

• DAY 11 OF 100+ DRUG MASTERY SERIES

Psychiatric & Neurologic *Pharmacology* — Part 2

Mood stabilizers, typical and atypical antipsychotics, and seizure medications. Aligned with the 2026 NCLEX-RN Test Plan: **Pharmacological and Parenteral Therapies (13–19%)**, **Psychosocial Integrity (6–12%)**, **Reduction of Risk Potential (9–15%)**, and **Physiological Adaptation (11–17%)**.

20 ADVANCED CARDS

5 SAFETY RULES

5 CALCULATIONS

5 NGN ITEMS

1 CASE STUDY

RED FLAGS

CONFUSING DRUGS

INFOGRAPHIC

SECTION 01 *Advanced flashcards*

Click any card to expand all 16 NCLEX-format fields: mechanism, must-assess, labs, dangerous effects, hold parameters, antidote, teaching, NGN cue, priority question with full rationale, and a test-taking tip.

CARD 01 / 20

HIGH RISK • NARROW TI

Lithium carbonate

Mood stabilizer • Bipolar disorder maintenance & acute mania

Therapeutic level: 0.6–1.2 mEq/L. Toxicity begins above 1.5 mEq/L. Sodium and water balance directly drive lithium levels – dehydration, low-sodium diets, NSAIDs, ACE inhibitors, and thiazides all raise serum lithium. *One of the most heavily tested drugs on NCLEX.*

EXPAND FULL CARD ↑

MECHANISM	Stabilizes neuronal membranes and modulates serotonin, norepinephrine, and dopamine. Reduces glutamate excitotoxicity. Onset for mania 5–7 days; full effect 2–3 weeks.
INDICATION	Acute mania, bipolar maintenance, suicide prevention in bipolar I, augmentation in treatment-resistant depression.
PRE-ASSESS	Baseline lithium level, BUN/Cr, eGFR, electrolytes (Na⁺), TSH, calcium, ECG (older adults), pregnancy test, weight . Verify adequate sodium and fluid intake. Review ACE/ARB, NSAIDs, thiazides, haloperidol, SSRIs. Pregnancy Category D – Ebstein anomaly.
LABS / MONITORING	Trough drawn 12 hours after last dose. Every 2–3 days during titration, weekly until stable, then every 3 months. TSH/creatinine every 6 months (causes hypothyroidism and nephrogenic DI).
MOST DANGEROUS AE	Lithium toxicity → coarse tremor, ataxia, slurred speech, severe N/V, confusion, seizures, dysrhythmias, coma, death. Severe (>2.5) → hemodialysis .
COMMON SE	Fine hand tremor, polyuria/polydipsia, GI upset, metallic taste, weight gain, acne, hypothyroidism. Fine tremor = expected; coarse = toxic.

CARD 02 / 20

HIGH RISK • HEPATIC/HEME

Valproic acid / Divalproex

Anticonvulsant & mood stabilizer • Depakote

Therapeutic level: 50–100 mcg/mL. Bipolar mania, mixed episodes, complex partial & absence seizures, migraine prophylaxis. *Black box: hepatotoxicity, pancreatitis, neural tube defects.*

EXPAND FULL CARD ↑

MECHANISM	Increases GABA, blocks sodium channels, inhibits T-type calcium channels.
INDICATION	Acute mania (faster than lithium), mixed/rapid-cycling bipolar, seizures, migraine prevention.
PRE-ASSESS	Baseline LFTs, ammonia, CBC w/ platelets, lipase, pregnancy test . Absolute contraindication in pregnancy – spina bifida.
LABS	Trough monthly initially. LFTs/CBC every 1–3 months × first 6 months. Ammonia if confused.
MOST DANGEROUS AE	Hepatotoxicity (first 6 months), pancreatitis, thrombocytopenia, hyperammonemic encephalopathy, neural tube defects.
COMMON SE	GI upset, sedation, tremor, weight gain, alopecia, mild thrombocytopenia.
HOLD / NOTIFY	Severe abdominal pain (pancreatitis), jaundice/RUQ pain, unusual bruising/bleeding, confusion/lethargy (hyperammonemia), pregnancy.
ANTIDOTE	No specific antidote. L-carnitine for severe hyperammonemia/overdose. Charcoal if recent.
TEACHING	Take with food. Don't crush enteric-coated. Two forms of contraception. Report yellow eyes/skin, severe stomach pain,

HOLD / NOTIFY	Level >1.5, toxicity signs, new V/D/fever/diaphoresis (dehydration concentrates lithium), reduced urine output, new ACE/thiazide/NSAID.
ANTIDOTE	No true antidote. Mild: hold + IV NS. Severe (>2.5): hemodialysis — no protein binding, dialyzable.
TEACHING	Maintain consistent salt and 2–3 L fluid daily . Take with food. No NSAIDs without provider approval — use acetaminophen. Report worsening tremor, persistent V/D, blurred vision, confusion immediately. Contraception teaching.
NURSING ACTION	Verify trough timing before dosing. Reinforce hydration before heat/exercise/illness. Coordinate dietary consult.
NGN CUE	Client on lithium 2 years: coarse tremor, vomiting × 2 days, ataxia, slurred speech ; level 2.3 mEq/L. → Lithium toxicity — hold, call provider, IV fluids, possible dialysis.

PRIORITY QUESTION

Which finding requires the **most immediate** intervention in a client on lithium 600 mg BID?

- A. Fine hand tremor on extension
- B. Serum sodium 130 mEq/L
- C. TSH 6.2 mIU/L
- D. Weight gain of 2 kg over 6 months

ANSWER • B

B is correct. Hyponatremia is most dangerous — lithium is reabsorbed in competition with sodium, so low Na raises the lithium level. Hold dose, draw STAT level, notify. **A** is expected. **C** is mild hypothyroidism — non-emergent. **D** is a common SE.

 **Test-taking tip:** Any "vomiting / diarrhea / sweating / low sodium / new NSAID or ACE / diuretic" with lithium → that's the answer. Toxicity is triggered by sodium and volume loss.

easy bruising, sleepiness, confusion. No alcohol.

NURSING ACTION

Review baseline LFTs; never give if AST/ALT >3× ULN. Educate on pancreatitis/hepatic failure signs. Folic acid in women of childbearing age.

NGN CUE

Client on valproate 4 weeks: **severe epigastric pain radiating to back, vomiting, lipase 480 U/L.** → **Drug-induced pancreatitis — hold, NPO, notify STAT.**

PRIORITY QUESTION

Which lab requires the nurse to **withhold** the next dose?

- A. Valproate trough 78 mcg/mL
- B. Platelets 220,000/mm³
- C. ALT 412 U/L
- D. Hemoglobin 13.8 g/dL

ANSWER • C

C. ALT >3× ULN signals hepatotoxicity — a black box warning. Hold and notify. **A** therapeutic. **B** normal. **D** normal Hgb.

 **Tip:** Valproate = liver + pancreas + platelets + pregnancy. If the stem mentions any of those four → wrong answer is there.

CARD 03 / 20

HIGH RISK • SJS / HEME

Carbamazepine

Anticonvulsant & mood stabilizer · Tegretol

Level: 4–12 mcg/mL. First-line for trigeminal neuralgia; partial seizures, tonic-clonic, bipolar mania. *Black box:* aplastic anemia, agranulocytosis, SJS — especially HLA-B*1502 (Asian ancestry).

EXPAND FULL CARD ↑

MECHANISM	Blocks voltage-gated sodium channels. Potent CYP3A4 inducer — auto-induces own metabolism.
INDICATION	Trigeminal neuralgia (1st-line), partial/tonic-clonic seizures, bipolar disorder, alcohol withdrawal adjunct.
PRE-ASSESS	CBC w/ diff, LFTs, BUN/Cr, sodium, HLA-B*1502 in Asian-descent clients. Review grapefruit, warfarin, OCs, AEDs. Pregnancy test.
LABS	CBC, LFTs, sodium every 1–2 months initially, then every 3–6 months. Watch sodium — causes SIADH.
MOST DANGEROUS AE	Aplastic anemia, agranulocytosis, SJS/TEN, hyponatremia/SIADH, hepatotoxicity, AV block.
COMMON SE	Dizziness, diplopia, ataxia, sedation, GI upset, photosensitivity.
HOLD / NOTIFY	Any new rash — could be SJS. Sore throat, fever, bruising/bleeding (marrow suppression). Confusion/seizures (hyponatremia). Yellow skin. WBC <3,000 or ANC <1,500.
ANTIDOTE	No antidote. Supportive; charcoal if recent ingestion; hemodialysis sometimes.
TEACHING	Report any rash immediately , fever, sore throat, easy bruising. No grapefruit juice. Non-hormonal

CARD 04 / 20

HIGH RISK • RASH/SJS

Lamotrigine

Anticonvulsant & mood stabilizer · Lamictal

First-line for **bipolar depression** — one of few mood stabilizers with antidepressant properties. *Black box:* severe rash including SJS, especially with rapid titration or combination with valproate.

EXPAND FULL CARD ↑

MECHANISM	Stabilizes presynaptic sodium channels; inhibits glutamate release.
INDICATION	Bipolar maintenance (esp. depression), partial seizures, Lennox-Gastaut, tonic-clonic seizures.
PRE-ASSESS	Confirm slow titration schedule. If on valproate — half-dose titration (valproate doubles lamotrigine). Pregnancy test. Skin baseline.
LABS	No routine levels. Monitor rash (first 2–8 wks) and suicidality.
MOST DANGEROUS AE	SJS/TEN, HLH, aseptic meningitis, suicidality. Highest with rapid escalation, kids, or combined with valproate.
COMMON SE	Headache, dizziness, blurred vision, GI upset, ataxia, benign rash (cannot distinguish from SJS clinically — always stop).
HOLD / NOTIFY	Any rash — esp. with fever, mucosal involvement, blistering, eye irritation. Suicidal ideation. Persistent fever or stiff neck.
ANTIDOTE	No antidote. Supportive care; hemodialysis if severe.
TEACHING	Never skip or double doses — the slow titration prevents the rash. Report any rash. Non-hormonal contraception in some cases. Don't stop suddenly.
NURSING ACTION	Confirm titration schedule before each dose. Educate on rash

	contraception. Take with food. Sun protection. Don't stop abruptly.
NURSING ACTION	Never give if WBC < 3,000 or platelets < 100,000. Educate on rash recognition. Verify HLA-B*1502 testing.
NGN CUE	Client started carbamazepine 10 days ago: fever, mucosal blisters, painful spreading red rash trunk and palms. → SJS — stop drug, notify, burn-unit care.

PRIORITY QUESTION

Which teaching demonstrates the **most critical** safety understanding?

- A. "I'll take this with food."
- B. "I'll use sunscreen outdoors."
- C. "I'll call my provider right away if I notice a new rash or fever."
- D. "I'll avoid grapefruit juice."

ANSWER • C

C. Recognizing rash is the highest-priority safety teaching — SJS/TEN is life-threatening and rapidly progressive. Other answers address comfort, photosensitivity, and interactions — not immediate life-threatening risk.

💡 **Tip:** 3 S's of carbamazepine = *Skin (SJS), Sodium (low), Suppression (marrow)*.

photos if available.

NGN CUE

Child on lamotrigine + valproate 3 weeks: **fever 102.5°F, conjunctivitis, blistering of oral mucosa. → SJS — hold both, notify, IV fluids, burn/ICU.**

PRIORITY QUESTION

Which client statement indicates **correct** understanding?

- A. "If I miss a dose, I'll take a double dose the next day."
- B. "If I develop any rash, I'll stop and call my provider."
- C. "I'll need my drug level drawn every month."
- D. "I should feel better within 2–3 days."

ANSWER • B

B. Any rash on lamotrigine = stop until proven otherwise. **A** dangerous — doubling triggers severe rash. **C** incorrect — no routine levels. **D** incorrect — takes weeks.

💡 **Tip:** "*Lami-rash-ine*" — any rash = stop. Lamotrigine treats *down* (depression); lithium treats *up* (mania).

CARD 05 / 20

HIGH RISK • EPS / NMS

Haloperidol

Typical (1st-gen) antipsychotic · Haldol

High-potency D2 blocker. Acute psychosis, agitation, Tourette, ICU delirium. *Highest EPS and NMS risk among typicals*. Long-acting decanoate IM available.

EXPAND FULL CARD ↑

MECHANISM	Blocks D2 in mesolimbic (treats hallucinations/delusions) and nigrostriatal (causes EPS) pathways.
INDICATION	Schizophrenia, acute psychosis, severe agitation (IM), Tourette, ICU delirium, refractory hiccups.
PRE-ASSESS	Baseline ECG (QT), AIMS, vital signs, mental status, hydration. Avoid in Parkinson, Lewy body, severe CNS depression. Black box: ↑ mortality in dementia.
LABS	ECG (QTc), K+/Mg2+ (low worsens QT), CPK if NMS suspected, AIMS q 3 months.
MOST DANGEROUS AE	NMS (fever, lead-pipe rigidity, ALOC, autonomic instability, ↑CPK). Tardive dyskinesia (irreversible). QT prolongation/torsades. Acute dystonia (laryngeal spasm).
COMMON SE	Sedation, anticholinergic effects, orthostatic hypotension, EPS (acute dystonia, akathisia, parkinsonism, TD), ↑ prolactin.
HOLD / NOTIFY	Fever + rigidity + ALOC (NMS). QTc >500. New tongue/lip movements (TD). Acute neck arching, eye rolling (dystonia).
ANTIDOTE	NMS: stop drug + dantrolene ± bromocriptine , cooling, fluids, ICU. Dystonia: benztropine IM or diphenhydramine IM.
TEACHING	Rise slowly. No alcohol. Report stiffness, fever, repetitive movements, restlessness. Sun

CARD 06 / 20

COMMONLY TESTED

Risperidone

Atypical (2nd-gen) antipsychotic · Risperdal

Blocks D2 + 5-HT2A. **Lower EPS than haloperidol, higher than other atypicals.** Highest prolactin elevation — gynecomastia, galactorrhea, amenorrhea.

EXPAND FULL CARD ↑

MECHANISM	D2 + 5-HT2A blockade. Serotonin blockade helps negative symptoms and reduces EPS.
INDICATION	Schizophrenia, bipolar mania, irritability in autism (only atypical FDA-approved).
PRE-ASSESS	Baseline weight, BMI, fasting glucose, HbA1c, lipids, BP, prolactin (if symptoms), ECG. Black box: dementia mortality.
LABS	Quarterly: weight, glucose, lipids. Annual HbA1c. Prolactin if galactorrhea/sexual dysfunction. AIMS.
MOST DANGEROUS AE	NMS, hyperglycemia/DM, metabolic syndrome, orthostatic hypotension, EPS at higher doses, dementia mortality.
COMMON SE	Weight gain, sedation, hyperprolactinemia (gynecomastia, galactorrhea, amenorrhea, sexual dysfunction), orthostasis, mild EPS.
HOLD / NOTIFY	NMS signs, new DM symptoms, syncope, persistent EPS, suicidality.
ANTIDOTE	No specific antidote. NMS: dantrolene/bromocriptine.
TEACHING	Diet/exercise for weight. Report breast tenderness/lactation. Take consistently. Rise slowly. Risperdal Consta IM q 2 wks for adherence.
NURSING ACTION	Trend metabolic labs. Distinguish hyperprolactinemia from other med side effects.

protection. Don't stop abruptly.
Decanoate q 2-4 wks.

NURSING ACTION

Baseline + ongoing AIMS.
Recognize akathisia (motor restlessness – don't raise dose!).
Keep benztropine available.

NGN CUE

Client 48 h after haloperidol started: **temp 103.8°F, lead-pipe rigidity, BP 168/96, HR 128, diaphoresis, CPK 6,800. → NMS – STOP drug, ICU, dantrolene, cooling, fluids.**

PRIORITY QUESTION

Client receiving haloperidol IM has stiff neck, head pulled back, eyes rolled up. Priority action?

- A. Reassure client; continue doses.
- B. Apply restraints.
- C. Administer benztropine IM as prescribed PRN for acute dystonia.
- D. Document and notify on next shift report.

ANSWER • C

C. Acute dystonic reaction (oculogyric crisis) is an emergency – airway muscles can spasm. Benztropine/diphenhydramine IM rapidly reverses it.

💡 **Tip:** EPS timing → *HOURS* = dystonia, *DAYS* = akathisia, *WEEKS* = parkinsonism, *MONTHS-YEARS* = TD. NMS = anytime.

NGN CUE

Adolescent boy on risperidone × 3 mo: **weight ↑6 kg, fasting glucose 142, breast tenderness, galactorrhea. →**
Hyperprolactinemia + emerging metabolic syndrome – alternative atypical.

PRIORITY QUESTION

Which 16-year-old male client report requires **most immediate** follow-up?

- A. "I feel drowsy in the mornings."
- B. "I've gained 2 lb this month."
- C. "I feel restless and can't sit still."
- D. "My breasts feel tender and there's some leaking."

ANSWER • C

C. Akathisia is highly distressing, mistaken for worsening psychosis (leading to inappropriate dose escalation), and associated with suicide risk. Treat with dose adjustment, propranolol, or switch.

💡 **Tip:** Atypicals = "metabolic minefield." Risperidone uniquely = prolactin. Teen male + "breasts" = risperidone.

CARD 07 / 20

COMMONLY TESTED • METABOLIC

Olanzapine

Atypical antipsychotic • Zyprexa

Highest metabolic risk of atypicals — major weight gain, DM, dyslipidemia. Excellent for acute mania, treatment-resistant schizophrenia. *Olanzapine IM + benzodiazepine IM = avoid (cardiorespiratory depression).*

EXPAND FULL CARD ↑

MECHANISM	D2 + 5-HT2A blockade + strong antihistamine and anticholinergic → severe weight gain and sedation.
INDICATION	Schizophrenia, bipolar mania, agitation (IM), treatment-resistant depression with fluoxetine (Symbyax).
PRE-ASSESS	Baseline weight, BMI, waist circumference, glucose, HbA1c, lipids, BP, smoking status. Pregnancy.
LABS	Quarterly weight/BMI; quarterly glucose/lipids in year 1, then annual. HbA1c. LFTs.
MOST DANGEROUS AE	DKA (can occur before significant weight gain), severe hyperlipidemia, NMS, post-injection delirium/sedation (depot form), cardiorespiratory depression with parenteral benzodiazepines.
COMMON SE	Sedation, significant weight gain (5–12 kg), dry mouth, constipation, dizziness, ↑appetite.
HOLD / NOTIFY	Polyuria/polydipsia/blurred vision (new DM), glucose >200, severe sedation, NMS, post-injection sedation (depot — 3 hr observation).
ANTIDOTE	No specific. NMS: dantrolene/bromocriptine. DKA: insulin + IV fluids.

CARD 08 / 20

COMMONLY TESTED

Quetiapine

Atypical antipsychotic • Seroquel

Lowest EPS risk — favored when EPS or hyperprolactinemia is a concern. Schizophrenia, bipolar (mania + depression), MDD augmentation, off-label insomnia. *Highly sedating; orthostatic hypotension common.*

EXPAND FULL CARD ↓

MECHANISM	D2 + 5-HT2A blockade with much weaker D2 affinity — explains low EPS. Strong H1 (sedation) and α1 (hypotension) blockade.
INDICATION	Schizophrenia, bipolar mania/depression, MDD augmentation, sleep (off-label).
PRE-ASSESS	Baseline weight, glucose, lipids, ECG (mild QT), LFTs, BP (orthostatic). Pregnancy.
LABS	Quarterly metabolic + lipids. Annual HbA1c. LFTs during titration.
MOST DANGEROUS AE	Orthostatic hypotension causing falls, metabolic syndrome, cataracts (eyes q 6 months), NMS, suicidality, QT prolongation.
COMMON SE	Heavy sedation, orthostasis, weight gain (less than olanzapine), dry mouth, dizziness, constipation.
HOLD / NOTIFY	Significant orthostatic drop, syncope, NMS signs, sedation interfering with safety, vision changes.
ANTIDOTE	No antidote. Supportive; orthostasis precautions.
TEACHING	Take at bedtime. Rise slowly. No alcohol/CNS depressants. Eye exam q 6 months. Don't stop abruptly.
NURSING ACTION	Fall precautions in older adults. Educate on position changes, hydration.

TEACHING

Diet, exercise, weight monitoring essential. Recognize early DM symptoms. No alcohol. Take at bedtime.

NURSING ACTION

For IM depot: observe ≥3 hr post-injection. Never give IM olanzapine + IM lorazepam together.

NGN CUE

Client on olanzapine 4 mo: **weight ↑9 kg, fasting glucose 312, blurred vision, polyuria.** → Drug-induced DM — endocrine consult, switch.

PRIORITY QUESTION

ED nurse prepares IM olanzapine; provider also ordered IM lorazepam 2 mg. Best action?

- A. Administer both in same syringe.
- B. Olanzapine first, lorazepam 1 hour later.
- C. Hold lorazepam and clarify with provider.
- D. Lorazepam IV, olanzapine IM simultaneously.

ANSWER • C

C. Concurrent IM olanzapine + IM benzodiazepines = black box warning for excessive sedation and cardiorespiratory depression/death. Clarify the order.

💡 **Tip:** Olanzapine = the "biggest." Biggest weight gain, biggest glucose effect. "8 kg in 3 months" → olanzapine.

NGN CUE

Older adult on quetiapine 200 mg:
BP supine 138/82, standing 96/58, falls, hip pain. → Orthostatic fall — reassess dose, timing, hydration.

PRIORITY QUESTION

Older adult with Parkinson develops psychosis. Most appropriate antipsychotic?

- A. Haloperidol
- B. Risperidone
- C. Quetiapine
- D. Olanzapine

ANSWER • C

C. Quetiapine and clozapine are preferred in Parkinson — low D2 affinity treats psychosis without worsening parkinsonism. Haloperidol/risperidone/olanzapine have higher D2 effect.

💡 **Tip:** "Sleepy Seroquel." Older adults + falls + sedation = quetiapine. Also first choice for Parkinson psychosis.

CARD 09 / 20

HIGH RISK • REMS

Clozapine

Atypical antipsychotic · Clozaril

Gold standard for **treatment-resistant schizophrenia** — only antipsychotic to reduce suicide in schizophrenia. REMS program for **agranulocytosis (1–2%)**. Five black boxes: agranulocytosis, seizures, myocarditis, orthostasis/CV, dementia mortality.

EXPAND FULL CARD ↑

MECHANISM	Weak D2, strong 5-HT _{2A} , broad receptor effects. Unique benefit on negative symptoms, cognition, suicide.
INDICATION	Treatment-resistant schizophrenia (2+ failed antipsychotics), reducing suicide in schizophrenia/schizoaffective.
PRE-ASSESS	Baseline ANC , CBC, ECG, troponin, BNP, weight, glucose, lipids. REMS enrollment.
LABS	ANC weekly × 6 months, then biweekly × 6 months, then monthly for life. Echo/troponin if myocarditis suspected. Quarterly metabolic.
MOST DANGEROUS AE	Agranulocytosis (ANC <500), myocarditis (wks 2–4), seizures (dose-dependent), severe constipation/ileus/ischemia, orthostatic syncope, DKA.
COMMON SE	Hypersalivation (signature), sedation, weight gain, constipation, dizziness, tachycardia.
HOLD / NOTIFY	ANC <1,500 = stop & recheck; <1,000 = high alert; <500 = STOP permanently. Fever, sore throat, mouth ulcers (infection). Chest pain, dyspnea, tachycardia (myocarditis). Severe constipation/distension. New seizure.
ANTIDOTE	No specific. Filgrastim for severe agranulocytosis. Supportive care

CARD 10 / 20

COMMONLY TESTED

Aripiprazole

Atypical (3rd-gen partial agonist) · Abilify

D2 partial agonist — "dopamine stabilizer." Lowest metabolic risk of common atypicals. Distinct side effects: *akathisia* and *impulse-control disorders (gambling, hypersexuality, binge eating)*.

EXPAND FULL CARD ↑

MECHANISM	Partial agonist at D ₂ , 5-HT _{1A} ; antagonist at 5-HT _{2A} . Stabilizes dopamine — reduces where high, raises where low.
INDICATION	Schizophrenia, bipolar mania, MDD augmentation, irritability in autism, Tourette.
PRE-ASSESS	Baseline metabolic + lipids, BP, ECG, history of impulse-control behaviors.
LABS	Quarterly metabolic + lipids, weight. Behavioral compulsion screen.
MOST DANGEROUS AE	NMS, severe akathisia, suicidality (young adults), impulse-control disorders, dementia mortality.
COMMON SE	Akathisia (very common), headache, nausea, insomnia, mild weight gain, anxiety.
HOLD / NOTIFY	Severe akathisia, NMS, new gambling/sexual/eating compulsions, suicidality.
ANTIDOTE	No specific. Akathisia: dose reduce, propranolol, benzo, or switch.
TEACHING	Report new compulsive behaviors — typically resolve with dose change. Recognize akathisia as distinct from anxiety. Long-acting injectables for adherence.
NURSING ACTION	Screen at each visit for impulse-control. Family education — client may not self-report.

TEACHING

for myocarditis.

Mandatory weekly blood draws — non-negotiable. Report fever, sore throat, mouth sores, chest pain, severe constipation immediately. Stool softeners proactively. Rise slowly. **Tell provider before quitting smoking — can double drug levels.**

NURSING ACTION

Verify ANC in REMS portal before each dispense. Aggressive bowel regimen.

NGN CUE

Client on clozapine 3 wks: **fever 101.4°F, sore throat, mouth ulcers; ANC 380.** → **Agranulocytosis + infection — STOP permanently, antibiotics, heme consult, G-CSF.**

PRIORITY QUESTION

Client on clozapine × 5 weeks. Most concerning finding?

- A. Drooling on pillow at night
- B. Weight gain 4 kg
- C. HR 118, chest pain, dyspnea
- D. Constipation requiring docusate

ANSWER • C

C. Clozapine-induced myocarditis peaks at wks 2–4 — tachycardia, chest pain, dyspnea, ↑troponin/CRP. Immediate ECG, troponin, echo. **A** expected (hypersalivation). **B** routine. **D** being managed.

💡 **Tip:** Clozapine 5 black boxes = "MISCS":
Myocarditis, Infection (agranulocytosis), Seizures, CV/orthostasis, Suicide-Mortality in dementia. Plus Constipation = fatal.

NGN CUE

Family of client on aripiprazole reports **online gambling, spending savings, risky sexual behavior.** → Drug-induced impulse-control disorder — notify provider.

PRIORITY QUESTION

Which statement requires **further teaching**?

- A. "This may make me feel restless and unable to sit still."
- B. "My partner will let you know if I start gambling."
- C. "This will probably make me gain a lot of weight quickly."
- D. "I shouldn't stop this abruptly."

ANSWER • C

C. Aripiprazole has lowest metabolic burden of common atypicals. Calling it "a lot" is inaccurate. **A, B, D** are correct teaching.

💡 **Tip:** Aripiprazole = "the impulse drug."
Gambling/hypersexuality/binge eating in an antipsychotic stem = aripiprazole. Also favored for kids/teens (less weight gain).

CARD 11 / 20

SAFETY ALERT • QT

Ziprasidone

Atypical antipsychotic • Geodon

Lower metabolic risk but **highest QT prolongation** of common atypicals. *Must be taken with a 500-calorie meal* (otherwise absorption drops ~50%). Avoid with cardiac history or other QT-prolonging drugs.

EXPAND FULL CARD ↑

MECHANISM	D2 + 5-HT _{2A} antagonist; also serotonin reuptake inhibition (mild antidepressant effect).
INDICATION	Schizophrenia, acute mania, agitation (IM).
PRE-ASSESS	Baseline ECG (QTc), K ⁺ /Mg ²⁺ , interacting drugs (methadone, ondansetron, certain antibiotics).
LABS	Periodic ECG, electrolytes.
MOST DANGEROUS AE	QT prolongation → torsades, NMS, DRESS syndrome.
COMMON SE	Somnolence, nausea, dizziness, mild akathisia, less weight gain.
HOLD / NOTIFY	QTc >500, syncope, palpitations, new rash, NMS.
ANTIDOTE	Torsades: magnesium sulfate IV, defibrillation if pulseless.
TEACHING	Always take with substantial meal (~500 calories). Report fainting/palpitations. Avoid other QT-prolonging drugs.
NURSING ACTION	Confirm food intake at administration. Trend ECG/electrolytes.
NGN CUE	Client on ziprasidone + ondansetron: QTc 528 ms, syncope. → QT prolongation — stop one or both, correct electrolytes.

PRIORITY QUESTION

Most essential baseline lab before ziprasidone?

A. HbA1c

Student

CARD 12 / 20

EMERGENCY • EPS REVERSAL

Benztropine

Anticholinergic • Cogentin

Treats **acute dystonia and drug-induced parkinsonism** from antipsychotics. Diphenhydramine IM is alternative. *Does NOT treat TD — actually worsens it.*

EXPAND FULL CARD ↑

MECHANISM	Central muscarinic ACh receptor antagonist — restores dopamine-acetylcholine balance disrupted by D2 blockade.
INDICATION	Acute dystonic reaction (IM), drug-induced parkinsonism (PO), prophylactic with haloperidol.
PRE-ASSESS	Type of EPS, closed-angle glaucoma (contraindication), BPH, bowel obstruction, dementia, age (caution older adults).
LABS	Clinical — dystonia improves within 15–30 min IM. Watch anticholinergic toxicity in elderly.
MOST DANGEROUS AE	Anticholinergic delirium (elderly), worsened TD, urinary retention, acute angle-closure glaucoma.
COMMON SE	Dry mouth, blurred vision, constipation, urinary hesitancy, sedation, confusion in elderly.
HOLD / NOTIFY	Confusion, severe urinary retention, eye pain/vision loss, worsening abnormal movements (could be TD).
ANTIDOTE	Severe anticholinergic toxicity: physostigmine.
TEACHING	↑Fluids/fiber. No alcohol or other anticholinergics. Sugarless gum. Report eye pain immediately.
NURSING ACTION	Acute dystonia: benztropine 1–2 mg IM (onset ~15 min). Don't give for TD (use VMAT2 inhibitor).
NGN CUE	Older adult on haloperidol + benztropine: confusion,

- B. Prolactin
- C. Serum potassium and magnesium
- D. Serum creatinine

ANSWER • C

C. Low K⁺/Mg²⁺ dramatically increase QT/torsades risk. Correct before initiating.

💡 **Tip:** Ziprasidone = "*Zaps* the heart" + "*Zoom* in on the meal."

agitation, tachycardia, hot dry skin, urinary retention. →
Anticholinergic delirium –
discontinue, supportive.

PRIORITY QUESTION

Client on haloperidol 8 mo: repetitive lip smacking, tongue protrusion. Appropriate intervention?

- A. Benztropine 2 mg IM
- B. Increase haloperidol dose
- C. Notify provider; switch antipsychotic + start valbenazine
- D. Reassure and continue therapy

ANSWER • C

C. Presentation is tardive dyskinesia. **A** worsens TD. **B** worsens it. **D** ignores potentially irreversible disorder. Correct: dose reduction/switch + VMAT2 inhibitor (valbenazine/deutetrabenazine).

💡 **Tip:** Benztropine = "*Benz Time*": minutes for acute dystonia. NEVER for TD.

CARD 13 / 20

HIGH RISK • NARROW TI

Phenytoin

Anticonvulsant · Dilantin

Level: 10–20 mcg/mL. Tonic-clonic, partial seizures, status epilepticus. *Notorious for nystagmus (early toxicity), gingival hyperplasia, "purple glove syndrome," severe drug interactions.*

EXPAND FULL CARD ↑

MECHANISM	Blocks voltage-gated sodium channels — suppresses seizure activity without sedation.
INDICATION	Tonic-clonic and complex partial seizures (NOT absence — can worsen them), status epilepticus (after benzos), prophylaxis after neurosurgery/head trauma.
PRE-ASSESS	Baseline phenytoin level, albumin (low → high free drug), LFTs, CBC, IV access (large vein, NEVER D5W — precipitates). Pregnancy (fetal hydantoin).
LABS	Trough; free phenytoin if hypoalbuminemic. LFTs, CBC. IV max 50 mg/min (25 mg/min elderly/cardiac) .
MOST DANGEROUS AE	SJS (HLA-B*1502), agranulocytosis, severe IV reactions (hypotension, bradycardia, asystole, purple glove), suicidality, fetal hydantoin syndrome.
COMMON SE	Gingival hyperplasia, hirsutism, coarsening of facial features, nystagmus (level >20), ataxia, sedation, rash.
HOLD / NOTIFY	Nystagmus (early toxicity), ataxia, slurred speech (mid), confusion/coma (severe), level >20, any rash, IV site discoloration.
ANTIDOTE	No antidote. Supportive. Hemodialysis ineffective (highly protein-bound).

CARD 14 / 20

SAFETY ALERT • IV STATUS

Fosphenytoin

Prodrug of phenytoin · Cerebyx

Water-soluble prodrug — safer IV with less cardiac/tissue toxicity. Status epilepticus, neurosurgery prophylaxis. Dosed as "*phenytoin equivalents (PE)*."

EXPAND FULL CARD ↑

MECHANISM	Converted to phenytoin by phosphatases — same mechanism once converted.
INDICATION	Status epilepticus (after benzos fail), short-term substitute for PO phenytoin, neurosurgery prophylaxis. Can be given IM (phenytoin cannot).
PRE-ASSESS	IV/IM access, baseline ECG/BP, weight, allergy. Dose in PE.
LABS	Cardiac monitor; phenytoin level 2 hr after IV / 4 hr after IM. Same range (10–20).
MOST DANGEROUS AE	Hypotension/arrhythmias if too fast, hypersensitivity, SJS, hepatotoxicity.
COMMON SE	Pruritus, paresthesias (especially perineal "burning groin"), dizziness, sedation.
HOLD / NOTIFY	Hypotension, bradycardia, severe paresthesias, rash, hepatic signs.
ANTIDOTE	No antidote. Supportive.
TEACHING	Pruritus and perineal paresthesias are temporary, rate-related.
NURSING ACTION	Max IV rate 150 mg PE/min . Cardiac monitor + BP q 5–15 min. Can use NS or D5W (unlike phenytoin).
NGN CUE	Client receiving fosphenytoin: BP 78/40, severe genital burning. → Slow/pause, fluid bolus, cardiac monitor.

PRIORITY QUESTION

TEACHING

Meticulous oral hygiene, dental every 3 mo. Don't switch brands. No alcohol. Non-hormonal contraception. Report rash, fever, bruising, slurred speech.

NURSING ACTION

IV: large vein, NS only (NEVER D5W), filter, slow, cardiac monitor. Flush with saline before/after.

NGN CUE

Client on IV phenytoin: **discolored (dusky/purple) hand, pain, swelling at IV site.** → Purple glove syndrome — STOP infusion, do NOT remove IV (aspirate), elevate, warm compress, notify; possible surgical consult.

PRIORITY QUESTION

Client receiving IV phenytoin for status epilepticus. Which finding requires slowing/stopping the infusion?

- A. BP 110/70, HR 78
- B. BP 86/52, HR 46
- C. Respirations 16/min
- D. Pulse oximetry 96%

ANSWER • B

B. IV phenytoin can cause hypotension/bradycardia/asystole if infused too fast. Max 50 mg/min (25 elderly/cardiac). Slow or stop, cardiac monitor.

💡 **Tip:** Toxicity sequence: *Nystagmus* → *Ataxia* → *Slurred speech* → *Coma*. Plus "G&H": Gums grow, Hair grows. IV = saline only, slow, large vein.

Which is an **advantage** of fosphenytoin over phenytoin for IV use?

- A. Different mechanism of action
- B. No cardiac monitoring needed
- C. Less likely to cause severe IV-site tissue injury
- D. Can be mixed with blood products

ANSWER • C

C. Water-soluble — eliminates propylene glycol vehicle that causes phenytoin's purple glove syndrome and severe extravasation.

💡 **Tip:** "Phriendlier phenytoin." Same effects, safer IV, IM-capable, NS/D5W compatible.

CARD 15 / 20

COMMONLY TESTED

Levetiracetam

Broad-spectrum AED · Keppra

First-line broad-spectrum. Clean profile, minimal interactions, no level monitoring. Used for all major seizure types. *Main concern: behavioral changes ("Keppra rage") — irritability, aggression, depression, suicidality.*

EXPAND FULL CARD ↑

MECHANISM	Binds synaptic vesicle protein SV2A, reducing neurotransmitter release.
INDICATION	Partial-onset, myoclonic, primary generalized tonic-clonic seizures. Status epilepticus. Renal dose adjustment.
PRE-ASSESS	Baseline kidney function, psych history, suicidality screen.
LABS	No routine levels. Monitor renal function, behavior, mood.
MOST DANGEROUS AE	Suicidality, severe behavioral changes (aggression, psychosis), SJS (rare), anaphylaxis.
COMMON SE	Somnolence, asthenia, dizziness, irritability — especially pediatric.
HOLD / NOTIFY	Severe behavioral changes, suicidality, rash, anaphylaxis.
ANTIDOTE	No antidote. Hemodialysis for overdose.
TEACHING	Report mood/behavior changes — especially in children. Don't stop abruptly. Renal patients need dose adjustment.
NURSING ACTION	Screen for psych history before initiation. Family education on behavioral changes.
NGN CUE	8-year-old on Keppra 3 wks: new aggressive outbursts, hitting siblings, declining school performance. → "Keppra rage" — notify provider; pyridoxine, dose reduction, or switch.

CARD 16 / 20

SAFETY ALERT · CNS DEPRESSION

Phenobarbital

Long-acting barbiturate AED

Reserved for refractory status epilepticus, neonatal seizures, severe alcohol withdrawal. *Level: 15–40 mcg/mL.* Significant sedation, respiratory depression, dependence. Potent CYP inducer.

EXPAND FULL CARD ↑

MECHANISM	Enhances GABA-A by increasing chloride channel opening duration. Generalized CNS depression.
INDICATION	Status epilepticus (after benzos + phenytoin/fosphenytoin), neonatal seizures, alcohol withdrawal, sedation.
PRE-ASSESS	Respiratory status, BP, LOC, current opioids/benzos (synergy), suicidality.
LABS	Drug level (15–40); continuous pulse ox + capnography during IV; cardiac monitor.
MOST DANGEROUS AE	Respiratory arrest, severe hypotension, dependence, SJS, paradoxical excitation (kids/elderly).
COMMON SE	Sedation, cognitive slowing, ataxia, irritability, rash.
HOLD / NOTIFY	RR < 12, SpO2 declining, severe sedation, hypotension, rash.
ANTIDOTE	No flumazenil-style antidote. Support ABCs: intubation, urinary alkalization (bicarbonate), hemodialysis.
TEACHING	Avoid alcohol/opioids/benzos. Don't stop abruptly. Non-hormonal contraception. Cognitive effects expected.
NURSING ACTION	Bedside resuscitation equipment. Slow IV push. Capnography.
NGN CUE	Client receiving IV phenobarbital: RR 8, SpO2 84%, BP 82/40. →

PRIORITY QUESTION

Which parent statement requires **further education**?

- A. "We'll watch for mood or behavior changes."
- B. "This medication needs frequent blood-level monitoring."
- C. "We won't stop it suddenly."
- D. "The pediatrician may adjust dose for kidney changes."

ANSWER • B

B. Levetiracetam does NOT require routine drug-level monitoring — a major advantage. **A, C, D** are correct teaching.

💡 **Tip:** Keppra = "*Keep it simple*." No interactions, no levels — watch *mood/behavior*. Child + seizures + behavior problems = Keppra.

Respiratory depression — bag-mask, prepare to intubate, fluids.

PRIORITY QUESTION

Highest risk for respiratory failure on phenobarbital?

- A. 28 y/o on PO phenobarbital for partial seizures
- B. 70 y/o also receiving IV morphine for cancer pain
- C. Child on stable maintenance dose
- D. 40 y/o on monitored alcohol withdrawal protocol

ANSWER • B

B. Opioid + barbiturate in older adult = synergistic respiratory depression. Requires intensive monitoring or alternative pain management.

💡 **Tip:** Barbiturates = "*no Plan B*." Unlike benzos (flumazenil), no specific reversal.

CARD 17 / 20

EMERGENCY • 1ST-LINE STATUS

Lorazepam IV / Diazepam IV-rectal / Midazolam IM

Benzodiazepines — first-line for status epilepticus

FIRST drugs in status epilepticus. Lorazepam 4 mg IV (adult) or 0.1 mg/kg (peds). Diazepam rectal or midazolam IM/intranasal in field. *Always followed by maintenance AED.*

EXPAND FULL CARD ↑

MECHANISM	Bind GABA-A, increasing chloride channel opening frequency (vs barbiturates: duration). Powerful neuronal inhibition.
INDICATION	Status epilepticus (continuous >5 min, or 2 seizures without recovery), severe alcohol withdrawal/DTs, procedural sedation, severe agitation.
PRE-ASSESS	ABCs, IV access (no IV → midazolam IM 10 mg or diazepam rectal 0.2 mg/kg), oxygen, suction, glucose check (hypoglycemia mimics seizure).
LABS	Continuous pulse ox + capnography, BP q 5 min, cardiac monitor.
MOST DANGEROUS AE	Respiratory depression, hypotension, paradoxical excitation (rare).
COMMON SE	Sedation, amnesia, mild hypotension, ataxia.
HOLD / NOTIFY	RR < 10, SpO2 declining, severe hypotension. If seizure continues after 2 doses → escalate to fosphenytoin or valproate.
ANTIDOTE	Flumazenil — caution in chronic benzo users (precipitates seizures).
TEACHING	Caregivers: rescue meds (diazepam rectal gel, midazolam intranasal) — when to give, when to call 911 (>5 min seizure or repeat seizure).

CARD 18 / 20

COMMONLY TESTED

Topiramate

Broad-spectrum AED • Topamax

Partial & generalized seizures, migraine prophylaxis, weight loss (off-label). *Memorable: cognitive slowing ("Dopamax"), kidney stones, weight LOSS, metabolic acidosis, decreased sweating.*

EXPAND FULL CARD ↑

MECHANISM	Sodium channel block, enhances GABA, blocks AMPA glutamate, weak carbonic anhydrase inhibition.
INDICATION	Partial & tonic-clonic seizures, Lennox-Gastaut, migraine prophylaxis, weight management (with phentermine — Qsymia).
PRE-ASSESS	Baseline electrolytes (bicarbonate), renal function, nephrolithiasis history, glaucoma, pregnancy.
LABS	Bicarbonate, renal function. Visual acuity (acute angle-closure glaucoma in first month).
MOST DANGEROUS AE	Acute angle-closure glaucoma (vision loss), metabolic acidosis, kidney stones, oligohidrosis with hyperthermia (esp. kids), suicidality, cleft palate.
COMMON SE	Paresthesias, cognitive slowing ("Dopamax"), word-finding difficulty, weight loss, anorexia, fatigue.
HOLD / NOTIFY	Sudden eye pain/vision (glaucoma — emergency), flank pain/hematuria (stones), decreased sweating + fever, suicidality.
ANTIDOTE	No antidote. Hemodialysis for severe overdose.
TEACHING	2–3 L water daily for stones. Avoid overheating. Non-hormonal contraception. Report eye pain immediately.

NURSING ACTION

During seizure: ABCs, side-lying, suction, protect head — do NOT restrain, do NOT put anything in mouth. After 5 min → first-line benzo. Document onset/duration/character.

NGN CUE

Client seized 7 min; IV lorazepam 4 mg given; seizure continues. → Second dose, prepare fosphenytoin/levetiracetam, ICU, possible intubation.

PRIORITY QUESTION

Client seizing × 6 min. In what **order**?

- A. Administer IV lorazepam 4 mg
- B. Ensure airway patency and apply oxygen
- C. Document onset, duration, characteristics
- D. Call rapid response
- E. Check capillary blood glucose

ORDER • B → A → D → E → C

B first — ABCs always. **A** — first-line drug. **D** — escalate help. **E** — rule out reversible cause. **C** last — after stable.

💡 **Tip:** Status order: *ABC → Benzo → AED → Phenobarbital/anesthesia*. Benzo always FIRST.

NURSING ACTION

Monitor bicarbonate trend; supplement if acidosis. Educate on stone prevention.

NGN CUE

Client on topiramate 3 wks: **sudden eye pain, blurred vision, halos, headache**. → Acute angle-closure glaucoma — STOP drug, ophthalmology STAT.

PRIORITY QUESTION

Which statement is **most accurate**?

- A. "I should expect to gain weight."
- B. "I'll drink 2–3 L water daily to prevent kidney stones."
- C. "It is safe to continue oral contraceptives without changes."
- D. "I should sit in a hot tub if I feel anxious."

ANSWER • B

B. Topiramate increases stone risk; high fluid intake is preventive. **A** incorrect — causes weight LOSS. **C** reduces OC effectiveness. **D** dangerous — impairs sweating, risk hyperthermia.

💡 **Tip:** Topamax = "*Slow + Stones + Skinny + Sweat-stop*." Only AED that causes weight loss.

CARD 19 / 20

COMMONLY TESTED

Gabapentin / Pregabalin

AED & neuropathic pain · Neurontin / Lyrica

More commonly used for **neuropathic pain** (diabetic neuropathy, post-herpetic neuralgia, fibromyalgia, RLS).

Pregabalin more potent. *Schedule V; FDA warning: respiratory depression when combined with opioids.*

EXPAND FULL CARD ↑

MECHANISM	Binds $\alpha 2\delta$ subunit of voltage-gated calcium channels, reducing release of excitatory neurotransmitters. NOT a GABA agonist.
INDICATION	Partial seizures (adjunct), post-herpetic neuralgia, diabetic neuropathy, fibromyalgia, RLS.
PRE-ASSESS	Renal function (dose adjust), opioid use (respiratory depression risk), suicidality, mood.
LABS	Renal function. No drug levels.
MOST DANGEROUS AE	Respiratory depression with opioids (FDA warning), suicidality, severe rash (rare DRESS).
COMMON SE	Sedation, dizziness, peripheral edema, weight gain, ataxia, blurred vision.
HOLD / NOTIFY	Severe sedation with opioids, suicidality, severe edema/weight gain, rash.
ANTIDOTE	No antidote. Supportive. Hemodialysis for overdose.
TEACHING	Take consistently — abrupt stop = withdrawal. No alcohol. Antacids: separate by 2 hr. Report severe drowsiness with other meds.
NURSING ACTION	Monitor combined sedation with opioids/benzos.
NGN CUE	Older adult on gabapentin + morphine + lorazepam: RR 8, somnolent, hard to arouse. →

CARD 20 / 20

SAFETY ALERT • TD-SPECIFIC

Valbenazine / Deutetrabenazine

VMAT2 inhibitor · Ingrezza / Austedo

FDA-approved specifically for tardive dyskinesia.

Reduces dopamine release by inhibiting vesicular packaging. *Do not give benztropine for TD — give VMAT2 inhibitor.*

EXPAND FULL CARD ↑

MECHANISM	Inhibits VMAT2, reducing dopamine packaging into synaptic vesicles. Less dopamine release → less hyperkinetic movement.
INDICATION	Tardive dyskinesia (valbenazine); TD + Huntington chorea (deutetrabenazine).
PRE-ASSESS	Baseline ECG (QT), depression/suicidality screen (esp. deutetrabenazine), AIMS.
LABS	ECG; AIMS q 3 months; mood screening.
MOST DANGEROUS AE	Depression and suicidality (esp. deutetrabenazine in Huntington), QT prolongation, NMS, somnolence/falls.
COMMON SE	Somnolence, balance problems, headache, dry mouth, nausea.
HOLD / NOTIFY	New depression, suicidality, NMS, QTc >500.
ANTIDOTE	No specific.
TEACHING	Continue antipsychotic — VMAT2 does NOT replace it. Report new sadness or hopelessness.
NURSING ACTION	Screen for depression at each visit. Coordinate AIMS with psychiatrist.
NGN CUE	Client with Huntington on deutetrabenazine: new severe depression, "I'd be better off dead." → Suicidality — safety assessment, dose reduction/discontinuation.

Combined CNS depression –
naloxone, support, review meds.

PRIORITY QUESTION

Client with diabetic neuropathy on gabapentin uses oxycodone PRN. Which statement requires **immediate intervention**?

- A. "I'll take gabapentin three times daily as scheduled."
- B. "If pain is bad, I'll take extra oxycodone with my gabapentin."
- C. "I may feel dizzy when I start."
- D. "I'll separate my antacid by 2 hours."

ANSWER • B

B. Combined gabapentinoid + opioid significantly increases respiratory depression and death. Must teach unsafe.

💡 **Tip:** Gabapentin = "*Gaba-pain*" – nerve pain more than seizures. New black box: gabapentin + opioid = respiratory depression.

PRIORITY QUESTION

Client on long-term haloperidol develops persistent involuntary tongue and facial movements. Which class is **specifically** indicated?

- A. Anticholinergic (benztropine)
- B. Dopamine agonist (bromocriptine)
- C. VMAT2 inhibitor (valbenazine)
- D. Benzodiazepine (lorazepam)

ANSWER • C

C. TD = VMAT2 inhibitor (valbenazine, deutetrabenazine). **A** worsens TD. **B** for NMS. **D** masks but doesn't treat.

💡 **Tip:** EPS cheat sheet – *Acute dystonia/parkinsonism* → *benztropine*. *Akathisia* → *propranolol/benzo*. *NMS* → *dantrolene/bromocriptine*. *TD* → *VMAT2*.

SECTION 02 5 must-not-miss *safety rules*

These rules are absolute. They show up disguised in case studies, prioritization items, and SATAs.

01 Lithium toxicity hides in dehydration and sodium loss.

If a client on lithium reports **vomiting, diarrhea, sweating, low-sodium diet, new NSAID, ACE inhibitor, or thiazide diuretic** – assume the lithium level is rising. **Hold the dose**, draw a STAT level, and notify the provider. Coarse tremor + ataxia + slurred speech = level >2.0 mEq/L and possibly dialysis territory.

02 Any rash on lamotrigine, carbamazepine, or phenytoin = stop and call.

Stevens-Johnson syndrome and TEN can be fatal. Risk highest in the **first 8 weeks**, with **rapid titration**, or in clients of Asian descent with HLA-B*1502 (carbamazepine, phenytoin). Look for fever + mucosal involvement (mouth, eyes, genitals) + flat red rash that spreads. Never "watch and wait."

03 NMS = STOP, COOL, FLUIDS, DANTROLENE.

Neuroleptic malignant syndrome can occur with *any antipsychotic at any time*. Recognize: **fever (often >102°F)**, **severe "lead-pipe" muscle rigidity**, **altered mental status**, **autonomic instability (BP/HR fluctuating)**, **elevated CPK (often >1,000)**. Stop the drug immediately, transfer to ICU, give dantrolene or bromocriptine, cooling, IV fluids. Mortality 10–20% without treatment.

04 Clozapine requires ANC verification before EVERY dispense.

Clozapine REMS: **weekly ANC × 6 months, then biweekly × 6 months, then monthly for life**. ANC <1,500 – hold and recheck. <1,000 – high alert. <500 – usually permanent discontinuation. Also screen weekly for **myocarditis (especially weeks 2–4)**: chest pain, dyspnea, tachycardia, elevated troponin.

05 Status epilepticus order: ABCs → Benzo → AED → Phenobarbital/anesthesia.

If seizure >5 minutes or two seizures without recovery – **airway and oxygen first**, then **IV lorazepam 4 mg (or 0.1 mg/kg)**. Never start with phenytoin or levetiracetam. After 2 benzo doses, escalate to **fosphenytoin, levetiracetam, or valproate IV**. Refractory → phenobarbital or anesthetic infusion in ICU. Check glucose – hypoglycemia mimics seizures.

SECTION 03 5 dosage & safety calculations

Click each "Show work" to expand the full solution with stepwise calculations and safety reasoning.

CALC 01 • LITHIUM

A client weighing 70 kg is prescribed **lithium carbonate 900 mg PO daily** divided into 3 doses. The pharmacy supplies 300-mg tablets. The client's serum lithium today is 0.8 mEq/L. How many tablets will the nurse administer per dose, and is the level therapeutic?

SHOW WORK ↓

900 mg ÷ 3 doses = 300 mg per dose
300 mg ÷ 300 mg/tab = **1 tablet per dose**

Therapeutic = 0.6–1.2 mEq/L → 0.8 is **therapeutic and safe to administer**.

CALC 02 • PHENYTOIN IV RATE

A client in status epilepticus is prescribed **phenytoin 1,000 mg IV loading dose**. Max rate is **50 mg/min**. Diluted in 100 mL NS. What is the **minimum** infusion time, and pump rate in mL/hr?

SHOW WORK ↓

Min time: 1,000 mg ÷ 50 mg/min = 20 minutes
Pump rate: 100 mL ÷ 20 min × 60 min/hr = 300 mL/hr

Min infusion = 20 min; pump = 300 mL/hr. Use cardiac monitor, BP q 5 min. NS only (never D5W – precipitates). Large vein.

CALC 03 • LEVETIRACETAM (PEDS)

A 6-year-old child weighing **22 kg** is prescribed **levetiracetam 20 mg/kg PO BID**. Solution: **100 mg/mL**. How many mL per dose?

SHOW WORK ↓

Dose: $22 \text{ kg} \times 20 \text{ mg/kg} = 440 \text{ mg/dose}$

Volume: $440 \text{ mg} \div 100 \text{ mg/mL} = \mathbf{4.4 \text{ mL per dose}}$

Within pediatric range (10–30 mg/kg/dose BID). 20 mg/kg is appropriate.

CALC 04 • LORAZEPAM (PEDS STATUS)

A 4-year-old child weighing **18 kg** is in status epilepticus. **Lorazepam 0.1 mg/kg IV STAT, max 4 mg**. Vial: 2 mg/mL. How many mg and mL?

SHOW WORK ↓

Dose: $18 \text{ kg} \times 0.1 \text{ mg/kg} = 1.8 \text{ mg}$ (under 4 mg max – OK)

Volume: $1.8 \text{ mg} \div 2 \text{ mg/mL} = \mathbf{0.9 \text{ mL IV push}}$

Administer over 2–5 min. Airway equipment, suction, O2 ready. May repeat once if seizure continues 5–10 min.

CALC 05 • HALOPERIDOL IM AGITATION

Adult client severely agitated. **Haloperidol 5 mg IM × 1, may repeat q30 min PRN, max 20 mg/24h**. Vial: 5 mg/mL. Already received 5 mg at 0800 and 5 mg at 0900. At 1000, agitation persists. **How much can the nurse safely give now, and how many mL?**

SHOW WORK ↓

Already given: $5 + 5 = 10 \text{ mg}$

24-hr max: 20 mg → Remaining: **10 mg available**

Single ordered PRN = 5 mg (within remaining).

Volume: $5 \text{ mg} \div 5 \text{ mg/mL} = \mathbf{1 \text{ mL IM}}$.

Safety check: Verify QTC, confirm benztropine PRN available for dystonia. Monitor for NMS.

SECTION 04 5 NGN-style items

Mixed formats: matrix, bow-tie, SATA, prioritization, cloze. Each integrates NCJMM clinical judgment with pharmacological reasoning.

MATRIX • RECOGNIZE CUES

NGN 01

A 34-year-old client with bipolar I disorder takes **lithium 600 mg BID**. The client reports flu symptoms with vomiting and diarrhea × 2 days. Today's findings: lithium level 1.9 mEq/L (last week 0.9); sodium 128; coarse hand tremor; ataxia; BP 102/64, HR 102; BUN 32, creatinine 1.3.

For each finding, indicate whether it is a **cue of lithium toxicity**, **expected finding**, or **unrelated**:

FINDING	TOXICITY CUE	EXPECTED	UNRELATED
Lithium level 1.9 mEq/L	✓		
Sodium 128 mEq/L	✓		
Coarse hand tremor and ataxia	✓		
BUN 32, creatinine 1.3 (dehydration)	✓		
HR 102	✓		

RATIONALE

All five cluster as lithium toxicity. Volume loss from V/D triggered hyponatremia and prerenal azotemia (high BUN/Cr), causing the kidney to reabsorb more lithium — driving the level from 0.9 to 1.9. Coarse tremor (vs expected fine), ataxia, and tachycardia (autonomic toxicity) signal moderate-to-severe toxicity. **Priority:** Hold lithium, IV NS, prepare for possible hemodialysis if level >2.5 or worsening neuro.

BOW-TIE • PRIORITIZE/TAKE ACTION

NGN 02

A 22-year-old client with schizophrenia has been receiving **haloperidol 5 mg IM** every 4 hours for 48 hours. The nurse finds the client with temp 103.6°F, HR 132, BP 168/98, severe lead-pipe rigidity, diaphoresis, mumbling, CPK 8,400 U/L.

ACTIONS TO TAKE

- ✓ Discontinue haloperidol immediately
- ✓ Initiate IV NS bolus and cooling measures
- ✓ Prepare dantrolene and call rapid response
- Administer additional haloperidol
- Apply restraints

CONDITION MOST LIKELY

Neuroleptic Malignant Syndrome (NMS)

PARAMETERS TO MONITOR

- ✓ Core temperature continuously
- ✓ CPK and renal function (rhabdo)
- ✓ Cardiac rhythm and BP every 15 min
- AIMS test in 3 months
- Routine fasting lipids

RATIONALE

NMS tetrad: fever, lead-pipe rigidity, altered mental status, autonomic instability + elevated CPK. Mortality 10–20% without rapid intervention. Stop the agent, cool aggressively, fluid resuscitate (rhabdomyolysis → AKI), give dantrolene 1–2.5 mg/kg IV. Distractor actions risk worsening rigidity and aspiration.

SATA • ANALYZE CUES

NGN 03

A nurse is reviewing teaching for a client newly prescribed **clozapine** for treatment-resistant schizophrenia. Which client statements indicate the **need for further teaching**? *Select all that apply.*

"I'll go for weekly blood tests for the first 6 months."

✓ "If I get a sore throat or fever, I can just take some ibuprofen until my next appointment."

✓ "I plan to quit smoking next month — I won't need to change anything with my medication."

"I'll watch for chest pain or difficulty breathing, especially in the first month."

✓ "Drooling at night is bad — I should stop my medication if it happens."

"I'll use stool softeners to prevent constipation."

✓ "It's okay to skip my labs if I feel fine that week."

RATIONALE

Statements 2, 3, 5, 7 require further teaching. 2: Fever + sore throat = possible agranulocytosis — emergency ANC check, NOT OTC self-treatment. 3: Smoking induces CYP1A2; quitting can double clozapine levels → toxicity. The provider must adjust the dose. 5: Hypersalivation is expected — not a reason to stop. 7: Clozapine cannot be dispensed without documented ANC (REMS). Others are correct.

PRIORITIZATION • TAKE ACTION

NGN 04

A nurse on a neuroscience unit is caring for 4 clients. Which should the nurse assess **FIRST**?

A 70-year-old on phenytoin with a level of 18 mcg/mL and mild ataxia documented on shift report.

A 45-year-old on valproate × 2 weeks with mild GI upset and platelets 195,000/mm³.

✓ A 23-year-old on lamotrigine + valproate for bipolar disorder with a temp of 101°F and a new spreading red rash with mouth blisters.

A 58-year-old on lithium for 5 years with a fine hand tremor and TSH of 5.5 mIU/L.

RATIONALE

The 23-year-old has SJS until proven otherwise. Lamotrigine + valproate dramatically raises lamotrigine levels and SJS risk; rash + mucosal involvement + fever is the classic SJS triad — life-threatening dermatologic emergency. **A** — phenytoin therapeutic, ataxia mild and known. **B** — GI common, platelets normal. **D** — fine tremor and mild subclinical hypothyroidism are chronic and not emergent.

CLOZE/DROP-DOWN • GENERATE SOLUTIONS

NGN 05

Complete each statement by selecting the correct option.

The client experiencing acute dystonic reaction from haloperidol should receive **benztropine IM** [options: benztropine IM / dantrolene IV / valbenazine PO / lorazepam IM].

The maximum IV infusion rate of phenytoin in an adult without cardiac history is **50 mg/min** [options: 25 / 50 / 100 / 150 mg/min].

A client in status epilepticus should first receive **IV lorazepam** [IV phenytoin / IV lorazepam / IV phenobarbital / IV levetiracetam], followed by maintenance with **fosphenytoin or levetiracetam** [another benzodiazepine / fosphenytoin or levetiracetam / haloperidol / clozapine].

Tardive dyskinesia is best treated with **a VMAT2 inhibitor** [an anticholinergic / a VMAT2 inhibitor / a benzodiazepine / a dopamine agonist].

RATIONALE

Acute dystonia → anticholinergics (benztropine or diphenhydramine IM). Phenytoin max IV rate = 50 mg/min in adults (25 elderly/cardiac). Status algorithm: ABCs → benzo → AED maintenance → phenobarbital/anesthesia if refractory. TD requires VMAT2 inhibitors (valbenazine, deutetrabenazine) — anticholinergics worsen TD.

SECTION 05 Mini case study with NCJMM

Six-step clinical judgment walkthrough — recognize, analyze, prioritize, generate solutions, take action, evaluate outcomes.

Scenario: Mr. K is a 56-year-old man with schizoaffective disorder admitted to the inpatient psychiatric unit for medication restart after 4 months of nonadherence. He was previously stable on **olanzapine 20 mg HS**. He has type 2 diabetes (HbA1c 7.4), obesity (BMI 34), and BPH. On day 3, the provider also restarts **haloperidol 5 mg IM PRN q4h for agitation** and **lorazepam 2 mg IM PRN q4h for severe agitation**. At 2200, Mr. K receives both PRN doses for severe agitation. By 0200, the nurse finds him difficult to arouse with shallow breathing.

Findings at 0200:

- Temp 98.6°F, HR 58, BP 88/52, RR 8, SpO2 86% on room air
- Responsive only to sternal rub
- Glucose 215 mg/dL; Pupils 3 mm, sluggish

STEP 1 • RECOGNIZE CUES

Key cues: **respiratory depression (RR 8, SpO2 86%)**, hypotension (88/52), bradycardia (HR 58), reduced LOC, recent **concurrent IM olanzapine + IM lorazepam**, history of obesity + diabetes. **Red flag: olanzapine IM + benzodiazepine IM is a black box warning for cardiorespiratory depression.**

STEP 2 • ANALYZE CUES

The combination produces synergistic CNS, respiratory, and cardiovascular depression. Reduced LOC, low BP/HR/RR, and low SpO2 reflect drug-induced respiratory failure rather than NMS (no fever, no rigidity) or stroke (no focal deficits). Hyperglycemia is consistent with diabetes + olanzapine. **Working hypothesis: drug-induced cardiorespiratory depression from concurrent olanzapine + lorazepam IM.**

STEP 3 • PRIORITIZE HYPOTHESES

Most likely/urgent: Combined olanzapine + benzo respiratory depression.

Less likely but consider: Aspiration pneumonia, opioid overdose (none ordered), CVA, hypoglycemia (ruled out – 215). Priority is airway and breathing regardless of cause.

STEP 4 • GENERATE SOLUTIONS

Options:

- **Call rapid response** – yes
- **Reverse benzodiazepine with flumazenil 0.2 mg IV slowly** – appropriate if no chronic benzo dependence (lorazepam just restarted, lower risk of precipitated seizure)
- **Support airway and oxygenation** – bag-mask, prepare for intubation
- **IV fluid bolus** for hypotension
- **Hold all sedating medications** until reassessed

STEP 5 • TAKE ACTION

Priority order:

1. Call rapid response team.
2. Open airway, position, apply 100% O2 via NRB, prepare bag-mask.
3. Establish IV access; bolus 500 mL NS.
4. Administer **flumazenil 0.2 mg IV** over 15 sec; may repeat every minute (max 1 mg).
5. Hold all sedating medications; clarify olanzapine + lorazepam co-administration with provider.
6. Continuous monitoring: SpO2, ECG, BP q 5 min, RR, LOC.
7. Notify provider and pharmacy of medication interaction; document in safety event reporting.

STEP 6 • EVALUATE OUTCOMES

Expected improvement (15–30 min): RR $\geq$ 12, SpO₂ $\geq$ 94% on supplemental O₂, BP $\geq$ 100 systolic, LOC improving, HR $>$ 60.

If no improvement: escalate to intubation, ICU transfer; consider other causes (CT head, metabolic labs).

System change: Update unit protocol to prevent concurrent IM olanzapine + IM lorazepam; pharmacist double-check; staff education. Educate Mr. K and family on the interaction.

SECTION 06 Red flags — stop the medication

If you see any of these findings on NCLEX, the answer is to *stop, hold, call, antidote, or activate rapid response*. Memorize.

Lithium level >1.5 mEq/L

HOLD + call provider. Especially with vomiting, diarrhea, sodium loss, or new NSAID/ACE/thiazide. >2.5 + symptoms $\rightarrow$ hemodialysis.

ALT $>3\times$ upper limit on valproate

HOLD + call provider. Black box hepatotoxicity. Also: severe abdominal pain + $\uparrow$ lipase (pancreatitis), confusion (hyperammonemia), bruising (thrombocytopenia).

Any new rash on lamotrigine / carbamazepine / phenytoin

STOP drug + call provider. SJS/TEN — esp. with fever, mucosal involvement, blisters. Never “watch and wait.”

NMS tetrad: Fever + Rigidity + ALOC + Autonomic instability

STOP antipsychotic + RAPID RESPONSE. Cooling, IV fluids, dantrolene or bromocriptine, ICU. CPK often $>1,000$.

Clozapine: ANC $<1,500$

HOLD + recheck. $<1,000$ high alert; <500 STOP permanently. Also: chest pain/dyspnea/tachycardia weeks 2–4 (myocarditis); fever/sore throat/mouth ulcers (infection).

Acute dystonia (oculogyric crisis, opisthotonos)

Give benztropine or diphenhydramine IM STAT. Airway muscles can spasm (laryngospasm). Within minutes.

Phenytoin: nystagmus $\rightarrow$ ataxia $\rightarrow$ slurred speech

HOLD + draw level. Toxicity ladder. Also: IV site purple discoloration = *purple glove syndrome* — stop infusion, do NOT pull IV, elevate.

Seizure >5 minutes or 2 without recovery

ABCs $\rightarrow$ IV lorazepam 4 mg (0.1 mg/kg peds) STAT. Check glucose. Then maintenance AED (fosphenytoin / levetiracetam / valproate).

Topiramate: sudden eye pain + blurred vision + halos

STOP drug + ophthalmology STAT. Acute angle-closure glaucoma in first month — can cause permanent vision loss.

Aripiprazole: new gambling / hypersexuality / binge eating

Notify provider. Drug-induced impulse-control disorder — typically resolves with dose reduction or switch.

Tardive dyskinesia (tongue protrusion, lip smacking)

Notify provider; do NOT give benztropine. Reduce/switch antipsychotic + start VMAT2 inhibitor (valbenazine / deutetrabenazine).

Suicidal ideation on AED or antipsychotic

Safety assessment + notify provider. Almost all AEDs and antipsychotics carry suicidality warnings — never dismiss as expected.

SECTION 07 Confusing *drugs* — side-by-side

These pairs trip up the most students. Memorize the differences in one glance.

Lithium vs Valproate — for bipolar

LITHIUM

- Therapeutic 0.6–1.2 mEq/L (toxic >1.5)
- Best for classic mania & suicide prevention
- Onset 5–7 days for mania; 2–3 wks full
- Toxicity from sodium/water loss
- Causes hypothyroidism, polyuria (nephrogenic DI)
- Antidote = hemodialysis
- Pregnancy: Ebstein anomaly

VALPROATE

- Therapeutic 50–100 mcg/mL
- Best for mixed/rapid-cycling mania
- Onset ~5 days for mania
- Toxicity from CYP interactions
- Causes hepatotoxicity, pancreatitis, thrombocytopenia
- Antidote = L-carnitine for hyperammonemia
- Pregnancy: spina bifida (avoid)

Haloperidol vs Risperidone vs Clozapine

HALOPERIDOL (TYPICAL)

- Highest EPS / NMS risk
- Lowest metabolic risk
- Decanoate IM q 2–4 wks
- Antidote dystonia: benztropine
- Use for acute agitation / delirium

RISPERIDONE (ATYPICAL)

- Moderate EPS, moderate metabolic
- Highest prolactin → gynecomastia
- Only atypical FDA-approved for autism
- Consta IM q 2 wks
- Good for adolescents (FDA pediatric)

CLOZAPINE (ATYPICAL)

- Lowest EPS, lowest TD risk
- BUT – agranulocytosis, myocarditis
- Weekly ANC × 6 mo (REMS)
- Only drug proven to ↓ suicide in schizophrenia
- Signature: hypersalivation

Olanzapine vs Quetiapine vs Aripiprazole

OLANZAPINE

- Highest metabolic risk
- Major weight gain, DKA risk
- NEVER IM with benzodiazepine
- Take at bedtime (sedating)

QUETIAPINE

- Lowest EPS
- Heavy sedation + orthostasis
- First choice in Parkinson psychosis
- Eye exam q 6 mo (cataracts)

ARIPIPAZOLE

- Lowest metabolic risk
- Causes akathisia + impulse-control disorders
- D2 partial agonist (unique)
- Favored for kids/teens

Carbamazepine vs Lamotrigine — for SJS risk

CARBAMAZEPINE

- First-line for trigeminal neuralgia
- HLA-B*1502 testing in Asian-descent
- Strong CYP3A4 inducer
- Causes hyponatremia (SIADH)
- Aplastic anemia, agranulocytosis
- Reduces OC effectiveness

LAMOTRIGINE

- First-line for bipolar depression
- SJS especially with rapid titration
- Half-dose if combined with valproate
- No CYP induction
- No routine drug levels
- No marrow suppression

Phenytoin vs Fosphenytoin — for IV use

PHENYTOIN

- Saline ONLY (precipitates in D5W)
- Max 50 mg/min IV (25 elderly/cardiac)
- Risk: purple glove syndrome
- Cannot give IM
- Dosed in mg

FOSPHENYTOIN

- Compatible with NS or D5W
- Max 150 mg PE/min IV
- Safer extravasation profile
- Can give IM
- Dosed in PE (phenytoin equivalents)

EPS treatments — pick the right one

ACUTE DYSTONIA / PARKINSONISM

- **Benztropine IM** or diphenhydramine IM
- Onset 15–30 minutes
- Hours after starting antipsychotic
- NEVER for tardive dyskinesia

AKATHISIA

- **Propranolol** or benzodiazepine
- Or dose reduction / switch
- Days–weeks after starting
- Easily mistaken for worsening psychosis

NMS

- **Dantrolene** ± bromocriptine
- STOP antipsychotic + cooling + fluids
- Can occur anytime
- Medical emergency

TARDIVE DYSKINESIA

- **Valbenazine** or deutetrabenazine (VMAT2)
- NEVER benztropine (worsens TD)
- Months to years of exposure
- Often irreversible

Status epilepticus drugs — in order

1. LORAZEPAM IV

- Adult: 4 mg IV
- Peds: 0.1 mg/kg
- If no IV → midazolam IM 10 mg
- Or diazepam rectal 0.2 mg/kg
- Reversal: flumazenil (caution)

2. FOSPHENYTOIN OR LEVETIRACETAM IV

- Fosphenytoin 20 mg PE/kg, max 150 mg PE/min
- Levetiracetam 60 mg/kg IV (max 4.5 g)
- Or valproate 40 mg/kg IV
- For maintenance after benzo

3. PHENOBARBITAL / ANESTHESIA

- Phenobarbital 15–20 mg/kg IV
- Or propofol / midazolam infusion
- ICU + intubation
- Refractory status

SECTION 08 Day 11 infographic

Single-page summary — therapeutic ranges, drug families at a glance, EPS treatments, status algorithm, and pregnancy contraindications.

Psych & Neuro Pharm *Part 2*

Mood stabilizers · Antipsychotics · Anticonvulsants

LITHIUM

0.6–1.2

mEq/L · trough at 12 h

VALPROATE

50–100

mcg/mL

CARBAMAZEPINE

4–12

mcg/mL

PHENYTOIN

10–20

mcg/mL · total

PHENOBARBITAL

15–40

mcg/mL

MOOD STABILIZERS

- ▶ **Lithium** — classic mania, suicide prevention. Watch **Na+ & volume loss**. Antidote: **dialysis**.
- ▶ **Valproate** — mixed/rapid cycling. Watch **liver, pancreas, platelets, pregnancy**.
- ▶ **Carbamazepine** — trigeminal neuralgia. Watch **SJS, low Na+, marrow**.
- ▶ **Lamotrigine** — depression bipolar. Any rash → **stop**.

TYPICAL ANTIPSYCHOTIC

- ▶ **Haloperidol** — highest EPS & NMS, lowest metabolic.
- ▶ Use for **acute agitation, delirium, Tourette**.
- ▶ IM decanoate q 2–4 wks.
- ▶ Acute dystonia → **benztropine IM**.
- ▶ Black box: dementia mortality.

ATYPICAL ANTIPSYCHOTICS

- ▶ **Risperidone** — highest **prolactin** (gynecomastia).
- ▶ **Olanzapine** — **metabolic**; never IM with highest benzo.
- ▶ **Quetiapine** — lowest EPS; **Parkinson psychosis**.
- ▶ **Aripiprazole** — lowest metabolic; **impulse-control disorders**.
- ▶ **Ziprasidone** — **QT prolongation**; take with 500-cal meal.
- ▶ **Clozapine** — treatment-resistant; **ANC weekly**.

ANTICONSULSANTS

- ▶ **Phenytoin** — saline only, max 50 mg/min, **purple glove**.
- ▶ **Fosphenytoin** — water-soluble, IM-capable, 150 PE/min.
- ▶ **Levetiracetam** — clean; watch **behavior changes**.
- ▶ **Phenobarbital** — refractory only; respiratory depression.
- ▶ **Topiramate** — stones, weight loss, acidosis, glaucoma.
- ▶ **Gabapentin/Pregabalin** — neuropathic pain; **+ opioid risk**.

STATUS EPILEPTICUS ALGORITHM

- **0-5 min:** ABCs + O₂ + glucose check.
- **5-20 min:** Lorazepam 4 mg IV (or midazolam IM / diazepam rectal).
- **20-40 min:** Fosphenytoin 20 mg PE/kg or levetiracetam 60 mg/kg or valproate 40 mg/kg.
- **>40 min refractory:** Phenobarbital or anesthetic infusion + ICU.

EPS – PICK THE RIGHT ANTIDOTE

- **Acute dystonia** (hours) → **benztropine IM**.
- **Akathisia** (days) → **propranolol or benzo**.
- **Parkinsonism** (weeks) → **benztropine PO** or dose ↓.
- **Tardive dyskinesia** (months) → **valbenazine (VMAT2)**.
- **NMS** (anytime) → **STOP + dantrolene**.

PREGNANCY – AVOID

- **Lithium** → Ebstein cardiac anomaly.
- **Valproate** → neural tube defects (spina bifida).
- **Carbamazepine** → neural tube defects.
- **Phenytoin** → fetal hydantoin syndrome.
- **Topiramate** → cleft palate.
- Confirm pregnancy test + two forms of contraception.

STOP-THE-DRUG TRIGGERS

- Any rash on lamotrigine / carbamazepine / phenytoin.
- Lithium >1.5 with sx or >2.5 (dialysis).
- ALT >3× ULN on valproate.
- NMS tetrad on any antipsychotic.
- ANC <1,500 on clozapine.
- QTc >500 on ziprasidone / haloperidol.
- Eye pain + vision change on topiramate.