluid status, heart failure, IV patency (extravasation = severe necrosis).

KEY LABS / MONITORING

ABG (recheck within 30 min), Na, K, Ca, lactate.

MOST DANGEROUS ADVERSE EFFECT

Hypernatremia, hypokalemia (K shifts intracellularly), hypocalcemia (ionized Ca binds to HCO_3), fluid overload / pulmonary edema, metabolic alkalosis, paradoxical CSF acidosis, severe tissue necrosis if extravasation.

COMMON SIDE EFFECTS

Belching, flatulence (PO); fluid retention.

HOLD / NOTIFY PROVIDER

pH > 7.5, Na > 145, severe HF/pulmonary edema, hypocalcemia, IV burning.

PATIENT TEACHING

PO: avoid in HF/HTN/renal disease; not a daily antacid; report swelling.

NGN CLINICAL JUDGMENT CUE

Client in DKA receives bicarbonate empirically — develops K 2.8, tetany, RR 28, ionized Ca low. → **Over-correction: hypokalemia from K shift, hypocalcemia, possible alkalosis. Replace K and Ca, recheck ABG, slow/hold further bicarb.**

PRIORITY Q *Following bolus IV sodium bicarbonate for severe acidosis, which finding requires the most immediate intervention?*

A. Serum sodium 142 mEq/L
B. Serum potassium 2.4 mEq/L with U waves on ECG
C. Mild flushing
D. pH improved from 7.10 → 7.30

ANSWER · B

Bicarbonate drives K intracellularly causing acute hypokalemia — U waves and K 2.4 indicate clinically dangerous hypokalemia at risk for torsades. Replace K. A is normal; C is expected; D is the desired effect.

TEST-TAKING TIP

Bicarb shifts K and Ca INTO cells → watch for **HYPOKALEMIA AND HYPOCALCEMIA** *after administration.*

20 Lactulose

hepatic encephalopathy · osmotic laxative

COMMONLY TESTED

MECHANISM

Synthetic disaccharide → metabolized by colonic bacteria to lactic acid → traps NH_3 as NH_4^+ in gut → excreted in stool; osmotic effect draws water.

WHY GIVEN

Hepatic encephalopathy (lower ammonia), chronic constipation.

MUST-ASSESS BEFORE GIVING

Mental status (baseline LOC and asterixis), ammonia level, electrolytes, hydration, current bowel pattern.

KEY LABS / MONITORING

Ammonia, K, Na, glucose (diabetics), BUN/Cr; **titrate to 2–3 soft stools/day.**

MOST DANGEROUS ADVERSE EFFECT

Severe dehydration, hypokalemia, hypernatremia, hepatic coma if undertreated.

COMMON SIDE EFFECTS

Cramping, flatulence, sweet taste, diarrhea, abdominal distension.

HOLD / NOTIFY PROVIDER

More than 4–5 stools/day (over-dose), worsening mental status, dehydration, K < 3.5.

PATIENT TEACHING

Mix with juice/water/milk to mask sweet taste; expect frequent soft stools (goal); report worsening confusion, tremors, lethargy.

NURSING ACTION

Track stool count, neuro check q4h initially (LOC, asterixis, orientation), monitor ammonia trend.

NGN CLINICAL JUDGMENT CUE

Cirrhotic client on lactulose has 1 stool in 24 hr, more confused, asterixis present, ammonia 142. → **Subtherapeutic. Increase lactulose to achieve 2–3 stools/day, hold sedatives, low-protein diet, monitor LOC.**

PRIORITY Q *The nurse evaluates lactulose effectiveness in a client with hepatic encephalopathy. Which finding indicates the medication is working as intended?*

A. One firm bowel movement per day
B. Decreased ammonia, improved orientation, 2–3 soft stools/day
C. No bowel movements × 48 hours
D. Six watery stools per day with new lethargy

ANSWER · B

Goal: 2–3 soft stools/day, improved neuro status, declining ammonia. A is subtherapeutic; C is treatment failure; D is over-treatment with dehydration/hypokalemia risk (could worsen encephalopathy).

TEST-TAKING TIP

Lactulose in encephalopathy:
"GOAL = 2–3 SOFT STOOLS/DAY."
Too few → still encephalopathic. Too many → hypokalemia worsens it.

02 5 Must-Not-Miss Safety Rules

BOXED WARNINGS

NEVER IV Push Potassium 1

IV KCl is a high-alert medication. **Always dilute, always pump, always continuous ECG for > 10 mEq/hr.** Confirm urine output ≥ 30 mL/hr before infusing. Rapid IV K = cardiac arrest.

Calcium First in Hyperkalemia With ECG Changes 2

For K > 6.5 OR peaked T waves / wide QRS, **calcium gluconate IV is given FIRST** to stabilize the myocardium. Insulin + D50 and albuterol shift K next. SPS / dialysis remove K last.

Calcium + Digoxin = Stone Heart 3

IV calcium in a digitalis-toxic client can trigger irreversible ventricular contracture. **Always verify dig level and dig signs before IV calcium.**

Promethazine IV — Black Box Necrosis 4

Dilute, large vein, slow push, STOP if burning. **Contraindicated < 2 years old** — fatal respiratory depression. Prefer deep IM or PO.

Loperamide ≠ Infectious Diarrhea 5

Do NOT give antidiarrheals when fever, bloody stool, or recent antibiotics are present. **C. difficile + loperamide → toxic megacolon.** Send stool, isolate, use soap-and-water hand hygiene.

Phosphate Binders Go WITH Food 6

They bind dietary phosphate — empty stomach = useless. Separate other meds by 1 hr before or 3 hr after. Calcium-based binders carry hypercalcemia risk.

03 Dosage & Safety Calculations

5 PROBLEMS

1

Q: Order: Potassium chloride 40 mEq IV in 250 mL NS to infuse over 4 hr via peripheral IV. Is this rate safe? Calculate the infusion rate and identify the safety issue.

```
Rate (mEq/hr) = 40 mEq ÷ 4 hr = 10 mEq/hr ✓ (within peripheral max) Concentration = 40 mEq / 250 mL = 0.16 mEq/mL (acceptable) Pump rate = 250 mL ÷ 4 hr = 62.5 mL/hr Verify: urine output ≥ 30 mL/hr, continuous ECG NOT required at ≤ 10 mEq/hr
```

Safe: 62.5 mL/hr via pump. Maximum peripheral rate is 10 mEq/hr.

2

Q: A client weighing 88 lb is to receive ondansetron 0.15 mg/kg IV. The vial contains 2 mg/mL. How many mL will the nurse administer? (Round to nearest tenth.)

```
Weight: 88 lb ÷ 2.2 = 40 kg Dose: 40 kg × 0.15 mg/kg = 6 mg Volume: 6 mg ÷ 2 mg/mL = 3 mL
```

3.0 mL IV. (Verify QTc and Mg before push.)

3

Q: Magnesium sulfate 4 g IV loading dose ordered in 100 mL D5W over 20 min. Drop factor: 15 gtt/mL. Calculate the drip rate (gtt/min).

```
gtt/min = (Volume × Drop factor) ÷ Time (min) gtt/min = (100 mL × 15 gtt/mL) ÷ 20 min gtt/min = 1500 ÷ 20 = 75 gtt/min
```

75 gtt/min (calcium gluconate at bedside; assess DTRs and RR every 15 min).

4

Q: Calcium gluconate 2 g IV is ordered for symptomatic hypocalcemia. Stock: 10% calcium gluconate (100 mg/mL) in 10-mL vials. How many vials are needed?

```
2 g = 2000 mg 2000 mg ÷ 100 mg/mL = 20 mL needed Vials needed: 20 mL ÷ 10 mL/vial = 2 vials
```

2 vials (20 mL total). Dilute and infuse slowly over 10–20 min with continuous ECG.

5

Q: An older adult with CKD has K = 6.2 mEq/L. Order: Sodium polystyrene sulfonate 30 g PO with 100 mL sorbitol. Pharmacist provides SPS powder 15 g/packet. How many packets? Patient is post-bowel resection day 3. What additional action should the nurse take?

```
Packets = 30 g ÷ 15 g/packet = 2 packets SAFETY: Recent bowel surgery + SPS with sorbitol = boxed warning for intestinal necrosis.
```

2 packets — BUT hold and call provider. Suggest alternative (insulin/D50, IV calcium gluconate if ECG changes, dialysis consult). Document & rationale.

04 NGN-Style Items

5 FORMATS

FORMAT · MATRIX

Match each medication action to the correct clinical situation

Select whether each action is **Indicated**, **Contraindicated**, or **Non-Essential** for each scenario.

Scenario / Medication	Indicated	Contraindicated	Non-Essential
Loperamide for a client with bloody diarrhea 2 days after finishing clindamycin		✓	
Calcium gluconate IV for K 6.7 with peaked T waves	✓		
Sodium polystyrene sulfonate for K 6.2 in a postop bowel-resection client		✓	
Promethazine IM for a 22-month-old with vomiting		✓	
Sucralfate 1 hr before breakfast for active duodenal ulcer	✓		
Bisacodyl crushed in milk for a hospitalized adult		✓	
Lactulose titrated to 2–3 soft stools/day in hepatic encephalopathy	✓		
Magnesium citrate bowel prep for a client with CrCl 18 mL/min		✓	

RATIONALE

Loperamide is contraindicated with infectious / post-antibiotic colitis (toxic megacolon). Calcium gluconate is the first-line cardioprotectant for hyperkalemia with ECG changes. SPS is contraindicated postop bowel surgery (necrosis). Promethazine is contraindicated < 2 years (respiratory depression). Sucralfate must be on empty stomach. Bisacodyl with milk dissolves enteric coating → gastric irritation. Lactulose titrates to 2–3 stools/day. Mg citrate is contraindicated in renal failure (toxicity).

FORMAT · BOW-TIE

Hyperkalemia in CKD — complete the priority plan of care

CASE

A 64-year-old with stage 4 CKD presents with weakness, K 7.1, ECG showing peaked T waves and PR prolongation, BP 158/94, HR 58 bpm, UO 18 mL/hr, recent lisinopril dose increase.

ACTIONS TO TAKE

- Continue lisinopril ✗
- Calcium gluconate 1 g IV slowly ✓
- Regular insulin + D50 IV ✓
- Loperamide PO
- Continuous cardiac monitoring ✓
- Albuterol nebulizer
- 10% calcium chloride bolus IV push

PRIORITY CONDITION: Severe Symptomatic Hyperkalemia

TO MONITOR

- Serum K q1–2 hr ✓
- ECG continuously ✓
- Urine output / volume status ✓
- Hemoglobin A1C
- BP and HR ✓
- Liver enzymes

RATIONALE

K 7.1 + ECG changes is an emergency. **Calcium gluconate stabilizes the myocardium first**, then insulin + D50 shifts K into cells. **Hold the ACE inhibitor** (lisinopril worsens hyperkalemia in CKD). Continuous ECG and serial K levels guide therapy. Dialysis is the definitive removal. Albuterol can be added but is adjunctive. Calcium chloride is not first-line peripherally (extravasation/necrosis); calcium gluconate is preferred.

FORMAT · SATA

Select all teaching points appropriate for a client newly prescribed sucralfate

Select ALL that apply:

☑ A. Take 1 hour before meals and at bedtime.
☑ B. Separate from other medications by at least 2 hours.
☒ C. Take with food to prevent stomach upset.
☑ D. Constipation is the most common side effect — increase fiber and fluids.
☑ E. Notify provider of difficulty swallowing or abdominal distension.
☒ F. This medication reduces stomach acid production.
☑ G. If using NG tube, dissolve completely and flush tube before and after.

RATIONALE

Correct: A, B, D, E, G. Sucralfate requires acidic, EMPTY stomach to form protective gel. It does NOT reduce acid (eliminates F). Constipation is the most common adverse effect (D). Bezoars cause distension (E). Drug binds others — separate by 2 hr (B). Clogs feeding tubes (G).

FORMAT · ORDERED RESPONSE

Place the actions in correct order for an adult with K 7.5 and wide QRS

Drag the items below into the correct sequence.

1. **Apply continuous cardiac monitor** — establish baseline and detect arrhythmia
2. **Calcium gluconate 1 g IV slowly** — stabilize cardiac membrane (first drug)
3. **Regular insulin 10 units IV + D50W 25 g IV** — shift K intracellularly (onset 15–30 min)
4. **Albuterol nebulizer 10–20 mg** — additional intracellular shift
5. **Sodium polystyrene sulfonate / patiromer PO** — gut elimination (only when safe / not postop bowel)
6. **Notify nephrology — emergent dialysis if persistent** — definitive K removal

RATIONALE

The mnemonic **"C BIG K Drop"** walks through the priority sequence. Calcium stabilizes the heart immediately but does not lower K. Insulin/glucose and albuterol redistribute K. SPS/patiromer or dialysis eliminate it. Always continuous ECG.

FORMAT · CLOZE / DROP-DOWN

Complete the documentation note

A 78-year-old with hyperphosphatemia (P = 6.8 mg/dL, Ca = 8.9 mg/dL) was prescribed [sevelamer] to be taken [with meals]. The nurse instructs the client to separate other oral medications by [1 hr before / 3 hr after] to prevent decreased absorption. For breakthrough constipation, a [stool softener (docusate)] would be the safest initial choice, while [magnesium-based] laxatives should be avoided in chronic kidney disease.

RATIONALE

Sevelamer is non-calcium / non-aluminum — preferred when calcium is already adequate. Phosphate binders must be administered with meals. Mg-based agents (Mg hydroxide / Mg citrate) accumulate in CKD → toxicity. Docusate softens stool without electrolyte risk.

05 Mini Case Study · NCJMM Walk-Through

CLINICAL JUDGMENT

CASE · GI · RENAL · ELECTROLYTE INTEGRATION

Mr. R., 68, CKD Stage 4 + Severe GERD + New Hyperkalemia

Mr. R. is admitted with worsening dyspepsia and lower-extremity weakness. PMH: CKD stage 4 (baseline Cr 2.4), HFrEF (EF 30%), GERD, T2DM. Home meds: lisinopril 20 mg, spironolactone 25 mg, omeprazole 40 mg, magnesium hydroxide PRN, calcium acetate with meals, insulin glargine.

Vital signs: HR 56, BP 162/94, RR 18, SpO_2 96% RA. **Labs:** K 6.4 mEq/L · Mg 3.1 mg/dL · Na 138 · Ca 11.2 mg/dL · Cr 3.1 (up from 2.4) · phosphate 6.9 · BUN 62. **ECG:** peaked T waves, PR 240 ms. **Neuro:** mild lethargy, hyporeflexic.

1 RECOGNIZE CUES

Identify the abnormal data

Hyperkalemia (6.4), hypermagnesemia (3.1), hypercalcemia (11.2), AKI on CKD (Cr 2.4 → 3.1), hyperphosphatemia (6.9), bradycardia + ECG changes, hyporeflexia (Mg toxicity), HTN, BP elevated, drug combo of ACEi + spironolactone in CKD.

2 ANALYZE CUES

Group cues & explain why

- **Hyperkalemia + ECG changes:** ACEi + K-sparing diuretic + CKD worsening = K retention.
- **Hypermagnesemia + hyporeflexia:** Mg hydroxide PRN in CKD → Mg accumulation; further depresses neuromuscular system.
- **Hypercalcemia + hyperphosphatemia:** Calcium acetate over-binding + low GFR; Ca×P product elevated → vascular calcification risk.
- **Bradycardia + lethargy:** Synergistic K + Mg cardiac and CNS depression.

3 PRIORITIZE HYPOTHESES

What's most urgent?

#1 — Severe hyperkalemia with ECG changes (life-threatening, can deteriorate to VF/arrest within minutes).
#2 — Hypermagnesemia compounding cardiac depression.
#3 — AKI worsening removes the body's K-excretion pathway.
#4 — Hypercalcemia from over-binding adds long-term risk.

4 GENERATE SOLUTIONS

Possible interventions

- IV access × 2, continuous ECG
- **Calcium gluconate 1 g IV slow push** (NOT calcium chloride peripherally; verify no digoxin toxicity first)
- Regular insulin 10 units IV + D50W 25 g IV
- Albuterol nebulizer 10 mg
- **Hold lisinopril, spironolactone, Mg hydroxide, calcium acetate, omeprazole-induced Mg loss assessment**
- Nephrology consult for emergent dialysis
- SPS/patiromer NOT first-line in emergency with ECG changes (too slow)
- Fluid status assessment before NS bolus (HFrEF — risk of pulmonary edema)

5 TAKE ACTION

Execute (in order)

1. Apply continuous ECG, place on monitor, two large-bore IVs.
2. Calcium gluconate 1 g IV over 5 min (with ECG running).
3. Regular insulin 10 units IV + D50W 25 g IV simultaneously.
4. Albuterol 10–20 mg nebulizer.
5. Hold lisinopril, spironolactone, Mg hydroxide, calcium acetate.

6. STAT recheck of K, Mg, Ca, glucose within 30 min.
7. Notify nephrology — dialysis arrangement.
8. Foley/strict I&O.

6
EVALUATE OUTCOMES

Did it work?

- **Effective:** K trends down to < 5.5; peaked T waves resolve; PR normalizes; HR > 60; DTRs improve; glucose stable; no pulmonary edema.
- **Not effective / escalate:** K still > 6 after 1 hr of medical therapy → emergent dialysis; persistent bradycardia/AV block → pacing; respiratory deterioration → ICU transfer.
- **Long-term plan:** Avoid Mg-containing antacids and laxatives in CKD; switch to non-calcium phosphate binder (sevelamer); reassess ACEi + K-sparing diuretic combination; nephrology follow-up; medication reconciliation; teach the client about hidden K and Mg sources.

06 Red Flag Reference

STOP / HOLD / NOTIFY

⚠ STOP

! Peaked T waves on a client receiving IV KCl

STOP the infusion immediately. Activate rapid response. Prepare **calcium gluconate**. ECG, recheck K, do not flush remaining KCl.

! Urine output < 30 mL/hr in a client receiving IV K, Mg, or $NaHCO_3$

Hold the next dose. Notify provider. Renal excretion is failing — accumulation will be lethal.

! Absent DTRs + RR < 12 on magnesium infusion

Magnesium toxicity. Stop Mg. Give **calcium gluconate 1 g IV slowly**. Support airway. Notify provider.

! Burning, pallor, mottling at IV site during promethazine

STOP immediately. Leave catheter in place, aspirate residual drug. Suspect arterial injection / extravasation → gangrene risk. Notify provider; consult vascular/surgery.

! Involuntary tongue / facial movements on metoclopramide

Tardive dyskinesia — discontinue immediately. Often irreversible. Notify provider; consider neurology consult.

! Recent antibiotic + new watery, foul diarrhea on loperamide

Hold loperamide. Suspect C. difficile. Stool PCR/toxin, contact precautions with SOAP-AND-WATER hand hygiene (alcohol gel doesn't kill spores), notify provider.

! Postoperative ileus / bowel surgery + ordered sodium polystyrene sulfonate

Question the order. Boxed warning: intestinal necrosis. Suggest IV calcium + insulin/D50 + dialysis instead.

! QTc > 500 ms or K < 3.5 / Mg < 1.5 before ondansetron

Hold ondansetron. Replace electrolytes first. Consider non–QT-prolonging antiemetic (e.g., diphenhydramine, scopolamine alternatives).

! Child < 2 years and promethazine ordered

Refuse to give. Boxed contraindication — fatal respiratory depression. Clarify with provider; consider ondansetron with QT screening.

07 Confusing Drugs Compared

SIDE-BY-SIDE

PPIs vs H2 Blockers

omeprazole vs famotidine

	PPI (omeprazole)	H2 Blocker (famotidine)
MECHANISM	Irreversibly blocks H^+/K^+ pump (parietal cell)	Reversibly blocks histamine-2 receptor
ONSET / DURATION	Slower onset (days), longer duration	Faster onset (1 hr), shorter duration
WHEN TO TAKE	30–60 min BEFORE breakfast	Bedtime (suppresses nocturnal acid)
LONG-TERM RISKS	**Mg, B12, bone, C. diff, AKI**	Confusion in elderly, gynecomastia (cimetidine)
DRUG INTERACTIONS	Reduces clopidogrel activation (omeprazole)	Cimetidine = CYP450 inhibitor → ↑warfarin, phenytoin, theophylline
NCLEX FAVORITE	Hypomagnesemia + QT prolongation	Elderly confusion + cimetidine drug interactions

Ondansetron vs Promethazine

5-HT3 antagonist vs phenothiazine antiemetic

	Ondansetron (Zofran)	Promethazine (Phenergan)
CLASS	5-HT3 serotonin antagonist	Phenothiazine (H1, dopamine, anticholinergic)
SEDATION	Minimal	Significant — CNS depression
TOP DANGER	**QT prolongation → torsades**	**Tissue necrosis (IV) · resp. depression < 2 yr**
AGE RESTRICTIONS	Safe in pediatrics ≥ 6 mo	**Contraindicated < 2 years** (boxed)
ROUTES	PO, ODT, IM, IV	PO, IM (deep), IV (deep vein, dilute, slow)
ANTICHOLINERGIC EFFECTS	None	Dry mouth, urinary retention, constipation

Sodium Polystyrene Sulfonate vs Calcium Gluconate

Both used in hyperkalemia — totally different roles

	SPS (Kayexalate)	Calcium Gluconate IV
ACTION	Removes K via stool (binds in gut)	Stabilizes cardiac membrane (does NOT lower K)
ONSET	Hours	Minutes
USE WHEN	Non-emergent hyperkalemia, no ECG changes	Emergent hyperkalemia with ECG changes (peaked T, wide QRS)
RISK	Intestinal necrosis (esp. with sorbitol, postop)	Bradycardia/asystole if rapid; "stone heart" with digoxin
ALWAYS WITH	Wait for K result; check bowel function	Continuous ECG, dilute, slow push

Bulk-forming vs Osmotic vs Stimulant vs Stool Softener

Match the laxative to the patient

	Mechanism	Best Patient
BULK-FORMING (PSYLLIUM)	Absorbs water, mechanical bulk	Long-term chronic constipation, IBS, hemorrhoids, pregnancy
OSMOTIC (PEG, LACTULOSE)	Draws water into bowel	Chronic constipation, bowel prep, encephalopathy (lactulose)
STIMULANT (BISACODYL, SENNA)	Stimulates peristalsis directly	Acute / opioid-induced; short-term only
STOOL SOFTENER (DOCUSATE)	Surfactant — softens stool	Post-MI / post-op / anything where straining is dangerous
SALINE (MG-BASED)	Osmotic; high salt load	Acute constipation — NEVER in renal failure

Aluminum vs Magnesium vs Calcium-Based Antacids	Each cation tells you the side effect	
	Side Effect	**Caution**
ALUMINUM HYDROXIDE	Constipation; phosphate depletion	Aluminum toxicity in CKD (encephalopathy)
MAGNESIUM HYDROXIDE	Diarrhea	Hypermagnesemia in CKD (lethargy, ↓DTRs)
CALCIUM CARBONATE	Constipation; hypercalcemia	Milk-alkali syndrome with overuse; kidney stones

08 End-of-Day Infographic Summary

HIGH-YIELD RECALL

Day 13 · One-Page Recall Map

GI · RENAL · ELECTROLYTE PHARMACOLOGY

ACID SUPPRESSION

- **PPI** — empty stomach, long-term ⇒ Mg/B12/bone/C. diff
- **H2 (famotidine)** — bedtime; cimetidine = drug interactions
- **Antacids** — Al constipation, Mg diarrhea; separate 1–2 hr
- **Sucralfate** — empty stomach, no co-meds 2 hr

ANTIEMETICS

- **Ondansetron** — QT prolongation; check K/Mg
- **Promethazine** — necrosis (IV), no < 2 yr
- **Metoclopramide** — tardive dyskinesia; < 12 weeks

LAXATIVES & ANTIDIARRHEALS

- **Psyllium** — full glass water, no obstruction
- **PEG / Lactulose** — osmotic; lactulose → 2–3 stools/day
- **Bisacodyl/senna** — short term; no milk/antacid within 1 hr
- **Docusate** — softener for prevention (post-MI, post-op)
- **Loperamide** — NEVER with fever/blood/recent abx
- **Bismuth** — Reye risk in kids with viral illness

RENAL PHOSPHATE / POTASSIUM

- **Phosphate binders** — WITH MEALS, separate other meds
- **Ca acetate** watch hypercalcemia
- **Sevelamer** — non-calcium, non-aluminum option
- **SPS / patiromer** — slow K removal; not postop bowel

ELECTROLYTE REPLACEMENT

- **KCl IV** — NEVER PUSH; max 10 mEq/hr peripheral; UOP > 30
- **Calcium gluconate** — 1st in HyperK + ECG; antidote to Mg tox
- **Mg sulfate IV** — DTRs, RR, UO; antidote = Ca gluconate
- **$NaHCO_3$** — drives K & Ca into cells; watch hypoK / hypoCa

HEPATIC / SPECIAL

- **Lactulose** — encephalopathy; goal 2–3 soft stools/day
- **Avoid Mg laxatives in CKD**
- **Soap-and-water** for C. diff (alcohol gel ineffective)

NORMAL LAB RANGES TO MEMORIZE

Potassium	**Magnesium**	**Calcium (total)**	**Ionized Ca^{2+}**
3.5 – 5.0 mEq/L	1.5 – 2.5 mg/dL	8.5 – 10.5 mg/dL	4.5 – 5.6 mg/dL
Phosphate	**Sodium**	**Bicarbonate**	**BUN**
2.5 – 4.5 mg/dL	135 – 145 mEq/L	22 – 28 mEq/L	7 – 20 mg/dL
Creatinine	**Ammonia**	**Mg (OB therapeutic)**	**QTc upper limit**
0.6 – 1.3 mg/dL	15 – 45 µg/dL	4 – 7 mEq/L	< 470 ms (♀) / 450 (♂)