

• NCLEX-RN 2026 • NGN-ALIGNED

FILM NO. 012 • MSK SERIES

DAY 12 — REFERENCE DECK

MUSCULOSKELETAL PHARMACOLOGY

Bone, joint, muscle & autoimmune-MSK agents — osteoporosis therapy, muscle relaxants, gout medications, DMARDs & biologics, NSAIDs, and the high-risk safety anchors NGN loves to test.

13–19%

PHARMACOLOGICAL & PARENTERAL THERAPIES

11–17%

PHYSIOLOGICAL ADAPTATION

9–15%

REDUCTION OF RISK POTENTIAL

10–16%

SAFETY & INFECTION CONTROL

6–12%

HEALTH PROMOTION & MAINTENANCE

§ 01

ADVANCED FLASHCARDS

22 CARDS • 16 CLINICAL FIELDS EACH

MSK-01

Bisphosphonates

alendronate · risedronate · ibandronate · IV zoledronic acid

SAFETY-ALERT • TEACHING-HEAVY

MECHANISM (SIMPLE)	Bind bone hydroxyapatite and inhibit osteoclasts , slowing bone resorption so net bone density is preserved.
WHY PATIENT GETS IT	Postmenopausal & glucocorticoid-induced osteoporosis, Paget disease, hypercalcemia of malignancy, bone metastases.
MUST-ASSESS BEFORE	Serum calcium & vitamin D (correct hypocalcemia FIRST), renal function (avoid if CrCl <30–35), dental exam (ONJ risk), esophageal disorders (achalasia/stricture = contraindicated), ability to sit/stand upright.
KEY LABS / MONITORING	Serum calcium, 25-OH vitamin D, CrCl/creatinine, alkaline phosphatase (Paget).
MOST DANGEROUS EFFECT	Atypical subtrochanteric femur fracture & osteonecrosis of the jaw (ONJ) ; severe erosive esophagitis; IV zoledronic acid → acute-phase reaction, renal failure, symptomatic hypocalcemia.
COMMON SIDE EFFECTS	GI upset, dysphagia, transient flu-like myalgia/fever (IV), heartburn.
HOLD / NOTIFY PROVIDER	New dull thigh/groin pain (impending atypical fracture), jaw pain/loose teeth, dysphagia/retrosternal pain, serum Ca <8.5 mg/dL.
ANTIDOTE / REVERSAL	No specific antidote; treat hypocalcemia with IV calcium gluconate.
PATIENT TEACHING	Take first thing in AM, on an empty stomach, with a full 6–8 oz glass of plain water ; remain upright ≥30 min (60 min for ibandronate); no food, other meds, or drink for 30–60 min; complete dental work before starting; weight-bearing exercise + Ca/Vit D.

NURSING ACTION

Confirm patient can stay upright; administer with water only; separate from calcium, antacids, iron; assess oral cavity each visit.

NGN CUE

Patient on alendronate ×8 months reports a new **dull aching pain in the mid-thigh** with weight-bearing — classic prodrome of an **atypical femur fracture**; stop drug, image, notify provider.

Q · A client newly prescribed alendronate makes which statement that requires nurse follow-up?

“I’ll take it at bedtime with a snack so it doesn’t upset my stomach.” Bisphosphonates must be taken on an empty stomach in the morning with water, and the client must stay upright ≥30 min — lying down (bedtime) and food both cause esophageal erosion and block absorption.

Statements about morning dosing, plain water, and staying upright are correct.

© **TIP** On NCLEX, ANY bone-density drug ending in **-dronate** → think **water, upright, empty stomach, esophagus**. New thigh pain = atypical fracture until proven otherwise.

MSK-02

Denosumab

Prolia (osteoporosis) · Xgeva (bone mets)

HIGH-RISK

MECHANISM (SIMPLE)

Monoclonal antibody that is a **RANK-ligand inhibitor** → blocks osteoclast formation, function, and survival.

WHY PATIENT GETS IT

Osteoporosis with high fracture risk, bone metastases, hypercalcemia of malignancy, glucocorticoid-induced osteoporosis.

MUST-ASSESS BEFORE

Serum calcium — **must be corrected before each dose**, vitamin D, CrCl (hypocalcemia risk ↑ in CKD/dialysis), dental status, signs of active infection, pregnancy (avoid).

KEY LABS / MONITORING

Calcium, vitamin D, creatinine/CrCl; calcium again 10–14 days after a dose in CKD.

MOST DANGEROUS EFFECT

Severe symptomatic hypocalcemia (especially renal impairment), ONJ, atypical femur fracture, serious skin/soft-tissue infections (cellulitis), and **rebound multiple vertebral fractures** if stopped without transition therapy.

COMMON SIDE EFFECTS

Back/extremity pain, hypercholesterolemia, dermatitis/eczema.

HOLD / NOTIFY PROVIDER

Calcium <8.5 mg/dL or symptoms (perioral numbness, cramps), active infection, planned dental surgery.

ANTIDOTE / REVERSAL

No antidote; IV calcium for symptomatic hypocalcemia, daily oral Ca + Vit D as prophylaxis.

PATIENT TEACHING

SubQ injection **every 6 months** (Prolia); take daily calcium + vitamin D; **never discontinue without a provider transition plan**; report numbness/tingling, twitching, infection signs.

NURSING ACTION

Verify normocalcemia before giving; ensure Ca/Vit D supplementation; monitor Chvostek/Trousseau.

NGN CUE

Two weeks after a denosumab dose a dialysis client has **perioral tingling, carpopedal spasm, and a positive Trousseau sign** → symptomatic hypocalcemia, an emergency in this drug.

Q · Which lab value would cause the nurse to *hold* a scheduled dose of denosumab?

Serum calcium 7.6 mg/dL. Denosumab profoundly lowers serum calcium; giving it to an already hypocalcemic client can cause life-threatening tetany/arrhythmia, so the dose is held and calcium corrected. A creatinine that is merely elevated is monitored, not an absolute hold; normal phosphate and a mildly low vitamin D are corrected but don’t independently hold the dose.

© **TIP** Denosumab & calcium are inseparable: **“No calcium check, no shot.”** Higher hypocalcemia danger than bisphosphonates, especially in CKD.

MSK-03

Calcitonin (salmon)

Miacalcin · Fortical — intranasal/SubQ

COMMONLY TESTED

MECHANISM (SIMPLE)	Inhibits osteoclast bone resorption and increases renal calcium excretion → lowers serum calcium .
WHY PATIENT GETS IT	Acute hypercalcemia, Paget disease, and a second-line/analgesic option for acute osteoporotic vertebral fracture pain.
MUST-ASSESS BEFORE	Serum calcium, salmon/fish protein allergy (skin-test if high risk), nasal mucosa (intranasal).
KEY LABS / MONITORING	Serum calcium (watch for over-correction → hypocalcemia), alkaline phosphatase (Paget).
MOST DANGEROUS EFFECT	Hypocalcemia/tetany, hypersensitivity & anaphylaxis, possible small ↑ malignancy risk with long-term use.
COMMON SIDE EFFECTS	Nasal irritation/rhinitis & epistaxis (intranasal), flushing, nausea, injection-site reaction.
HOLD / NOTIFY PROVIDER	Signs of hypocalcemia (tingling, spasm), allergic reaction.
ANTIDOTE / REVERSAL	No antidote; supportive care, IV calcium if over-corrected.
PATIENT TEACHING	Intranasal — alternate nostrils daily , prime new bottle, store as directed; report nasal sores, twitching, or numbness.
NURSING ACTION	Have emergency equipment for first parenteral dose; monitor calcium trend.

NGN CUE During treatment for hypercalcemia the client develops **facial twitching and tingling fingertips** → calcium dropped too far (hypocalcemia).

Q · Calcitonin is given to a client with a serum calcium of 13.5 mg/dL. Which finding indicates the medication is working?

Serum calcium decreases toward 10 mg/dL. Calcitonin's therapeutic action is to lower elevated serum calcium, so a downward trend toward normal shows effectiveness. A rising calcium means failure; resolution of bone pain is a Paget endpoint, not the hypercalcemia goal here; a normal phosphate is unrelated to the immediate target.

⦿ **TIP Calci-TONIN TONES calcium DOWN.** Opposite job of PTH. Watch for over-shoot into hypocalcemia.

MSK-04

Raloxifene (SERM)

Evista — selective estrogen receptor modulator

SAFETY-ALERT

MECHANISM (SIMPLE)	Estrogen-receptor agonist on bone (↑ BMD) but antagonist on breast and uterus .
WHY PATIENT GETS IT	Postmenopausal osteoporosis prevention/treatment; reduces invasive breast-cancer risk in high-risk postmenopausal women.
MUST-ASSESS BEFORE	VTE history, immobilization status, smoking, pregnancy (contraindicated — teratogen), hepatic function.
KEY LABS / MONITORING	Lipid panel, LFTs; bone density (DEXA) for response.
MOST DANGEROUS EFFECT	Venous thromboembolism — DVT/PE (BLACK BOX) and ↑ fatal stroke in women with coronary disease.
COMMON SIDE EFFECTS	Hot flashes, leg cramps, peripheral edema, flu-like symptoms.
HOLD / NOTIFY PROVIDER	Any sign of DVT/PE; stop 72 h before and during prolonged immobilization (surgery, long travel, bed rest).
ANTIDOTE / REVERSAL	None; anticoagulate per protocol if VTE occurs.
PATIENT TEACHING	Report calf pain/swelling, chest pain, sudden dyspnea, vision changes; move/ambulate on long trips ; not for premenopausal or pregnant women.
NURSING ACTION	Assess Virchow-triad risk before starting; teach immobilization precautions.

NGN CUE

A postmenopausal client on raloxifene returns from a 12-hour flight with a warm, swollen, painful left calf → DVT; the drug's black-box risk realized.

Q · Which client is the BEST candidate for raloxifene?

A postmenopausal woman with osteoporosis and a strong family history of breast cancer. Raloxifene treats osteoporosis while lowering breast-cancer risk. A premenopausal/pregnant woman is contraindicated (teratogen); a client with prior PE is contraindicated (VTE black box); a man with osteoporosis is not a candidate (SERM is for postmenopausal women).

☉ TIP SERM = "Selective": helps bone, blocks breast — but the killer answer is always clots. Pair raloxifene with DVT/PE precautions.

MSK-05

PTH Analogs

teriparatide · abaloparatide — anabolic agents

HIGH-RISK

MECHANISM (SIMPLE)	Recombinant parathyroid-hormone fragment; given as intermittent daily injection it stimulates OSTEOBLASTS → new bone formation (anabolic, not antiresorptive).
WHY PATIENT GETS IT	Severe osteoporosis at very high fracture risk, or failure/intolerance of antiresorptive therapy.
MUST-ASSESS BEFORE	Serum calcium (hypercalcemia risk), prior skeletal radiation, Paget/unexplained ↑ alk phos, open epiphyses (peds), bone metastases — all increase osteosarcoma concern.
KEY LABS / MONITORING	Serum calcium (1 month after start), uric acid, urinary calcium.
MOST DANGEROUS EFFECT	Osteosarcoma (BLACK BOX) → lifetime use capped at ~2 years ; orthostatic hypotension/syncope after early doses; hypercalcemia.
COMMON SIDE EFFECTS	Dizziness, leg cramps, nausea, injection-site reaction.
HOLD / NOTIFY PROVIDER	Persistent hypercalcemia, syncope, bone pain suggesting tumor.
ANTIDOTE / REVERSAL	None; supportive care.
PATIENT TEACHING	Daily SubQ injection ; give first doses where the client can sit or lie down if dizzy; rotate sites (abdomen/thigh); refrigerate the pen; do not exceed 2-year lifetime course.
NURSING ACTION	Have client sit during/after early injections; monitor orthostatic vitals and calcium.

NGN CUE

After the first teriparatide dose the client stands and reports **lightheadedness** with BP dropping from 128/78 to 96/60 → expected early orthostatic effect; safety/positioning intervention needed.

Q · What is the priority teaching point for a client starting teriparatide?

Sit or lie down for the first several doses in case of dizziness. Orthostatic hypotension and syncope are common with initial doses, so fall prevention is the immediate safety priority. Lifetime duration limits and refrigeration matter but are not the first-dose safety issue; the drug is anabolic (builds bone), not a calcium-lowering agent.

☉ TIP Teri-para-TIDE = **builds bone (anabolic)**. Black-box osteosarcoma → 2-year cap. First-dose danger = falling from orthostasis.

MSK-06

Calcium + Vitamin D

Ca carbonate (w/ food) · Ca citrate · cholecalciferol (D3)

TEACHING-HEAVY

MECHANISM (SIMPLE)	Replace the mineral substrate (calcium) and the hormone (active vitamin D) needed for bone mineralization and absorption.
WHY PATIENT GETS IT	Osteoporosis prevention/adjunct (paired with every antiresorptive/anabolic agent), hypocalcemia, vitamin-D deficiency.

MUST-ASSESS BEFORE	Serum calcium & renal function (avoid loading in CKD/hypercalcemia), kidney-stone history, current meds (binding interactions), achlorhydria/PPI use (favor citrate).
KEY LABS / MONITORING	Serum calcium, 25-OH vitamin D, creatinine; 24-h urine calcium if stones.
MOST DANGEROUS EFFECT	Hypercalcemia, nephrolithiasis, milk-alkali syndrome (with antacid overuse), constipation/ileus.
COMMON SIDE EFFECTS	Constipation, bloating, gas; metallic taste.
HOLD / NOTIFY PROVIDER	Calcium >10.5 mg/dL, symptoms of stones, severe constipation.
ANTIDOTE / REVERSAL	None; hydration ± loop diuretic for hypercalcemia.
PATIENT TEACHING	Carbonate with food , citrate with or without; limit to ~500–600 mg elemental calcium per dose; plenty of fluids; separate by ≥2 h from levothyroxine, tetracyclines, fluoroquinolones, iron, and bisphosphonates (calcium binds them).
NURSING ACTION	Stagger administration times; teach elemental vs. salt dosing; monitor bowel pattern.
NGN CUE	Client on calcium carbonate + a daily antacid develops nausea, confusion, and serum Ca 11.8 → milk-alkali/hypercalcemia from combined intake.

Q · A client takes levothyroxine and is starting calcium carbonate. What is the priority instruction?

Separate the two medications by at least 4 hours. Calcium chelates levothyroxine and markedly reduces its absorption, risking hypothyroidism, so spacing is essential. Taking them together defeats both; doubling the levothyroxine is unsafe and not nurse-directed; stopping calcium is unnecessary if timed correctly.

⦿ **TIP** Calcium is the great **binder** — it grabs levo, -cyclines, -floxacin, iron, and bisphosphonates. Any combo question → **separate the doses**.

MSK-07

Cyclobenzaprine

Flexeril — centrally acting muscle relaxant

COMMONLY TESTED

MECHANISM (SIMPLE)	Acts in the brainstem to reduce tonic motor activity; structurally a tricyclic , so it carries anticholinergic/serotonergic properties.
WHY PATIENT GETS IT	Short-term (≤2–3 weeks) relief of acute musculoskeletal spasm , usually with rest and physical therapy.
MUST-ASSESS BEFORE	Cardiac history (recent MI, arrhythmia, heart block), MAOI use within 14 days (contraindicated) , hyperthyroidism, narrow-angle glaucoma, serotonergic meds, age (Beers — avoid in elderly).
KEY LABS / MONITORING	None routine; ECG if cardiac risk.
MOST DANGEROUS EFFECT	Anticholinergic toxicity, cardiac dysrhythmias, and serotonin syndrome when combined with SSRIs/SNRIs/MAOIs/tramadol.
COMMON SIDE EFFECTS	Drowsiness, dizziness, dry mouth, constipation, urinary retention.
HOLD / NOTIFY PROVIDER	Concurrent MAOI, recent MI/arrhythmia, signs of serotonin syndrome (hyperthermia, clonus, agitation).
ANTIDOTE / REVERSAL	None; supportive care, benzodiazepines/cyproheptadine for serotonin syndrome.
PATIENT TEACHING	No alcohol or other CNS depressants; do not drive until effects known; short course only; rise slowly (fall risk); relieve dry mouth with sips/sugar-free gum.
NURSING ACTION	Screen for MAOIs/serotonergics; institute fall precautions, especially in older adults.

NGN CUE	An older adult on cyclobenzaprine + sertraline becomes agitated with tremor, sweating, and a temp of 38.9 °C → serotonin syndrome from a TCA-like + SSRI combination.
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Q · Which home medication is MOST important to report before a client begins cyclobenzaprine?

Phenelzine (an MAOI) taken last week. Combining cyclobenzaprine with an MAOI within 14 days risks hypertensive crisis and serotonin syndrome — an absolute contraindication. Acetaminophen, a multivitamin, and an inhaled corticosteroid pose no comparable interaction.

© **TIP** Cyclobenzaprine = “TCA in disguise.” Same MAOI ban, anticholinergic load, and serotonin-syndrome risk as tricyclic antidepressants.

MSK-08

Baclofen

Lioresal — oral & intrathecal antispasticity agent

HIGH-RISK · SAFETY-ALERT

MECHANISM (SIMPLE)	GABA-B receptor agonist in the spinal cord that depresses reflex transmission → reduces spasticity.
WHY PATIENT GETS IT	Spasticity from multiple sclerosis, spinal-cord injury, or cerebral palsy.
MUST-ASSESS BEFORE	Baseline spasticity/function, renal function (renally cleared), seizure history, intrathecal pump integrity/alarms.
KEY LABS / MONITORING	None routine; renal function.
MOST DANGEROUS EFFECT	Abrupt withdrawal — especially intrathecal pump failure — causes high fever, rebound rigidity/severe spasticity, pruritus, seizures, rhabdomyolysis, and multi-organ failure (life-threatening). Overdose → CNS & respiratory depression, coma.
COMMON SIDE EFFECTS	Sedation, dizziness, muscle weakness, fatigue, nausea.
HOLD / NOTIFY PROVIDER	Never stop abruptly — must taper. Pump malfunction/empty reservoir = emergency.
ANTIDOTE / REVERSAL	No specific antidote; restart/replace baclofen urgently for withdrawal; supportive ICU care; ventilatory support for overdose.
PATIENT TEACHING	Do not stop suddenly; report pump alarms immediately; expect some weakness; avoid alcohol/CNS depressants; fall precautions.
NURSING ACTION	Taper on discontinuation; treat pump alarms as urgent; monitor for withdrawal fever/rigidity.

NGN CUE A spinal-cord-injury client whose intrathecal baclofen pump alarmed overnight now has fever, severe rebound spasticity, itching, and confusion → acute baclofen withdrawal, a medical emergency mimicking NMS/sepsis.

Q · A client with an intrathecal baclofen pump reports the pump has been alarming and now has fever and worsening rigidity. What is the priority nursing action?

Treat as a withdrawal emergency — notify provider/rapid response and prepare to restore baclofen. Abrupt intrathecal baclofen loss is life-threatening (hyperthermia, rhabdo, organ failure); rapid re-dosing and supportive care are critical. Administering acetaminophen for fever, simply documenting the alarm, or scheduling routine pump service all dangerously delay treatment.

© **TIP** Baclofen's NCLEX trap is **WITHDRAWAL, not the drug itself**. Sudden stop = fever + rigidity + seizures. Always taper; pump alarm = emergency.

MSK-09

Tizanidine

Zanaflex — central alpha-2 antispasticity agent

COMMONLY TESTED

MECHANISM (SIMPLE)	Central alpha-2 adrenergic agonist that reduces excitatory motor neurotransmitter release → decreases spasticity.
WHY PATIENT GETS IT	Spasticity (MS, spinal-cord injury); short-acting, often dosed around activities.
MUST-ASSESS BEFORE	Baseline BP/HR (hypotension risk), hepatic function, CYP1A2 inhibitors — ciprofloxacin and fluvoxamine are contraindicated (they spike levels), concurrent antihypertensives.

KEY LABS / MONITORING	LFTs at baseline and periodically.
MOST DANGEROUS EFFECT	Marked hypotension/bradycardia, sedation, hepatotoxicity , and rebound hypertension/tachycardia with abrupt withdrawal.
COMMON SIDE EFFECTS	Dry mouth, somnolence, dizziness, weakness.
HOLD / NOTIFY PROVIDER	Symptomatic hypotension, rising LFTs, concurrent ciprofloxacin/fluvoxamine.
ANTIDOTE / REVERSAL	None; supportive care.
PATIENT TEACHING	Rise slowly (orthostasis); avoid alcohol; do not stop abruptly ; report dark urine/jaundice; keep consistent dosing relative to food.
NURSING ACTION	Monitor BP & LFTs; screen for CYP1A2 interactions; taper on discontinuation.

NGN CUE A client on tizanidine prescribed **ciprofloxacin** becomes profoundly **hypotensive and sedated** → the antibiotic blocked tizanidine metabolism, causing toxicity.

Q · A client on tizanidine develops a UTI. Which antibiotic order should the nurse question?

Ciprofloxacin. It strongly inhibits CYP1A2, dramatically increasing tizanidine levels and causing severe hypotension and sedation — a contraindicated combination. Nitrofurantoin, cephalexin, and TMP-SMX do not have this major interaction with tizanidine.

☉ **TIP** Tizanidine vs clonidine — both **alpha-2 agonists** → think **low BP + sedation**. Killer combo on NCLEX = **cipro** (CYP1A2).

MSK-10

Dantrolene

Dantrium / Ryanodex — direct muscle relaxant

EMERGENCY · HIGH-RISK

MECHANISM (SIMPLE)	Acts directly on skeletal muscle, blocking calcium release from the sarcoplasmic reticulum (ryanodine receptor) → uncouples excitation-contraction.
WHY PATIENT GETS IT	First-line antidote for malignant hyperthermia (IV) ; also neuroleptic malignant syndrome and chronic spasticity (oral).
MUST-ASSESS BEFORE	For MH: rising EtCO ₂ , masseter/generalized rigidity, hyperthermia, tachycardia. For oral therapy: baseline LFTs, ambulation/weakness.
KEY LABS / MONITORING	LFTs (chronic oral use); CK, ABG, electrolytes, myoglobin during MH crisis.
MOST DANGEROUS EFFECT	Hepatotoxicity (BLACK BOX) with chronic oral use ; profound muscle weakness and respiratory compromise; with IV — thrombophlebitis, tissue necrosis on extravasation.
COMMON SIDE EFFECTS	Drowsiness, dizziness, diarrhea, generalized weakness.
HOLD / NOTIFY PROVIDER	Significant LFT elevation (oral); reassess if excessive weakness impairs swallowing/breathing.
ANTIDOTE / REVERSAL	Dantrolene IS the antidote (for MH); discontinue triggering anesthetic agents.
PATIENT TEACHING	Chronic oral — monitor for jaundice/dark urine; expect some weakness; avoid alcohol; rise slowly.
NURSING ACTION	For MH: reconstitute and push rapidly (2.5 mg/kg IV, repeat to ~10 mg/kg) , stop trigger agents, cool the patient, treat hyperkalemia/acidosis. Keep MH cart stocked.

NGN CUE During general anesthesia a client shows **rapidly rising end-tidal CO₂**, **jaw rigidity**, and **temperature climbing to 40 °C** → malignant hyperthermia; give IV dantrolene now.

Q · During surgery a client develops masseter rigidity and a sharply rising EtCO₂. After stopping the trigger agent, what is the priority medication?

IV dantrolene. It directly halts the runaway calcium release driving malignant hyperthermia and is the definitive treatment. Antipyretics don't address the muscle pathology; succinylcholine is itself a trigger; a benzodiazepine treats agitation, not MH.

© **TIP** Dantrolene = the only drug that works at the muscle's calcium store. MH crisis → "Stop trigger, push Dantrolene, cool."

MSK-11

Allopurinol

Zyloprim — xanthine oxidase inhibitor (urate-lowering)

SAFETY-ALERT · TEACHING-HEAVY

MECHANISM (SIMPLE)	Inhibits xanthine oxidase , reducing uric-acid production → chronic prevention of gout (does NOT treat an acute attack).
WHY PATIENT GETS IT	Chronic/tophaceous gout, recurrent uric-acid stones, tumor-lysis-syndrome prophylaxis.
MUST-ASSESS BEFORE	Renal function (dose-adjust), ethnicity/HLA-B*5801 risk (Han Chinese, Thai, Korean, African descent) , current azathioprine/6-MP or ampicillin, skin baseline, hydration.
KEY LABS / MONITORING	Serum uric acid (goal <6 mg/dL), CBC, LFTs, creatinine.
MOST DANGEROUS EFFECT	Stevens-Johnson syndrome / TEN / DRESS hypersensitivity , hepatotoxicity, and bone-marrow suppression.
COMMON SIDE EFFECTS	GI upset, drowsiness, gout flare on initiation (co-prescribe prophylaxis).
HOLD / NOTIFY PROVIDER	ANY new rash → stop immediately ; do not initiate during an acute attack; signs of marrow suppression.
ANTIDOTE / REVERSAL	None; discontinue and treat hypersensitivity aggressively.
PATIENT TEACHING	Stop and report any rash at once ; drink 2-3 L fluid/day; takes weeks to work; if already taking it, continue through an acute flare; avoid large alcohol intake.
NURSING ACTION	Inspect skin; reduce azathioprine/6-MP dose markedly; ensure flare prophylaxis (colchicine/NSAID) when starting.

NGN CUE Two weeks after starting allopurinol a client develops a **diffuse rash with mucosal blistering and fever** → Stevens-Johnson reaction; stop the drug and escalate immediately.

Q · A client started on allopurinol calls reporting a new spreading rash. What is the nurse's priority response?

Tell the client to stop the drug and seek care immediately. A new rash on allopurinol can herald Stevens-Johnson syndrome/TEN, a life-threatening hypersensitivity, so prompt discontinuation and evaluation are critical. Advising an antihistamine and continuing, waiting to see if it spreads, or applying lotion all dangerously delay recognition of SJS.

© **TIP** Allopurinol = **PREVENTS** gout (long-term), never rescues an attack. NCLEX red flag = **rash → STOP** (think SJS, esp. Asian/African ancestry).

MSK-12

Febuxostat

Uloric — non-purine xanthine oxidase inhibitor

COMMONLY TESTED

MECHANISM (SIMPLE)	Selective xanthine oxidase inhibitor (non-purine), lowering serum uric acid for chronic gout.
WHY PATIENT GETS IT	Chronic gout when allopurinol is not tolerated or ineffective.
MUST-ASSESS BEFORE	Cardiovascular history (CV-death risk), hepatic function, current azathioprine/6-MP, baseline uric acid.
KEY LABS / MONITORING	Serum uric acid, LFTs, renal function.
MOST DANGEROUS EFFECT	Increased cardiovascular death vs. allopurinol (BLACK BOX) , hepatotoxicity, severe hypersensitivity, gout flare on initiation.

COMMON SIDE EFFECTS	Nausea, arthralgia, rash, elevated LFTs.
HOLD / NOTIFY PROVIDER	New chest pain/cardiac symptoms, rising LFTs, rash.
ANTIDOTE / REVERSAL	None; discontinue.
PATIENT TEACHING	Continue daily even during flares; co-medicated with flare prophylaxis at start; report chest pain, jaundice, rash; routine LFT checks.
NURSING ACTION	Monitor LFTs and cardiac status; reserve for allopurinol-intolerant clients.
NGN CUE	A client with coronary disease on febuxostat reports new exertional chest pain → the drug's cardiovascular black-box risk emerging.

Q · Which client history would most concern the nurse before starting febuxostat?

Recent myocardial infarction. Febuxostat carries a black-box warning for increased cardiovascular death, making known cardiac disease the key concern. Mild seasonal allergies, controlled hypertension alone, and a remote tonsillectomy are not specific contraindications.

⦿ **TIP** Allopurinol and febuxostat are **twins** (xanthine oxidase, urate-lowering, prevention). Febuxostat's distinguishing flag = **cardiovascular risk**.

MSK-13 Colchicine

Colcrys — anti-inflammatory for gout

SAFETY-ALERT · HIGH-RISK

MECHANISM (SIMPLE)	Disrupts microtubules and neutrophil migration → blunts the inflammatory response to urate crystals (treats acute flare & prophylaxis; does NOT lower uric acid).
WHY PATIENT GETS IT	Acute gout attack and prophylaxis during initiation of urate-lowering therapy; pericarditis/familial Mediterranean fever.
MUST-ASSESS BEFORE	Renal & hepatic function (major dose reduction), CYP3A4/P-glycoprotein inhibitors — clarithromycin, statins, diltiazem, cyclosporine (toxicity/rhabdo), GI baseline.
KEY LABS / MONITORING	CBC (marrow suppression), CK (myopathy), renal/hepatic function.
MOST DANGEROUS EFFECT	Narrow therapeutic index — fatal in overdose with NO antidote ; GI toxicity, bone-marrow suppression, and neuromyopathy/rhabdomyolysis.
COMMON SIDE EFFECTS	Diarrhea, nausea, vomiting, abdominal cramping — and diarrhea is the earliest sign of toxicity .
HOLD / NOTIFY PROVIDER	New or worsening diarrhea/vomiting → hold and reassess (early toxicity), muscle weakness, low counts.
ANTIDOTE / REVERSAL	No antidote ; supportive care; never exceed dosing limits.
PATIENT TEACHING	Take at the first sign of a flare , never exceed prescribed dose, stop and call if diarrhea/vomiting develops , avoid grapefruit and interacting drugs, report muscle weakness.
NURSING ACTION	Enforce strict dose limits; monitor GI symptoms as a toxicity marker; check for CYP3A4/P-gp interactions.
NGN CUE	A client treating a gout flare with colchicine develops profuse diarrhea and vomiting → earliest sign of colchicine toxicity; hold and notify, because overdose is potentially fatal.

Q · A client taking colchicine for acute gout reports new severe diarrhea. What does the nurse recognize this as?

An early sign of colchicine toxicity requiring the drug be held. GI symptoms, especially diarrhea, are the first manifestation of colchicine toxicity, which can progress to fatal multi-organ failure with no antidote. It is not an expected harmless effect to push fluids through, not a sign the gout is resolving, and not an indication to increase the dose.

⦿ **TIP** Colchicine treats the **inflammation**, not the uric acid. Razor-thin safety margin: **diarrhea = the toxicity alarm**. No antidote.

MSK-14

Probenecid

uricosuric agent

COMMONLY TESTED

MECHANISM (SIMPLE)	Blocks renal tubular reabsorption of uric acid → increases urinary uric-acid excretion (uricosuric).
WHY PATIENT GETS IT	Chronic gout in clients who under-excrete urate with normal renal function; can prolong penicillin levels.
MUST-ASSESS BEFORE	Renal function (avoid if impaired), kidney-stone/uric-acid-stone history, current salicylates (antagonize effect), hydration status.
KEY LABS / MONITORING	Serum & urinary uric acid, renal function.
MOST DANGEROUS EFFECT	Uric-acid nephrolithiasis (stone formation), severe hypersensitivity, blood dyscrasias.
COMMON SIDE EFFECTS	GI upset, headache, flushing.
HOLD / NOTIFY PROVIDER	Acute gout attack (don't start during), signs of stones, hypersensitivity.
ANTIDOTE / REVERSAL	None.
PATIENT TEACHING	Drink 2–3 L fluid/day and keep urine alkaline to prevent stones; avoid aspirin/salicylates (they cancel the drug); continue through flares once established.
NURSING ACTION	Promote hydration/alkalinization; screen for salicylate use; not for clients with stones or renal impairment.

NGN CUE A client on probenecid taking daily aspirin reports **no improvement in gout and rising uric acid** → salicylates are antagonizing the uricosuric effect.

Q · Which instruction is most important for a client starting probenecid?

Drink at least 2–3 liters of fluid each day. Increasing urinary uric acid raises stone risk, so high fluid intake (with urine alkalinization) is essential. Taking it only during attacks misunderstands its preventive role; combining it with daily aspirin antagonizes it; restricting fluids would worsen stone risk.

⦿ **TIP** Probenecid **PROBES** the **urine** to dump uric acid – needs **lots of water + no aspirin**. Contrast with allopurinol, which blocks production.

MSK-15

Methotrexate (low-dose RA)

Rheumatrex / Trexall — anchor DMARD

HIGH-RISK · SAFETY-ALERT

MECHANISM (SIMPLE)	Folate antagonist (dihydrofolate-reductase inhibitor); at low weekly doses it is anti-inflammatory/immunomodulatory.
WHY PATIENT GETS IT	Rheumatoid arthritis (first-line DMARD), psoriatic arthritis, severe psoriasis (separate high-dose regimens treat malignancy).
MUST-ASSESS BEFORE	Confirm WEEKLY dosing (daily dosing is fatal) , pregnancy/contraception (teratogen — black box), CBC, LFTs, renal function, baseline CXR (pneumonitis), alcohol use, live-vaccine status.
KEY LABS / MONITORING	CBC with differential, LFTs, creatinine — baseline and periodic; folate.
MOST DANGEROUS EFFECT	Dosing error (daily instead of weekly) → fatal toxicity ; hepatotoxicity/fibrosis, myelosuppression , pneumonitis/pulmonary fibrosis , mucositis, and teratogenicity (BLACK BOX).
COMMON SIDE EFFECTS	Nausea, stomatitis, fatigue, alopecia, photosensitivity.

HOLD / NOTIFY PROVIDER	Signs of infection/low counts, new dry cough/dyspnea (pneumonitis), mouth ulcers, rising LFTs, pregnancy.
ANTIDOTE / REVERSAL	Leucovorin (folinic acid) rescue; glucarpidase for high-dose/renal toxicity.
PATIENT TEACHING	Take ONCE WEEKLY — never daily ; daily folic acid (not on the MTX day) reduces side effects; avoid alcohol; use reliable contraception; report cough, dyspnea, sore mouth, fever, bleeding; sun protection.
NURSING ACTION	Double-check the weekly schedule on every encounter; monitor CBC/LFTs; assess for pulmonary & mucosal toxicity.

NGN CUE A client with RA states, “I take my methotrexate every morning with breakfast” — a dosing error; weekly drug taken daily → impending pancytopenia and mucositis, a medication-safety emergency.

Q · During teaching, a client with rheumatoid arthritis says she takes methotrexate every day. What is the nurse's priority action?

Stop and clarify the dosing immediately — methotrexate for RA is dosed once weekly. Daily administration causes life-threatening bone-marrow suppression and mucositis, so correcting this error is the top safety priority. Reinforcing folic acid, discussing alcohol, or reviewing sun protection are all appropriate later but secondary to the lethal dosing error.

© **TIP** Low-dose MTX = **ONCE A WEEK**; the #1 NCLEX kill-shot is daily dosing. Pair with **folic acid**; rescue agent = **leucovorin**. Watch lungs + counts.

MSK-16

Hydroxychloroquine

Plaquenil — antimalarial DMARD

COMMONLY TESTED

MECHANISM (SIMPLE)	Antimalarial immunomodulator that dampens autoimmune inflammatory activity (exact MOA multifactorial).
WHY PATIENT GETS IT	Rheumatoid arthritis and systemic lupus erythematosus.
MUST-ASSESS BEFORE	Baseline ophthalmologic exam, cardiac history (QT), G6PD status (hemolysis), pregnancy (generally continued in lupus per provider).
KEY LABS / MONITORING	CBC, LFTs; ECG if cardiac risk; periodic eye exams.
MOST DANGEROUS EFFECT	Irreversible retinopathy / vision loss , QT prolongation/cardiomyopathy, hemolysis in G6PD deficiency.
COMMON SIDE EFFECTS	GI upset, headache, skin/hair pigment changes.
HOLD / NOTIFY PROVIDER	Any new visual disturbance, significant QT prolongation, signs of cardiomyopathy.
ANTIDOTE / REVERSAL	None.
PATIENT TEACHING	Baseline and annual eye exams ; report any vision change (blurring, halos, reading difficulty) immediately; takes weeks–months; take with food.
NURSING ACTION	Ensure ophthalmology follow-up; teach to report visual symptoms early.

NGN CUE A client on long-term hydroxychloroquine reports **trouble reading and seeing colors** → early retinal toxicity; report promptly to prevent permanent loss.

Q · Which assessment is essential before and during hydroxychloroquine therapy?

Regular ophthalmologic (retinal) examination. Hydroxychloroquine can cause irreversible retinopathy, so baseline and periodic eye exams are mandatory to catch toxicity early. Routine pulmonary-function testing, daily weights, and frequent INR checks are not specific monitoring requirements for this drug.

© **TIP** Hydroxychloroquine → think **EYES**. Vision change = report now. (Also a QT-prolonging, G6PD-sensitive drug.)

MSK-17

Sulfasalazine

Azulfidine — conventional DMARD

COMMONLY TESTED

MECHANISM (SIMPLE)	Cleaved to 5-aminosalicylate (anti-inflammatory) plus sulfapyridine; reduces synovial/bowel inflammation.
WHY PATIENT GETS IT	Rheumatoid arthritis and inflammatory bowel disease.
MUST-ASSESS BEFORE	Sulfa allergy , G6PD deficiency (hemolysis), CBC/LFTs, hydration, pregnancy.
KEY LABS / MONITORING	CBC with differential (agranulocytosis), LFTs, renal function.
MOST DANGEROUS EFFECT	Agranulocytosis/blood dyscrasias, hepatotoxicity, Stevens-Johnson syndrome, hemolytic anemia (G6PD).
COMMON SIDE EFFECTS	Nausea, headache, harmless orange-yellow discoloration of urine/skin/contact lenses , photosensitivity, reversible oligospermia.
HOLD / NOTIFY PROVIDER	Sore throat/fever (agranulocytosis), rash/blistering, jaundice.
ANTIDOTE / REVERSAL	None; discontinue.
PATIENT TEACHING	Expect orange-yellow urine/skin (normal) ; report sore throat/fever/easy bruising; folic-acid supplement; increase fluids; sun protection; take after meals.
NURSING ACTION	Verify no sulfa allergy; monitor CBC; reassure about color change.

NGN CUE A client on sulfasalazine develops a **fever and sore throat** → possible agranulocytosis; obtain CBC and notify provider (not just a routine cold).

Q · A client beginning sulfasalazine asks why the urine turned orange. What is the nurse's best response?

“This is a harmless, expected color change from the medication.” Sulfasalazine commonly tints urine, skin, and soft contact lenses orange-yellow without harm. It does not indicate kidney damage, liver failure, or dehydration; reassurance prevents unnecessary alarm or discontinuation.

© **TIP** Sulfasalazine = **SULFA** drug → allergy + G6PD + marrow caution. The benign trick answer is the **orange urine**. Danger sign = **fever/sore throat**.

MSK-18

TNF-α Inhibitors / Biologics

etanercept · adalimumab · infliximab

HIGH-RISK

MECHANISM (SIMPLE)	Monoclonal antibodies / fusion proteins that neutralize tumor necrosis factor-α , suppressing the inflammatory cascade.
WHY PATIENT GETS IT	Moderate-severe RA, psoriatic arthritis, ankylosing spondylitis, IBD, plaque psoriasis.
MUST-ASSESS BEFORE	Screen for latent TB (PPD/IGRA) and hepatitis B BEFORE starting ; active infection, heart-failure status, demyelinating disease, malignancy history, no live vaccines , pregnancy.
KEY LABS / MONITORING	TB test, hepatitis panel, CBC, LFTs.
MOST DANGEROUS EFFECT	Serious infections/sepsis and reactivation of latent TB (and fungal infections), lymphoma/malignancy (BLACK BOX) , demyelinating disease, worsening heart failure.

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COMMON SIDE EFFECTS	Injection-site/infusion reactions, headache, upper-respiratory infections.
HOLD / NOTIFY PROVIDER	Any active infection, fever, or signs of TB; new neurologic deficits; worsening HF.
ANTIDOTE / REVERSAL	None; treat infection aggressively; complete latent-TB therapy first.

PATIENT TEACHING	Report any infection signs/fever immediately; no live vaccines; rotate SubQ sites; refrigerate (don't freeze); attend TB/labs follow-up; avoid contact with sick persons.
NURSING ACTION	Confirm negative TB screen before first dose; monitor for infection; ensure vaccines updated (inactivated) pre-therapy.
NGN CUE	A client on adalimumab develops night sweats, a productive cough, and unintended weight loss → reactivation of latent tuberculosis from TNF blockade.

Q · Which screening is mandatory before initiating a TNF- α inhibitor?

Tuberculosis screening (PPD or IGRA). TNF inhibitors can reactivate latent TB into disseminated disease, so screening — and treating latent TB — must precede therapy. A bone-density scan, lipid panel, and pulmonary-function test are not the required pre-biologic safety screens.

⦿ **TIP** Biologic DMARDs ending in -mab/-cept = immunosuppression. Two anchors: check TB first and no live vaccines. Any fever = stop & assess.

MSK-19 **NSAIDs**
ibuprofen · naproxen · ketorolac · celecoxib (COX-2)

COMMONLY TESTED · SAFETY-ALERT

MECHANISM (SIMPLE)	Inhibit cyclooxygenase (COX) → ↓ prostaglandins → anti-inflammatory, analgesic, antipyretic; celecoxib is COX-2 selective (less GI, no platelet effect).
WHY PATIENT GETS IT	Musculoskeletal pain & inflammation, osteoarthritis/RA symptom control, acute gout flare, dysmenorrhea.
MUST-ASSESS BEFORE	Renal function , GI-bleed/ulcer history, BP/heart-failure status, anticoagulant/antiplatelet use, dehydration, sulfa allergy (celecoxib), pregnancy (avoid 3rd trimester).
KEY LABS / MONITORING	Creatinine/BUN, CBC/H&H (occult bleed), BP.
MOST DANGEROUS EFFECT	GI bleeding/ulceration/perforation (BLACK BOX) , acute kidney injury, and cardiovascular thrombotic events — MI/stroke (BLACK BOX); ketorolac limited to ≤5 days.
COMMON SIDE EFFECTS	Dyspepsia, fluid retention/edema, ↑ BP, headache.
HOLD / NOTIFY PROVIDER	Black/tarry stools, rising creatinine, significant BP rise, ketorolac beyond 5 days.
ANTIDOTE / REVERSAL	None; PPI for GI protection, discontinue and treat bleed.
PATIENT TEACHING	Take with food ; stay hydrated; watch for black stools, abdominal pain, decreased urine ; don't combine multiple NSAIDs; limit alcohol; report swelling/weight gain.
NURSING ACTION	Monitor renal function, BP, and GI signs; add gastroprotection in high-risk clients; cap ketorolac at 5 days.
NGN CUE	An older client on ketorolac for 6 days has black tarry stools and a creatinine rise from 0.9 to 1.7 → GI bleed plus NSAID-induced AKI; stop the drug.

Q · An older adult with heart failure asks about taking ibuprofen for knee pain. What is the nurse's best guidance?

Avoid ibuprofen because NSAIDs worsen fluid retention, blood pressure, and kidney function in heart failure. NSAIDs cause sodium/water retention and renal vasoconstriction, exacerbating HF, so acetaminophen is generally preferred. Taking it on a full stomach, doubling the dose, or combining it with aspirin does not resolve the underlying cardiorenal risk.

⦿ **TIP** NSAID triad of harm = **Gut, Kidney, Heart**. Ketorolac ≤5 days. Celecoxib spares the stomach but still hits kidneys/heart and carries a **sulfa** caution.

MSK-20

Acute-Spasm Relaxants

methocarbamol · carisoprodol · metaxalone

COMMONLY TESTED

MECHANISM (SIMPLE)	Central nervous-system depressants that reduce acute muscle spasm (no direct action on muscle fiber).
WHY PATIENT GETS IT	Short-term relief of acute, painful musculoskeletal spasm alongside rest/PT.
MUST-ASSESS BEFORE	Sedation/fall risk, CNS-depressant use (alcohol/opioids/benzos), substance-misuse history (carisoprodol), driving needs, hepatic function.
KEY LABS / MONITORING	None routine.
MOST DANGEROUS EFFECT	Excess sedation/respiratory depression with other depressants; carisoprodol → metabolized to meprobamate → dependence, abuse, and withdrawal seizures.
COMMON SIDE EFFECTS	Drowsiness, dizziness, dry mouth; methocarbamol may turn urine brown/green/black (harmless).
HOLD / NOTIFY PROVIDER	Oversedation, signs of misuse/withdrawal (carisoprodol).
ANTIDOTE / REVERSAL	None; supportive care.
PATIENT TEACHING	Avoid alcohol and other CNS depressants; do not drive; short-term use only; rise slowly; reassure about urine color (methocarbamol).
NURSING ACTION	Fall precautions; screen for depressant stacking; limit carisoprodol duration and watch for misuse.

NGN CUE

A client taking carisoprodol with oxycodone and a bedtime drink is found **excessively sedated with shallow respirations** → additive CNS/respiratory depression.

Q · Which combination would most concern the nurse for a client prescribed carisoprodol?

Daily alcohol use plus an opioid prescription. Carisoprodol's CNS depression is additive with alcohol and opioids, risking respiratory depression, and it also carries dependence potential. A daily multivitamin, topical analgesic, or seasonal antihistamine pose far less additive sedation risk.

© **TIP** These are “**acute spasm, short-term, sedating**” drugs. Carisoprodol is the **abuse/dependence** standout; methocarbamol's trick = **colored urine.**

MSK-21

Recombinant Uricase

pegloticase (gout) · rasburicase (tumor lysis)

HIGH-RISK

MECHANISM (SIMPLE)	Enzyme that converts uric acid to allantoin (water-soluble, readily excreted) → rapidly lowers urate.
WHY PATIENT GETS IT	Refractory chronic gout (pegloticase, IV) and prevention/treatment of tumor-lysis hyperuricemia (rasburicase).
MUST-ASSESS BEFORE	Screen for G6PD deficiency BEFORE giving (hemolysis/methemoglobinemia), infusion-reaction risk, pre-medication (antihistamine/corticosteroid), cardiac status.
KEY LABS / MONITORING	G6PD activity, uric acid, CBC, methemoglobin if symptomatic.
MOST DANGEROUS EFFECT	Anaphylaxis & infusion reactions (BLACK BOX — premedicate, infuse slowly); in G6PD deficiency → severe hemolytic anemia and methemoglobinemia.
COMMON SIDE EFFECTS	Gout flare, nausea, chest discomfort during infusion.
HOLD / NOTIFY PROVIDER	Known/positive G6PD deficiency, any infusion-reaction signs (flushing, dyspnea, hypotension).
ANTIDOTE / REVERSAL	None specific; stop infusion, treat anaphylaxis (epinephrine), methylene blue is avoided in G6PD methemoglobinemia.

PATIENT TEACHING	Given as an IV infusion under monitoring ; report itching, throat tightness, dizziness during infusion; expect possible flare.
NURSING ACTION	Verify G6PD result; premedicate; have emergency anaphylaxis equipment; monitor closely during/after infusion.
NGN CUE	During a pegloticase infusion the client develops flushing, wheezing, and hypotension → infusion/anaphylactic reaction; stop the infusion and treat.

Q · What must be confirmed before administering rasburicase or pegloticase?

The client is not G6PD deficient. These uricase enzymes generate hydrogen peroxide; in G6PD deficiency this causes severe hemolysis and methemoglobinemia, so screening is mandatory. Confirming NPO status, recent potassium level, or last bowel movement is not the relevant pre-administration safety check.

© **TIP** Uricase drugs **“eat” uric acid fast**. Two safety anchors: **check G6PD first** and **watch for anaphylaxis** during infusion.

MSK-22

Glucocorticoids in MSK

prednisone · methylprednisolone · intra-articular triamcinolone

TEACHING-HEAVY · SAFETY-ALERT

MECHANISM (SIMPLE)	Broad anti-inflammatory and immunosuppressive action via suppression of inflammatory mediators and immune cells.
WHY PATIENT GETS IT	RA/lupus flares, acute gout flare (short burst), bursitis/tendinitis (intra-articular), bridging therapy while DMARDs take effect.
MUST-ASSESS BEFORE	Blood glucose (esp. diabetics), infection/TB status, BP, GI-ulcer risk, bone density/osteoporosis risk, current duration of therapy (adrenal suppression).
KEY LABS / MONITORING	Glucose, electrolytes (K ⁺ , Na ⁺), CBC, bone density for chronic use.
MOST DANGEROUS EFFECT	Adrenal crisis if stopped abruptly (must taper) , masked infection/sepsis, hyperglycemia, GI bleed, osteoporosis/avascular necrosis, Cushingoid changes.
COMMON SIDE EFFECTS	Weight gain, mood changes, insomnia, fluid retention, increased appetite, hyperglycemia.
HOLD / NOTIFY PROVIDER	Active untreated infection (relative), abrupt discontinuation, signs of GI bleed.
ANTIDOTE / REVERSAL	None; stress-dose steroids for adrenal insufficiency during illness/surgery.
PATIENT TEACHING	Never stop suddenly — taper as ordered ; take with food in the morning; monitor glucose; report infection signs (fever may be blunted); calcium/Vit D for bones; carry steroid alert.
NURSING ACTION	Reinforce tapering; monitor glucose and infection; teach stress-dosing; gastroprotection in high-risk clients.

NGN CUE	A diabetic client on prednisone for an RA flare has a fasting glucose of 318 and reports increased thirst → steroid-induced hyperglycemia requiring management.
---------	--

Q · A client on chronic prednisone says, “I felt better so I stopped taking it three days ago.” What complication is the nurse most concerned about?

Acute adrenal insufficiency (adrenal crisis). Chronic steroids suppress the adrenal axis; abrupt withdrawal can cause hypotension, hypoglycemia, and shock, so steroids must be tapered. Rebound joint pain is uncomfortable but not life-threatening; hyperglycemia and weight gain relate to continued use, not abrupt cessation.

© **TIP** Steroids: **never stop cold — TAPER**. Think the long-term cost set — **sugar up, immunity down, bone down, mood up** — and stress-dose when sick.

§ 02

5 MUST-NOT-MISS SAFETY RULES

MEMORIZE COLD

1 Bisphosphonate & oral-DMARD positioning

Alendronate/risedronate must be taken on an empty stomach with a full glass of plain water, and the client **must stay upright for ≥30 minutes** (60 for ibandronate). Lying down or taking it with food causes severe esophageal erosion. **Never give to a client who cannot sit or stand upright.**

2 Methotrexate is dosed ONCE WEEKLY for RA

Low-dose methotrexate for rheumatoid arthritis is taken **once a week**. **Daily dosing is a lethal medication error** causing pancytopenia and mucositis. Always verify the weekly schedule, supplement **folic acid**, and know the rescue agent is **leucovorin**.

3 Never stop baclofen or chronic steroids abruptly

Abrupt baclofen withdrawal (especially intrathecal pump failure) → fever, rebound spasticity, seizures, rhabdomyolysis — life-threatening. **Abrupt glucocorticoid withdrawal** → adrenal crisis (hypotension, shock). Both require a **taper**; a baclofen pump alarm is an emergency.

4 A new rash on allopurinol = STOP the drug

Any new rash during allopurinol therapy may signal **Stevens-Johnson syndrome / TEN** — discontinue immediately and escalate. Risk is highest in clients of **Han Chinese, Thai, Korean, or African descent (HLA-B*5801)**. Allopurinol prevents gout; it never treats an acute attack.

5 Screen TB before biologics; check G6PD before uricase

TNF-α inhibitors reactivate latent TB — screen (PPD/IGRA) and give **no live vaccines**; any fever/infection means hold and assess. **Pegloticase/rasburicase** cause hemolysis in **G6PD deficiency** — confirm G6PD status and watch for anaphylaxis during infusion.

§ 03

5 DOSAGE / SAFETY CALCULATIONS

WORK SHOWN

1 Weekly methotrexate — catch the error

An RA client is prescribed **methotrexate 15 mg PO once weekly**. Tablets are 2.5 mg. How many tablets per **weekly** dose, and what schedule safety check must the nurse make?

```
Tablets per dose = ordered dose ÷ tablet strength
                  = 15 mg ÷ 2.5 mg/tab
                  = 6 tablets, taken ONCE on the same day each week
Safety check: confirm the MAR/label reads "weekly," not "daily."
```

✓ 6 tablets once weekly. If any record says "daily," stop and clarify — daily dosing is fatal.

2 Zoledronic acid IV infusion rate

Zoledronic acid 5 mg in 100 mL is ordered to infuse over **at least 15 minutes**. What is the minimum pump rate in mL/hr, and why is a minimum time enforced?

```
Rate = volume ÷ time
      = 100 mL ÷ 15 min × 60 min/hr
      = 100 ÷ 0.25 hr
      = 400 mL/hr (maximum) → 15 min is the MINIMUM duration
```

✓ ≤400 mL/hr (infuse over ≥15 min). Rapid infusion raises the risk of renal injury — ensure hydration and adequate renal function first.

3 Pediatric ibuprofen — weight-based safety

A child weighs **22 kg**. The order is **ibuprofen 10 mg/kg/dose**. Suspension is **100 mg/5 mL**. What single-dose volume should be given?

```
Dose (mg) = 10 mg/kg × 22 kg = 220 mg
Volume = 220 mg ÷ (100 mg / 5 mL)
        = 220 ÷ 20 mL-1
        = 11 mL per dose
```

✓ 11 mL per dose. Confirm it stays within the max single/daily mg/kg limit and give with food/fluids.

4 Elemental calcium from calcium carbonate

Calcium carbonate is **40% elemental calcium**. A client needs **1,200 mg elemental calcium/day** and should take **no more than 500–600 mg elemental per dose**. How much calcium carbonate provides 600 mg elemental, and how should doses be split?

```
Carbonate needed = elemental ÷ 0.40
                  = 600 mg ÷ 0.40
                  = 1,500 mg calcium carbonate per dose
Daily plan: 600 mg elemental × 2 doses = 1,200 mg/day
```

✓ 1,500 mg carbonate per dose, given as two divided doses to meet 1,200 mg elemental/day — absorption caps at ~500–600 mg elemental per dose.

5 Colchicine — staying under the ceiling

Acute gout order: **colchicine 1.2 mg PO at onset, then 0.6 mg one hour later**. Tablets are **0.6 mg**. How many tablets total in the first hour, and what symptom signals toxicity to hold further dosing?

```
First dose: 1.2 mg ÷ 0.6 mg/tab = 2 tablets
One hour later: 0.6 mg ÷ 0.6 mg/tab = 1 tablet
Total in 1 hour = 3 tablets (1.8 mg) – do not exceed limits
```

✓ 3 tablets total (2 then 1). New diarrhea or vomiting = toxicity → hold further doses (no antidote exists).

§ 04

5 NGN-STYLE ITEMS

MIXED FORMATS · NCJMM-ALIGNED

MATRIX / GRID

Bisphosphonate teaching review

For each client statement about alendronate, mark whether it indicates **Correct Understanding** or **Needs Reteaching**.

CLIENT STATEMENT	CORRECT	NEEDS RETEACHING
"I'll take it first thing in the morning with a full glass of water."	✓	
"I'll stay sitting or standing for at least 30 minutes after."	✓	
"I'll take it at bedtime with my evening snack."		✓
"I'll take my calcium supplement at the same time."		✓
"I'll tell the dentist I'm on this before any tooth work."	✓	
"New thigh pain is just normal aging, so I'll ignore it."		✓

Rationale: Bisphosphonates require morning, empty-stomach, upright dosing with plain water; bedtime/food causes esophageal injury, calcium binds the drug (separate it), and new thigh pain signals possible atypical femur fracture that must be reported.

BOW-TIE

Gout client on colchicine

Scenario: A client treating an acute gout flare with colchicine reports profuse watery diarrhea and vomiting for several hours.

ACTIONS TO TAKE (CHOOSE 2)	CONDITION	PARAMETERS TO MONITOR (CHOOSE 2)
✓ Hold further colchicine doses ✓ Notify the provider ✗ Encourage more colchicine for the flare ✗ Administer the next scheduled dose	Colchicine toxicity	✓ CBC (marrow suppression) ✓ Renal function & CK ✗ Serum uric acid as priority ✗ Blood glucose

Rationale: GI symptoms are the earliest marker of colchicine toxicity, which can progress to marrow suppression and rhabdomyolysis with **no** antidote. Hold the drug, notify, and monitor CBC/renal/CK — uric acid and glucose are not the immediate safety concern.

SELECT ALL THAT APPLY

Methotrexate (RA) teaching

Which statements should the nurse include when teaching a client starting low-dose methotrexate for RA? *Select all that apply.*

- ☒ Take the methotrexate **once weekly** on the same day.
- ☒ Take a daily **folic acid** supplement (not on the methotrexate day).
- ☒ **Avoid alcohol** due to liver-toxicity risk.
- ☒ Report a new **dry cough or shortness of breath** (pneumonitis).
- ☒ Use **reliable contraception** — the drug is teratogenic.
- ☐ Take the medication every morning with breakfast.
- ☐ Stop folic acid because it blocks the drug's effect.

Rationale: Weekly dosing, folic-acid supplementation, alcohol avoidance, pulmonary-symptom reporting, and contraception are all essential. Daily dosing is a fatal error, and folic acid is recommended (it reduces side effects without negating low-dose efficacy).

ORDERED RESPONSE

Intrathecal baclofen pump alarm with withdrawal signs

Place the nurse's actions in priority order for a client whose baclofen pump alarmed and who now has fever, rigidity, and confusion.

- 1 Recognize this as an acute baclofen withdrawal emergency.
- 2 Activate rapid response / notify provider immediately.
- 3 Support airway, breathing, circulation and monitor continuously.
- 4 Prepare to restore baclofen (oral/IT) and give supportive meds (e.g., benzodiazepines) per orders.
- 5 Initiate cooling and treat complications (rhabdo, hyperthermia).
- 6 Evaluate response — temperature, rigidity, mental status — and document.

Rationale: Abrupt intrathecal baclofen loss mimics NMS/sepsis and is life-threatening; recognition and rapid escalation precede ABC support and baclofen restoration, with ongoing evaluation closing the loop.

CLOZE / DROP-DOWN

Complete the clinical statement

A client on a TNF- α inhibitor (adalimumab) develops night sweats, a productive cough, and weight loss. The nurse recognizes this most likely represents **reactivation of latent tuberculosis**. Before this drug was started, the client should have had a **TB screening test (PPD/IGRA)**, and while on therapy the client should receive **no live vaccines**. The priority nursing action now is to **hold the drug and notify the provider**.

Rationale: TNF inhibitors suppress the immune defenses that contain latent TB; mandatory pre-therapy screening, avoidance of live vaccines, and prompt hold-and-report for infection signs are the core safety behaviors.

§ 05

NCJMM MINI CASE STUDY

6-STEP CLINICAL JUDGMENT

A 58-year-old woman with rheumatoid arthritis returns to clinic. She was started on **methotrexate** 6 weeks ago. She reports, "I've been taking my methotrexate **every morning** because my joints hurt so much." Today she has **mouth ulcers, a new dry cough, fatigue, and easy bruising**. Vitals: T 38.4 °C, HR 104, RR 22, SpO₂ 93% on room air. Labs: WBC 2.1, Hgb 9.4, platelets 88,000, AST/ALT elevated.

RECOGNIZE
CUES

STEP 1

Key cues: **daily (not weekly) methotrexate dosing**, mucositis (mouth ulcers), pancytopenia (WBC 2.1, Hgb 9.4, plts 88k), fever, dry cough + low SpO₂ (possible pneumonitis), elevated transaminases.

ANALYZE
CUES

STEP 2

The pattern fits **methotrexate toxicity from a dosing error** — taking a once-weekly drug daily produced bone-marrow suppression, mucositis, hepatotoxicity, and possible pneumonitis. Fever in a neutropenic client is an additional emergency.

PRIORITIZE
HYPOTHESES

STEP 3

Top priority: **life-threatening methotrexate toxicity with febrile neutropenia**. Competing concerns (RA flare, viral URI) are lower priority given the lab and dosing picture.

GENERATE
SOLUTIONS

STEP 4

Goals: stop the offending drug, rescue the toxicity, protect from infection/bleeding, and support oxygenation. Interventions: hold methotrexate, anticipate **leucovorin rescue**, neutropenic + bleeding precautions, supplemental O₂, hydration, provider notification.

TAKE
ACTION

STEP 5

Hold methotrexate immediately and correct the dosing error; notify provider/escalate; administer **leucovorin** as ordered; apply neutropenic and bleeding precautions; give oxygen to keep SpO₂ $\geq 94\%$; obtain cultures; reinforce that the drug is **once weekly**.

STEP 6

EVALUATE
OUTCOMES

Effective if: counts recover (WBC/platelets rising), fever resolves, mucositis and cough improve, SpO₂ normalizes, LFTs trend down, and the client correctly restates **weekly** dosing with daily folic acid. If counts keep falling or respiratory status worsens, escalate care.

§ 06

RED-FLAG ACTION MAP

BY REQUIRED ACTION

🛑 STOP / HOLD THE DRUG

- ▶ Any new rash on allopurinol → possible SJS/TEN
- ▶ New diarrhea/vomiting on colchicine → early toxicity
- ▶ Daily dosing of low-dose methotrexate → fatal error
- ▶ Black/tarry stools or rising creatinine on NSAIDs
- ▶ Calcium <8.5 before denosumab/IV bisphosphonate
- ▶ Active infection/fever on a TNF- α biologic

📞 CALL THE PROVIDER

- ▶ New thigh/groin pain on a bisphosphonate (atypical fracture)
- ▶ Vision changes on hydroxychloroquine (retinopathy)
- ▶ Fever/sore throat on sulfasalazine or methotrexate (marrow)
- ▶ New dry cough/dyspnea on methotrexate (pneumonitis)
- ▶ Rising LFTs on tizanidine, dantrolene, or febuxostat
- ▶ Jaw pain/loose teeth on a bisphosphonate/denosumab (ONJ)

🚑 ACTIVATE RAPID RESPONSE

- ▶ Baclofen withdrawal / intrathecal pump failure → fever, rigidity, seizures
- ▶ Malignant hyperthermia → rising EtCO₂, rigidity, hyperthermia
- ▶ Anaphylaxis/infusion reaction with pegloticase/rasburicase
- ▶ Symptomatic severe hypocalcemia (tetany, laryngospasm) post-denosumab
- ▶ Suspected adrenal crisis after abrupt steroid stop (hypotension/shock)

🩺 GIVE THE ANTIDOTE / RESCUE

- ▶ Methotrexate toxicity → leucovorin (glucarpidase for high-dose)
- ▶ Malignant hyperthermia → IV dantrolene
- ▶ Symptomatic hypocalcemia → IV calcium gluconate
- ▶ Hypercalcemia from Ca/Vit D → hydration $\pm$ loop diuretic
- ▶ Baclofen withdrawal → urgent re-dosing of baclofen + support

§ 07

CONFUSING-DRUG COMPARISONS

SIDE-BY-SIDE

ALLOPURINOL VS COLCHICINE (GOUT)

	ALLOPURINOL (FEBUXOSTAT SIMILAR)	COLCHICINE
Job	Lowers uric-acid production → long-term prevention	Blocks inflammation → acute flare + prophylaxis
Acute attack?	No — can worsen a flare if newly started	Yes — take at first sign of flare
Signature danger	Rash → SJS/TEN (HLA-B*5801)	Diarrhea = toxicity; narrow index, no antidote
Teaching	2-3 L fluid; stop drug if rash	Never exceed dose; stop if GI symptoms

BACLOFEN VS DANTROLENE (RELAXANTS)

	BACLOFEN	DANTROLENE
Site of action	Central — GABA-B in spinal cord	Direct on muscle — blocks Ca release (SR)
Headline use	Spasticity (MS, SCI, CP)	Malignant hyperthermia antidote ; also spasticity/NMS
Key danger	Abrupt withdrawal → fever, seizures, rhabdo	Hepatotoxicity (chronic oral, black box)

NCLEX anchor

Taper; pump alarm = emergency

MH crisis → push it fast

METHOTREXATE (RA) VS METHOTREXATE (CHEMO)

	LOW-DOSE RA	HIGH-DOSE ONCOLOGY
Frequency	Once WEEKLY	Cyclic high-dose protocols
Co-therapy	Daily folic acid	Leucovorin rescue after dose
The trap	Daily dosing = fatal	Renal clearance & level monitoring
Shared toxicities	Myelosuppression, hepatotoxicity, mucositis, pneumonitis, teratogenicity	

BISPHOSPHONATE VS DENOSUMAB VS TERIPARATIDE (OSTEOPOROSIS)

	BISPHOSPHONATE	DENOSUMAB	TERIPARATIDE
Mechanism	Anti-resorptive (osteoclast)	Anti-resorptive (RANKL)	Anabolic (osteoblast)
Route/freq	PO daily/weekly or IV yearly	SubQ q6 months	SubQ daily, ≤2 yr
Signature risk	Esophagitis, ONJ, atypical fx	Hypocalcemia, ONJ, rebound fx	Osteosarcoma, orthostasis

NSAID VS GLUCOCORTICOID (MSK INFLAMMATION)

	NSAID	GLUCOCORTICOID
Big risks	GI bleed, AKI, CV events	Hyperglycemia, infection, osteoporosis, adrenal suppression
Stopping	Can stop anytime	Must taper if chronic (adrenal crisis)
Monitor	Renal, BP, stools/Hgb	Glucose, infection, bone density

§ 08

ONE-PAGE SUMMARY

DAY 12 AT A GLANCE

MUSCULOSKELETAL PHARMACOLOGY — DAY 12

BONE · MUSCLE · GOUT · DMARDS · NSAIDS · STEROIDS

OSTEOPOROSIS

- **Bisphosphonates:** water, upright, empty stomach; ONJ, atypical fx
- **Denosumab:** RANKL; check calcium first; q6 mo
- **Teriparatide:** anabolic; osteosarcoma cap 2 yr; orthostasis

MUSCLE RELAXANTS

- **Cyclobenzaprine:** TCA-like; no MAOI; serotonin syndrome
- **Baclofen:** never stop abruptly; pump alarm = emergency
- **Tizanidine:** hypotension; avoid **cipro** (CYP1A2)

GOUT

- **Allopurinol:** prevents (not acute); rash → STOP (SJS)
- **Febuxostat:** XO inhibitor; CV-death warning
- **Colchicine:** acute flare; diarrhea = toxicity; no antidote

DMARDS & BIOLOGICS

- **Methotrexate:** ONCE WEEKLY; folic acid; leucovorin rescue; lungs/counts
- **Hydroxychloroquine:** EYES — retinopathy
- **Sulfasalazine:** sulfa/G6PD; orange urine OK; fever =

- **Raloxifene:** SERM; VTE/PE risk
- **Calcium:** binds levo/-cyclines/-floxacin — separate doses

- **Dantrolene:** MH antidote; chronic = hepatotoxic
- **Methocarbamol/carisoprodol:** sedation; carisoprodol abuse

- **Probenecid:** uricosuric; lots of water, no aspirin
- **Pegloticase/rasburicase:** check **G6PD**; anaphylaxis

marrow

- **TNF inhibitors (-mab/-cept):** screen TB; no live vaccines

NSAIDS & STEROIDS

- **NSAIDs:** Gut bleed, Kidney, Heart; with food; ketorolac ≤5 d
- **Celecoxib:** COX-2, GI-sparing, sulfa caution
- **Glucocorticoids:** never stop cold — taper; sugar↑, immunity↓, bone↓

ANTIDOTES & ANCHORS

- Methotrexate → **leucovorin**
- Malignant hyperthermia → **dantrolene**
- Hypocalcemia → **IV calcium gluconate**
- Screen first: **TB** (biologics), **G6PD** (uricase), **calcium** (denosumab)
- Taper, don't stop: **baclofen, tizanidine, steroids**

NCLEX-RN 2026 · DAY 12 — Musculoskeletal Pharmacology Reference Deck

22 flashcards · 5 safety rules · 5 calculations · 5 NGN items · NCJMM case · red-flag map · comparisons · summary

Study aid for NCLEX-RN preparation aligned to the 2026 Test Plan and Next-Generation NCLEX item formats. Always follow current facility protocols, prescriber orders, and authoritative drug references in clinical practice.