NCLEX-RN 2026 · DAILY PHARMACOLOGY MASTERY

Day 10 — Antidepressants & *Serotonin Crisis*

SSRIS · SNRIS · TCAS · MAOIS · BUPROPION · TRAZODONE · BUSPIRONE · SEROTONIN SYNDROME · HYPERTENSIVE CRISIS

§ 01 Advanced Flashcards

Twenty-two application-level cards aligned to the 2026 NCLEX-RN Test Plan: Pharmacological & Parenteral Therapies, Psychosocial Integrity, Reduction of Risk Potential, and Safety & Infection Prevention and Control. Black-box and emergency content marked.

Sertraline

COMMONLY TESTED

ZOLOFT · SSRI

MECHANISM
Selectively inhibits presynaptic serotonin (5-HT) reuptake → ↑ synaptic serotonin → improved mood, decreased anxiety. Minimal effect on NE or DA.

INDICATION
Major depression, GAD, panic disorder, OCD, PTSD, social anxiety, premenstrual dysphoric disorder. Often **first-line** SSRI in pregnancy and breastfeeding (best safety data).

PRE-ASSESSMENT
Suicidality screen (PHQ-9, C-SSRS), MAOI use within 14 days, current serotonergic agents (tramadol, triptans, linezolid, St. John's wort), pregnancy/lactation, bleeding risk, hyponatremia risk (elderly, diuretics).

LABS/MONITOR
Baseline LFTs, sodium (esp. in older adults — SIADH risk), pregnancy test, suicidal ideation at every visit × first 12 weeks.

WORST AE
Serotonin syndrome (with serotonergic combos); suicidal ideation in patients <25 (black-box); SIADH/hyponatremia in elderly.

SIDE EFFECTS
Nausea, diarrhea (very common — Zoloft is the most GI of SSRIs), insomnia or somnolence, sexual dysfunction, headache, weight changes, GI bleeding (esp. + NSAIDs).

HOLD/NOTIFY
New or worsening suicidal thoughts, manic switch (hypomania), serotonin syndrome signs (hyperthermia, clonus, agitation), Na^+ <130, severe rash (Stevens-Johnson rare).

ANTIDOTE
No specific reversal. Serotonin syndrome → stop drug, cooling, benzodiazepines, **cyproheptadine** (serotonin antagonist).

TEACHING
Takes 4–6 weeks for full effect; do *not* stop abruptly (discontinuation syndrome — dizzy, flu-like, "brain zaps"); avoid alcohol; report new suicidal thoughts; take in AM if insomnia, PM if drowsy; sexual side effects often improve over time.

NURSING
Establish therapeutic relationship; assess suicidality at each contact during initiation (energy returns before mood lifts → highest suicide risk window); monitor sodium in elderly.

NGN CUE · *Day 10 of sertraline therapy in a 19-year-old: patient reports "I finally have the energy to do what I've been thinking about."*

Fluoxetine

COMMONLY TESTED

PROZAC, SARAFEM · SSRI

MECHANISM
SSRI with the **longest half-life** (active metabolite norfluoxetine ~7–15 days) → no taper required at discontinuation, fewer withdrawal symptoms.

INDICATION
Depression, OCD, bulimia (only SSRI FDA-approved for bulimia), PMDD, panic disorder, pediatric depression (FDA-approved age ≥8).

PRE-ASSESSMENT
Same SSRI workup. Critical: **5-week washout** before starting an MAOI (vs. 14 days for shorter SSRIs) because of its prolonged half-life. Bulimia screening (electrolytes, ECG for QT).

LABS/MONITOR
Electrolytes, baseline ECG if eating disorder, suicidality, pregnancy planning.

WORST AE
Serotonin syndrome; suicidality (black-box); QT prolongation at higher doses; severe drug interactions via CYP2D6 inhibition (TCAs, codeine, tamoxifen, metoprolol).

SIDE EFFECTS
Activating (insomnia, jitteriness, anorexia) more than other SSRIs — give in AM. Sexual dysfunction, headache, GI upset.

HOLD/NOTIFY
Serotonin syndrome cues, suicidality, prolonged QT, severe weight loss.

ANTIDOTE
None specific; cyproheptadine for serotonin syndrome.

TEACHING
Take in morning; do not need to taper but expect delayed onset of withdrawal if stopped; many drug interactions — show every provider/pharmacist; full effect at 4–6 weeks.

NURSING
Most activating SSRI → AM dosing; verify 5-week washout before MAOI; recognize CYP2D6 interactions (tamoxifen efficacy reduced, metoprolol levels rise).

NGN CUE · *A breast-cancer survivor on tamoxifen is started on fluoxetine — this combination reduces tamoxifen's protective metabolite → recommend an SSRI without CYP2D6 inhibition (escitalopram, sertraline).*

PRIORITY QUESTION

A client has been taking fluoxetine 40 mg daily for 2 years. The provider plans to switch to phenelzine. What is the nurse's priority action?

— recognize the early-improvement suicide window.

PRIORITY QUESTION

A 17-year-old is started on sertraline 50 mg PO daily for major depression. Which statement by the parent indicates the highest priority for teaching?

A. "It may take several weeks before we see improvement."
B. "We will keep all firearms locked and remove leftover medications from the home."
C. "She might feel nauseated when she first starts the medication."
D. "She should avoid drinking alcohol while taking this."

Correct: B. The FDA black-box warning identifies increased suicidality in patients <25 during the first weeks of antidepressant therapy. Means-restriction (lethal-means counseling) is the single highest-priority safety intervention. A, C, D are accurate teaching points but secondary to lethality reduction.

✱ **TEST-TAKING TIP —** *If a vignette mentions "antidepressant + adolescent/young adult + recent start," scan for suicidality cues and means-restriction teaching before anything else.*

A. Begin phenelzine 24 hours after the last fluoxetine dose.
B. Cross-taper fluoxetine and phenelzine over 7 days.
C. Discontinue fluoxetine and wait 5 weeks before starting phenelzine.
D. Reduce fluoxetine to 20 mg daily and add phenelzine.

Correct: C. Fluoxetine's long-acting metabolite requires a **5-week washout** before any MAOI to prevent serotonin syndrome. Other SSRIs need only 14 days. Choices A, B, D combine serotonergic drugs and can be lethal.

✱ **TEST-TAKING TIP —** *"Fluoxetine = 5-week washout" — every other SSRI = 14-day washout. Memorize this single exception.*

Escitalopram

COMMONLY TESTED

LEXAPRO · SSRI

MECHANISM	S-enantiomer of citalopram → highly selective SSRI; cleanest receptor profile (fewest drug interactions of the SSRIs).
INDICATION	Major depression and GAD (FDA-approved age ≥12 for depression, ≥7 for GAD); often preferred for medically complex/elderly clients.
PRE-ASSESSMENT	Suicidality, MAOI use, baseline ECG only at high doses or risk factors (less QT effect than citalopram), pregnancy, bleeding history.
LABS/MONITOR	Suicidality, Na^+ in elderly, ECG if cardiac risk; LFTs at baseline.
WORST AE	Serotonin syndrome, suicidality (black-box), hyponatremia/SIADH, very rare QT prolongation.
SIDE EFFECTS	Nausea, headache, somnolence/insomnia, sexual dysfunction, sweating.
HOLD/NOTIFY	Suicidality, serotonin syndrome, severe rash, Na^+ <130.
ANTIDOTE	None specific.
TEACHING	4–6 weeks for full effect; do not stop abruptly; report serotonin-syndrome symptoms; safer drug-interaction profile but still avoid MAOIs, tramadol, triptans, St. John's wort without provider review.
NURSING	Often selected when patient is on many other medications (statins, anticoagulants, β-blockers) because of low CYP interaction; still requires standard SSRI safety teaching.

NGN CUE · *A 78-year-old on HCTZ and escitalopram becomes confused on day 14 — check sodium first (SIADH/hyponatremia is the SSRI complication with the highest incidence in older adults).*

PRIORITY QUESTION

An 80-year-old client on escitalopram 10 mg and hydrochlorothiazide presents with confusion and unsteady gait. Which lab is the priority?

A. Serum sodium
B. Serum potassium
C. Serum digoxin level
D. BUN/creatinine

Correct: A. SSRI + thiazide is a classic SIADH/hyponatremia combination → confusion, ataxia, seizures. Acute Na^+ <125

Paroxetine

SAFETY-ALERT

PAXIL · SSRI

MECHANISM	SSRI with the **strongest anticholinergic** activity and shortest half-life among SSRIs.
INDICATION	Depression, GAD, panic, PTSD, social anxiety, OCD, PMDD, vasomotor menopausal symptoms (only non-hormonal SSRI approved).
PRE-ASSESSMENT	Pregnancy (**Category D — cardiac malformations, esp. first trimester**), anticholinergic burden in elderly, glaucoma, urinary retention, current MAOI/serotonergics.
LABS/MONITOR	Pregnancy test, suicidality, BP/HR, anticholinergic side-effect screen in elderly.
WORST AE	Worst SSRI discontinuation syndrome (short half-life); teratogenicity; serotonin syndrome.
SIDE EFFECTS	Sedation, weight gain, dry mouth, constipation, sexual dysfunction, blurred vision.
HOLD/NOTIFY	Pregnancy, severe discontinuation symptoms, suicidality, glaucoma exacerbation, urinary retention.
ANTIDOTE	None specific.
TEACHING	Use reliable contraception; never stop abruptly (taper); take at bedtime if sedating; sip water and use sugarless gum for dry mouth; increase fiber.
NURSING	Avoid in pregnancy and elderly when possible; if discontinuing, taper slowly over weeks.

NGN CUE · *A 26-year-old taking paroxetine for 3 years reports a positive home pregnancy test — call provider immediately about teratogenic risk and safer alternatives (sertraline).*

PRIORITY QUESTION

Which SSRI is most likely to be discontinued when a patient discovers an unplanned pregnancy in the first trimester?

A. Sertraline
B. Paroxetine
C. Escitalopram
D. Fluoxetine

Correct: B. Paroxetine is FDA Category D — associated with congenital cardiac defects in first-trimester exposure.

is life-threatening. K^+ and BUN/Cr are reasonable adjuncts but Na^+ is the priority.

✱ **TEST-TAKING TIP —** *"Confusion in an elderly client on an SSRI + diuretic" → always check sodium before assuming dementia or stroke.*

Sertraline is generally the preferred SSRI in pregnancy.

✱ **TEST-TAKING TIP —** *SSRI + pregnancy → think **sertraline = safest, paroxetine = worst**.*

Citalopram

SAFETY-ALERT

CELEXA · SSRI

MECHANISM	SSRI; racemic mixture (R + S enantiomers). Dose-dependent QT prolongation.
INDICATION	Major depression.
PRE-ASSESSMENT	Baseline ECG (QTc), electrolytes (Mg^{2+}, K^{+}), other QT-prolonging drugs (ondansetron, methadone, antipsychotics, fluoroquinolones), liver function.
LABS/MONITOR	QTc baseline and on dose changes; potassium & magnesium; suicidality.
WORST AE	**QT prolongation → torsades de pointes**; serotonin syndrome; suicidality (black-box).
SIDE EFFECTS	Nausea, dry mouth, somnolence, increased sweating, sexual dysfunction.
HOLD/NOTIFY	QTc >500 ms, syncope, palpitations, hypomagnesemia/hypokalemia, dose >40 mg/day (≥60 in elderly contraindicated).
ANTIDOTE	Correct electrolytes; IV magnesium for torsades; defibrillation if unstable.
TEACHING	Report fainting/palpitations; don't exceed prescribed dose; tell every provider about citalopram before any new prescription.
NURSING	Max 40 mg/day (20 mg/day if >60 yrs, hepatic impairment, or CYP2C19 poor metabolizer); always check QTc + Mg/K before increasing dose.

NGN CUE · *QTc 510 ms in a patient on citalopram 40 mg + ondansetron 8 mg IV — recognize additive QT risk; hold both and notify provider.*

PRIORITY QUESTION

A 72-year-old on citalopram 40 mg daily complains of dizziness. Vital signs: HR 58, BP 118/72. ECG: QTc 530 ms. K^{+} 3.2, Mg^{2+} 1.4. Priority intervention?

A. Administer the next dose of citalopram and recheck QTc tomorrow.
B. Hold citalopram, replace potassium and magnesium, and notify provider.
C. Administer atropine 0.5 mg IV.
D. Request a 12-lead ECG in 4 hours.

Correct: B. QTc >500 ms with hypokalemia and hypomagnesemia is a torsades setup. Hold citalopram (elderly max is 20 mg), correct electrolytes, and call. Giving

SSRI Class · Discontinuation Syndrome

TEACHING-HEAVY

F.I.N.I.S.H.

WHAT IT IS	Abrupt SSRI cessation (esp. paroxetine, sertraline) → flu-like symptoms typically within 24–72 hr, lasting 1–2 weeks. **Not** addiction or relapse.
F.I.N.I.S.H. MNEMONIC	**F**lu-like · **I**nsomnia · **N**ausea · **I**mbalance (dizzy, ataxia) · **S**ensory disturbance ("brain zaps") · **H**yperarousal (anxiety, irritability)
HIGHEST RISK	Paroxetine > venlafaxine (SNRI) > sertraline. **Fluoxetine = lowest** risk because of long half-life self-tapers.
DIFFERENTIATION	Returns within days of stopping (vs. depression relapse over weeks); resolves quickly when drug restarted.
MANAGEMENT	Restart the same dose, then taper over 4–8+ weeks; consider switching to fluoxetine as a bridge.
TEACHING	"Never stop your SSRI abruptly. If you run out, call before you miss a dose. These symptoms are not a sign you are addicted."

NGN CUE · *A client stopped paroxetine 3 days ago "because I felt better" and now reports dizziness, electric shocks in the head, and nausea → recognize discontinuation syndrome, not stroke.*

PRIORITY QUESTION

A nurse hears a discharged client say, "I'll just stop the Paxil when I feel better." Best response?

A. "That's reasonable since SSRIs are non-addictive."
B. "Stopping suddenly may cause flu-like symptoms and dizziness — we need to taper it slowly with your provider."
C. "You'll need to take this medication for life."
D. "It's safer to switch to herbal St. John's wort first."

Correct: B. Communicates accurate teaching about discontinuation syndrome and partners with the client. A is misleading; C is inaccurate; D is dangerous (St. John's wort = serotonergic).

✱ TEST-TAKING TIP — *"Brain zaps + flu-like + recent SSRI stop" = discontinuation syndrome, not a new disease.*

more drug (A) worsens the QT. Atropine (C) is not indicated. Delaying ECG (D) misses the window.

✱ **TEST-TAKING TIP —** *"Citalopram + elderly + dose >20 mg" — always a trap. The maximum for ≥60 yrs is 20 mg/day.*

Venlafaxine

SAFETY-ALERT

EFFEXOR · SNRI

MECHANISM	Inhibits serotonin reuptake at lower doses; adds norepinephrine reuptake inhibition at higher doses (>150 mg).
INDICATION	Depression, GAD, panic disorder, social anxiety, neuropathic pain.
PRE-ASSESSMENT	BP (baseline + each visit — **dose-related hypertension**), MAOI/serotonergic agents, cardiac history, suicidality, pregnancy.
LABS/MONITOR	BP, HR, lipids, glucose, sodium, suicidality. Watch for hypertensive emergencies at high doses.
WORST AE	Hypertensive crisis, serotonin syndrome, suicidality (black-box), severe discontinuation syndrome (worst of SNRIs), seizures at high doses.
SIDE EFFECTS	Nausea, headache, sweating, insomnia, sexual dysfunction, dry mouth, weight loss initially.
HOLD/NOTIFY	SBP >180/DBP >110, severe HA, suicidality, manic switch.
ANTIDOTE	None specific; cyproheptadine for serotonin syndrome; standard antihypertensives if BP crisis.
TEACHING	Check BP at home; do *not* stop abruptly (worst SNRI for discontinuation); take with food; report severe headaches.
NURSING	Monitor BP at every visit and 2 weeks after each dose increase. Educate that ER doses are higher and steady plasma levels reduce withdrawal.

NGN CUE · *Patient on venlafaxine 300 mg/day: BP 168/102, HR 92, headache — escalating dose-related hypertension, not anxiety.*

PRIORITY QUESTION

A client titrated to venlafaxine XR 225 mg daily reports occipital headache, BP 178/108, and visual changes. Priority action?

A. Administer the next venlafaxine dose with food.
B. Hold venlafaxine and notify the provider immediately.
C. Reassure the client that headaches are common.
D. Reduce sodium intake.

Correct: B. Hypertensive urgency/emergency with end-organ symptoms (visual changes) at a high venlafaxine dose → hold

Duloxetine

COMMONLY TESTED

CYMBALTA · SNRI

MECHANISM	Dual serotonin and norepinephrine reuptake inhibition at all doses.
INDICATION	Depression, GAD, diabetic peripheral neuropathy, fibromyalgia, chronic musculoskeletal pain, stress urinary incontinence (off-label).
PRE-ASSESSMENT	Hepatic function (**contraindicated in liver disease/chronic alcohol use**), renal function (avoid if CrCl <30), uncontrolled narrow-angle glaucoma, MAOIs, serotonergics, suicidality.
LABS/MONITOR	LFTs, BUN/Cr, glucose (especially in diabetic neuropathy use — slight glucose changes), BP.
WORST AE	Hepatotoxicity (esp. + alcohol), serotonin syndrome, suicidality (black-box), severe rash (Stevens-Johnson rare), hypertensive episodes.
SIDE EFFECTS	Nausea, dry mouth, constipation, decreased appetite, fatigue, dizziness, sweating, sexual dysfunction.
HOLD/NOTIFY	Elevated LFTs (3× normal), jaundice, suicidality, manic switch.
ANTIDOTE	None specific.
TEACHING	Avoid all alcohol; swallow capsule whole; take same time daily; takes 1–4 weeks for pain relief, 4–6 weeks for mood; don't stop abruptly.
NURSING	Confirm no alcohol use before initiation; verify CrCl ≥30 and normal LFTs; rare but important hepatotoxicity signal.

NGN CUE · *A diabetic on duloxetine and 3 beers/night develops jaundice and AST 240 — hold drug, notify provider, classic alcohol + duloxetine hepatotoxicity.*

PRIORITY QUESTION

Which client is the poorest candidate for duloxetine?

A. 52-year-old with diabetic neuropathy
B. 34-year-old with GAD and fibromyalgia
C. 60-year-old with chronic alcohol use disorder
D. 40-year-old with major depression

Correct: C. Chronic alcohol use → hepatotoxicity risk; duloxetine is contraindicated in chronic alcohol use and hepatic disease. A, B, D are appropriate indications.

and call. A continues the offending agent; C delays care; D doesn't address the acute problem.

✱ **TEST-TAKING TIP —** *Among SNRIs, venlafaxine is the BP raiser and the withdrawal nightmare.*

✱ **TEST-TAKING TIP —** *Duloxetine = SNRI of choice for **pain** conditions, but the liver is the limit. Alcohol + duloxetine = stop.*

Amitriptyline

HIGH RISK

ELAVIL · TCA

MECHANISM Blocks serotonin and norepinephrine reuptake; potent muscarinic, H1, and α1 blockade → wide side-effect profile. Sodium-channel blockade explains overdose cardiotoxicity.

INDICATION Depression (less first-line now), neuropathic pain, migraine prophylaxis, chronic insomnia, fibromyalgia.

PRE-ASSESSMENT Baseline ECG (QTc, QRS), cardiac history (recent MI = contraindicated), glaucoma, BPH, seizure history, MAOI use, suicidality (high lethality in overdose).

LABS/MONITOR ECG (QTc and QRS), suicidality screen, blood pressure (orthostatic), constipation/voiding.

WORST AE **Overdose cardiotoxicity** — wide-complex QRS >100 ms, hypotension, seizures, arrhythmias, coma → high death rate. Treat with **sodium bicarbonate IV**. Anticholinergic crisis in elderly.

SIDE EFFECTS Sedation, dry mouth, blurred vision, urinary retention, constipation, weight gain, orthostatic hypotension, sexual dysfunction.

HOLD/NOTIFY QRS >100 ms, QTc >500 ms, suicidal ideation, orthostatic falls, urinary retention, glaucoma flare.

ANTIDOTE **Sodium bicarbonate IV bolus** for QRS widening and arrhythmias; supportive care for hypotension and seizures.

TEACHING Take at bedtime (sedation works *with* you); rise slowly; sugarless gum, fluids, fiber; avoid alcohol; high overdose risk → dispense small quantities to depressed clients.

NURSING Recognize fatal overdose risk; coordinate dispensing limits with provider/pharmacy in suicidal clients; know that a 1-week supply can be fatal.

NGN CUE · *Wide QRS, hypotension, seizure, dilated pupils, dry skin in a depressed teen → TCA overdose. Get bicarb, call rapid response.*

PRIORITY QUESTION

A 17-year-old presents to the ED 90 min after ingesting an unknown amount of her mother's amitriptyline. ECG: QRS

Nortriptyline

COMMONLY TESTED

PAMELOR · TCA (SECONDARY AMINE)

MECHANISM Active metabolite of amitriptyline; predominantly NE reuptake inhibition; fewer anticholinergic effects than amitriptyline.

INDICATION Depression (better tolerated TCA), neuropathic pain, smoking cessation (off-label), chronic pain syndromes.

PRE-ASSESSMENT ECG, cardiac history, MAOI use, BPH, glaucoma, suicidality. Therapeutic-window drug — levels matter.

LABS/MONITOR **Therapeutic plasma level 50–150 ng/mL**; ECG, suicidality.

WORST AE Same as amitriptyline but milder; overdose still cardiotoxic.

SIDE EFFECTS Sedation (less than amitriptyline), dry mouth, mild orthostasis, constipation.

HOLD/NOTIFY Plasma level >150 ng/mL, QRS widening, suicidality.

ANTIDOTE Sodium bicarbonate IV for overdose-related QRS widening.

TEACHING Levels are drawn 12 hr after a dose; full mood effect at 2–4 weeks; rise slowly; avoid alcohol; report falls.

NURSING Often preferred TCA in elderly with neuropathic pain because of lower anticholinergic load; verify trough level on dose changes.

NGN CUE · *Trough nortriptyline level 240 ng/mL with ataxia and confusion → toxicity above the therapeutic window.*

PRIORITY QUESTION

Which finding warrants the nurse to hold the next dose of nortriptyline and call the provider?

A. Plasma level 110 ng/mL
B. BP 128/78, HR 76
C. Plasma level 245 ng/mL with confusion
D. Dry mouth

Correct: C. Therapeutic range is 50–150 ng/mL. A toxic level with neurologic symptoms requires holding the dose and reassessment. A is therapeutic. B is normal. D is a common but non-emergent side effect.

✱ **TEST-TAKING TIP** — *Nortriptyline's "magic number" range: **50–150 ng/mL**.*

132 ms, BP 88/50, agitated. Priority intervention?

A. Administer activated charcoal PO.
B. Administer IV sodium bicarbonate 1–2 mEq/kg bolus.
C. Administer flumazenil 0.2 mg IV.
D. Administer naloxone 2 mg IV.

> **Correct: B.** QRS >100 ms with hypotension after TCA ingestion = sodium-channel toxicity → **sodium bicarbonate** shifts the drug off the channel and alkalinizes, narrowing the QRS. Charcoal (A) is given only within 1 hr and only if airway protected. Flumazenil (C) is for benzodiazepines and lowers seizure threshold. Naloxone (D) reverses opioids.

✱ **TEST-TAKING TIP —** *"Wide QRS + TCA + hypotension" → memorize* ***sodium bicarbonate****.*

TCA Overdose

EMERGENCY

EMERGENCY MANAGEMENT

THE THREE C'S — **C**ardiotoxicity (QRS widening, arrhythmias, hypotension) · **C**onvulsions (seizures) · **C**oma (CNS depression). Anticholinergic crisis: hot, dry, red, blind, mad as a hatter.

ECG SIGNATURE — **QRS >100 ms** + terminal R wave in aVR + sinus tachycardia → toxic. QRS >160 ms → ventricular arrhythmia risk.

PRE-ACTION — ABCs first. Continuous cardiac monitoring, large-bore IV ×2, ECG, glucose, electrolytes, ABG, tox screen, acetaminophen level (co-ingestion).

FIRST-LINE — **Sodium bicarbonate 1–2 mEq/kg IV bolus**, then infusion to keep arterial pH 7.45–7.55. Reverses Na-channel blockade. Repeat boluses for QRS widening.

ADJUNCTS — Crystalloid for hypotension; norepinephrine if pressors needed; benzodiazepines for seizures (not phenytoin); intralipid emulsion in refractory cases; rarely magnesium for torsades.

CONTRAINDICATED — **Flumazenil** (can precipitate seizures), **physostigmine** (causes asystole in TCA tox), **class IA/IC antiarrhythmics** (worsen Na-channel block).

MONITOR — QRS, BP, MS, pH, K^+ (alkalinization causes hypokalemia), seizure recurrence.

DISPOSITION — Observe ≥6 hr after normal ECG and asymptomatic; longer if extended-release; psychiatric evaluation when stable.

NGN CUE · *Wide-complex tachycardia + seizure + hypotension + anticholinergic findings = act on TCA overdose protocol now; do not wait for level confirmation.*

PRIORITY QUESTION

An ED nurse caring for a TCA overdose recognizes which order as contraindicated?

A. Sodium bicarbonate 100 mEq IV bolus
B. Normal saline 1 L IV bolus
C. Flumazenil 0.2 mg IV
D. Lorazepam 2 mg IV for seizure

Correct: C. Flumazenil is contraindicated in mixed/unknown overdoses and especially in TCA toxicity — it lowers the

Phenelzine

HIGH RISK

NARDIL · MAOI (NON-SELECTIVE, IRREVERSIBLE)

MECHANISM — Irreversibly inhibits MAO-A and MAO-B → ↑ serotonin, NE, DA. Effects last ~2 weeks until new enzyme is synthesized.

INDICATION — Treatment-resistant depression, atypical depression, social anxiety; rarely first-line because of dietary and drug restrictions.

PRE-ASSESSMENT — Comprehensive med review (no SSRIs, SNRIs, TCAs, tramadol, meperidine, dextromethorphan, sympathomimetics, decongestants, linezolid, methylene blue, St. John's wort); dietary literacy; BP baseline; suicidality; pregnancy.

LABS/MONITOR — BP at home (daily), suicidality, weight, orthostatic vitals.

WORST AE — **Hypertensive crisis** from tyramine ingestion (severe occipital HA, neck stiffness, palpitations, sweating, photophobia, nausea, chest pain, possible CVA); serotonin syndrome with serotonergics.

SIDE EFFECTS — Orthostatic hypotension (more common day-to-day than crises), insomnia, weight gain, dry mouth, sexual dysfunction, peripheral edema.

HOLD/NOTIFY — BP >180/110 with headache, suicidality, manic switch, serotonin-syndrome symptoms.

ANTIDOTE — Hypertensive crisis → **phentolamine** 5–10 mg IV (α-blocker); avoid β-blockers alone (unopposed α). Serotonin syndrome → cyproheptadine.

TEACHING — Strict tyramine-restricted diet (see safety rule #4); avoid OTC cold/flu meds; 14-day washout before/after switching to/from serotonergic drugs; carry medication ID; medical-alert bracelet.

NURSING — Frequent reinforcement of diet; coordinate with dietitian; verify no contraindicated meds at every visit; teach BP self-monitoring and crisis recognition.

NGN CUE · *Patient on phenelzine attended a wedding, now has BP 220/120, occipital pounding HA, vomiting — hypertensive crisis; activate emergency, prep IV phentolamine.*

PRIORITY QUESTION

seizure threshold and removes any protective benzodiazepine effect, precipitating refractory seizures.

✱ **TEST-TAKING TIP —** *"Wide QRS + TCA = bicarb in, flumazenil out."*

Which dinner is safest for a client on phenelzine?

A. Pepperoni pizza and Chianti
B. Grilled chicken breast, white rice, steamed broccoli, water
C. Aged cheddar sandwich and tap beer
D. Smoked salmon with sauerkraut and red wine

Correct: B. Fresh-cooked, unaged meat with simple sides is safe. All other options contain aged, fermented, smoked, or pickled foods rich in tyramine, which precipitate hypertensive crisis on MAOIs.

✱ **TEST-TAKING TIP —** *If a food is **aged, smoked, fermented, pickled, or draft**, it's banned on MAOIs.*

Tranylcypromine

HIGH RISK

PARNATE · MAOI

MECHANISM	Non-selective irreversible MAOI with amphetamine-like structure → more activating than phenelzine.
INDICATION	Treatment-resistant depression.
PRE-ASSESSMENT	Same as phenelzine; greater concern with stimulants and sympathomimetics due to amphetamine-like activity.
LABS/MONITOR	BP, weight, sleep, suicidality.
WORST AE	Hypertensive crisis with tyramine; serotonin syndrome; insomnia; abuse potential (very rare).
SIDE EFFECTS	Insomnia, agitation, orthostatic hypotension, weight loss, dry mouth.
HOLD/NOTIFY	Same MAOI alarms.
ANTIDOTE	Phentolamine for HTN crisis; cyproheptadine for serotonin syndrome.
TEACHING	Same MAOI dietary and drug precautions; take last dose by mid-afternoon to avoid insomnia.
NURSING	More activating than phenelzine — use this for patients with atypical depression and hypersomnia.

NGN CUE · *Patient on tranylcypromine takes an OTC pseudoephedrine for a cold → severe HTN within hours; teach:* ***never any OTC without provider check****.*

PRIORITY QUESTION

A client on tranylcypromine asks the nurse if they can take cough/cold medicine for a sinus infection. Best response?

A. "Any cold medicine without a decongestant is fine."
B. "Avoid all over-the-counter cough and cold preparations and call your provider before taking anything."
C. "You can take pseudoephedrine, just not phenylephrine."
D. "Acetaminophen and dextromethorphan are both safe."

Correct: B. MAOI patients must clear every new med — even OTC — with the provider. Dextromethorphan and pseudoephedrine both cause serious reactions (serotonin syndrome and hypertensive crisis, respectively).

✱ TEST-TAKING TIP — *If the answer for an MAOI patient is "go to the provider/pharmacist," it's usually right.*

Selegiline (transdermal)

TEACHING-HEAVY

EMSAM · MAOI-B (LOW DOSE), NON-SELECTIVE AT HIGHER DOSES

MECHANISM	Transdermal MAOI; at the 6 mg/24 hr patch, selectively inhibits MAO-B in the brain → **no dietary restrictions required**. At 9 mg and 12 mg patches, MAO-A in the gut is also inhibited → tyramine diet returns.
INDICATION	Major depression; oral selegiline used in Parkinson's (different dosing).
PRE-ASSESSMENT	Skin assessment, current medications (no serotonergics or sympathomimetics regardless of patch strength), BP.
LABS/MONITOR	Skin (rotation sites), BP, weight.
WORST AE	HTN crisis (at higher patches with tyramine), serotonin syndrome with serotonergics.
SIDE EFFECTS	Application-site irritation, insomnia, headache, dry mouth.
HOLD/NOTIFY	Severe HA, BP >180/110, serotonin syndrome features, severe site rash.
ANTIDOTE	Same as other MAOIs.
TEACHING	Apply to clean, dry, intact skin (upper trunk/arm); rotate sites; remove old patch before applying new; **do not** cut the patch; tyramine diet not required for 6 mg patch but is required for 9 and 12 mg patches.
NURSING	The transdermal route minimizes first-pass gut MAO-A inhibition — that's why dietary rules ease at the lowest dose only.

NGN CUE · *Selegiline patch 12 mg client orders cured-meat charcuterie board — same dietary precautions as oral MAOIs at this dose.*

PRIORITY QUESTION

A client wearing the 6 mg/24 hr selegiline transdermal system asks about food restrictions. Best response?

A. "Avoid all aged cheeses and cured meats."
B. "At this strength, special dietary restrictions are not required, but always check before starting any new medications."
C. "Cut the patch in half if you eat tyramine-rich foods."
D. "You can take any cold medicine without concern."

Correct: B. The 6 mg patch is MAO-B selective in the brain and does not require dietary restrictions; drug-interaction precautions still apply. A is true for higher patches. C is

dangerous — patches are never cut. D is unsafe — sympathomimetics and serotonergics are still prohibited.

✱ **TEST-TAKING TIP —** *"6 mg patch = no diet, but still no other psych meds." Higher patches return the diet.*

Bupropion

SAFETY-ALERT

WELLBUTRIN, ZYBAN · NDRI

MECHANISM	Inhibits norepinephrine and dopamine reuptake; **no serotonergic activity** → no sexual dysfunction, no weight gain, no serotonin-syndrome risk.
INDICATION	Depression, seasonal affective disorder, ADHD (off-label), **smoking cessation (Zyban)**.
PRE-ASSESSMENT	**Seizure history (contraindicated), eating disorder (anorexia/bulimia contraindicated** — electrolyte/seizure risk), alcohol/sedative withdrawal, head injury, MAOIs, hepatic/renal function, pregnancy.
LABS/MONITOR	Weight, BP, electrolytes if eating disorder history, suicidality.
WORST AE	**Seizures** (dose-related — risk rises sharply >450 mg/day); hypertension; psychosis with high doses.
SIDE EFFECTS	Insomnia, dry mouth, headache, tremor, sweating, agitation, decreased appetite.
HOLD/NOTIFY	Any seizure, severe HTN, manic switch, suicidality.
ANTIDOTE	None specific; benzodiazepines for seizures.
TEACHING	Take in AM and not within 6 hours of bedtime to limit insomnia; don't crush XR/SR forms; alcohol is a major seizure trigger; report any seizure; useful for clients distressed by SSRI sexual side effects or weight gain.
NURSING	Screen for eating disorder and seizure history before initiation; ensure single-dose max ≤200 mg IR, total ≤450 mg/day; recognize the "no sex side effects, no weight gain, no SS risk" appeal.

NGN CUE · *Client with anorexia nervosa is prescribed bupropion for depression — recognize contraindication; advocate for change.*

PRIORITY QUESTION

Bupropion is contraindicated in which client?

A. 54-year-old with smoking cessation goals
B. 32-year-old with bulimia nervosa
C. 40-year-old with depression and obesity
D. 28-year-old with SSRI-induced sexual dysfunction

Correct: B. Eating disorders (anorexia and bulimia) are contraindications because seizure risk is elevated. A, C, D are

Trazodone

SAFETY-ALERT

DESYREL, OLEPTRO · SARI

MECHANISM	Serotonin antagonist and reuptake inhibitor + strong α1 blockade and H1 blockade → highly sedating; rarely used as antidepressant monotherapy.
INDICATION	Insomnia (low dose 25–100 mg HS, most common use), adjunctive depression, anxiety.
PRE-ASSESSMENT	Recent MI (caution), cardiac arrhythmia history (QT prolongation), other serotonergics, MAOIs, men & risk of priapism.
LABS/MONITOR	BP (orthostatic), ECG if QT risk, sleep quality.
WORST AE	**Priapism** (painful erection >4 hr — urologic emergency); orthostatic hypotension & falls in elderly; QT prolongation.
SIDE EFFECTS	Sedation, dizziness, dry mouth, blurred vision, orthostasis, nausea.
HOLD/NOTIFY	Priapism, syncope, suicidality, manic switch.
ANTIDOTE	Priapism → urology immediately (aspiration, intracavernous phenylephrine).
TEACHING	Take with food at bedtime; rise slowly; men: prolonged erection >4 hr is an emergency — go to ED; can cause next-day grogginess.
NURSING	Fall precautions in elderly; ask men directly about priapism before discharge — patient embarrassment can cost the diagnosis.

NGN CUE · *A 22-year-old male on trazodone reports a painful 5-hr erection — ED referral immediately for priapism evaluation.*

PRIORITY QUESTION

An older adult on trazodone 50 mg HS for insomnia fell at home overnight. Which education is the priority?

A. "Take your trazodone immediately after waking."
B. "Sit on the side of the bed before standing and rise slowly to prevent dizziness."
C. "Discontinue the medication today."
D. "Increase your fluid intake before bedtime."

Correct: B. Orthostatic hypotension is the most common cause of trazodone falls. Slow position changes reduce risk. A causes daytime sedation; C is not the nurse's scope; D worsens nocturia and falls.

favored uses of bupropion.

✱ **TEST-TAKING TIP —** *Bupropion's "three rules out": **seizures, eating disorders, MAOIs**.*

✱ **TEST-TAKING TIP —** *Trazodone = sleeping aid #1 + a-blockade hypotension + male priapism warning.*

Mirtazapine

TEACHING-HEAVY

REMERON · NASSA

MECHANISM	Blocks α2 presynaptic autoreceptors → ↑ NE and 5-HT release; H1 blockade → sedation; 5-HT3 blockade → antiemetic. **Lower doses are more sedating** than higher.
INDICATION	Depression — especially with insomnia, weight loss, low appetite, elderly cachectic clients.
PRE-ASSESSMENT	Weight, hepatic function, CBC (rare agranulocytosis), MAOIs, suicidality.
LABS/MONITOR	Weight, lipids, glucose, CBC if signs of infection, LFTs.
WORST AE	Agranulocytosis (rare), serotonin syndrome, significant weight gain, hypercholesterolemia.
SIDE EFFECTS	Sedation, weight gain, dry mouth, increased appetite, dizziness, constipation.
HOLD/NOTIFY	Fever, sore throat, leukopenia (agranulocytosis), serotonin syndrome features, suicidality.
ANTIDOTE	None specific.
TEACHING	Take at bedtime; weight gain is expected — monitor; report fever or sore throat (could be agranulocytosis).
NURSING	First-line in geriatric depression with insomnia and weight loss; use the "drug of side effects" — pick the antidepressant whose side effects help the patient.

NGN CUE · *An 86-year-old widowed client on mirtazapine has BMI rising and sleeping better — that's exactly the desired effect, not a complication.*

PRIORITY QUESTION

Which client would benefit most from mirtazapine over sertraline?

A. 22-year-old female with bulimia and weight loss
B. 78-year-old male with depression, insomnia, anorexia, and 8-lb weight loss
C. 30-year-old with new-onset diabetes
D. 45-year-old with refractory hypertension

Correct: B. Mirtazapine's sedation, appetite stimulation, and weight gain are therapeutic in the malnourished older adult with insomnia.

Buspirone

TEACHING-HEAVY

BUSPAR · AZAPIRONE ANXIOLYTIC

MECHANISM	Partial 5-HT1a agonist → anxiolysis without GABA effects → **no sedation, no dependence, no withdrawal, no respiratory depression**.
INDICATION	Chronic anxiety (GAD); not for acute or PRN use; not for panic attacks.
PRE-ASSESSMENT	Current MAOIs, grapefruit (CYP3A4 substrate — ↑ levels), other serotonergics.
LABS/MONITOR	Symptom rating scales over weeks; no specific labs.
WORST AE	Serotonin syndrome (rare), severe BP elevation with MAOIs.
SIDE EFFECTS	Dizziness, headache, nausea, restlessness, lightheadedness — usually mild.
HOLD/NOTIFY	Serotonin syndrome features, hypertensive symptoms if combined with MAOIs.
ANTIDOTE	None specific.
TEACHING	Takes **2–4 weeks** for full effect — must take consistently; not for "as needed" use; avoid grapefruit/grapefruit juice; doesn't impair driving.
NURSING	Ideal for clients with substance-use disorder concerns; verify scheduled dosing, not PRN; manage expectation about onset.

NGN CUE · *A client takes buspirone "only when anxious" and reports no relief — recognize incorrect use; teach scheduled dosing.*

PRIORITY QUESTION

Which teaching is essential for a new buspirone prescription?

A. "Take it when you feel anxious."
B. "Take it consistently every day; the full effect develops over 2–4 weeks."
C. "You may need to gradually withdraw to prevent dependence."
D. "Avoid driving — this medication causes significant sedation."

Correct: B. Buspirone is scheduled, not PRN, and requires several weeks of consistent dosing. A is wrong — not effective PRN. C is wrong — no dependence. D is wrong — minimal sedation.

✱ TEST-TAKING TIP — *"Buspirone = like an SSRI for anxiety, not like Xanax."*

✱ **TEST-TAKING TIP —** *"Old, thin, can't sleep" — think mirtazapine.*

Serotonin Syndrome

EMERGENCY

HUNTER CRITERIA · EMERGENCY

WHAT IT IS	Life-threatening excess of CNS and peripheral serotonin from drug combinations (SSRI + SNRI + MAOI + tramadol + linezolid + triptans + St. John's wort + ondansetron + meperidine + dextromethorphan + MDMA + lithium).
ONSET	Typically within 6–24 hours of new drug or dose change.
CLASSIC TRIAD	**1. Mental status change** (agitation, confusion) · **2. Autonomic instability** (hyperthermia >38–41 °C, tachycardia, hypertension, diaphoresis, mydriasis) · **3. Neuromuscular hyperactivity** (clonus — especially lower extremities, hyperreflexia, tremor, rigidity, seizures).
HUNTER CLUE	Spontaneous or inducible **clonus** is the most specific finding.
VS. NMS	Serotonin = fast onset (hours), hyperreflexia/clonus, mydriasis, diaphoretic. NMS = slow onset (days–weeks), **lead-pipe rigidity**, hyporeflexia, normal/sluggish pupils.
MANAGEMENT	1) Stop all serotonergic drugs. 2) ABCs, IV access, cooling. 3) Benzodiazepines (lorazepam) for agitation, rigidity, seizure. 4) **Cyproheptadine PO/NG 12 mg load, then 2 mg q2h** as needed (serotonin antagonist). 5) Fluids; norepinephrine if hypotensive. 6) Intubate + paralysis (non-depolarizing) if hyperthermia >41.1 °C unresponsive to cooling.
AVOID	Antipyretics are ineffective (heat comes from muscle activity, not hypothalamus); avoid bromocriptine; succinylcholine risk if hyperkalemic.
DISPOSITION	Most resolve <24 hr after offending drugs stopped; psychiatry follow-up; medication reconciliation.

NGN CUE · *Patient on sertraline started tramadol 6 hr ago — now: T 39.6 °C, HR 132, BP 168/102, clonus in both ankles, confused. This is serotonin syndrome until proven otherwise.*

PRIORITY QUESTION

Which combination of findings most strongly supports serotonin syndrome over NMS?

A. Lead-pipe rigidity, normal pupils, slow onset

MAOI Hypertensive Crisis

EMERGENCY

TYRAMINE REACTION

WHAT IT IS	MAO inhibition prevents tyramine breakdown in the gut → massive NE release at sympathetic nerve terminals → severe sudden hypertension.
TRIGGERS	Aged/matured cheeses, cured/smoked/fermented meats, soy sauce, tofu, miso, fermented soy, sauerkraut, pickled herring, fava beans, draft beer, red wines, overripe bananas/avocados, brewer's yeast, MSG-heavy foods, OTC sympathomimetics (pseudoephedrine, phenylephrine), stimulants.
ONSET	Within 15 min – 2 hr of trigger.
SIGNS	**Severe occipital headache** ("pounding"), neck stiffness, sweating, tachycardia or reflex bradycardia, photophobia, chest pain, vomiting, dilated pupils. BP often >200/120.
END-ORGAN DAMAGE	Stroke (ICH), MI, aortic dissection, pulmonary edema.
MANAGEMENT	1) Stop MAOI. 2) ABCs; IV access; continuous BP, ECG, neuro checks. 3) **Phentolamine 5–10 mg IV** q5–15 min (α-blocker) — first-line. 4) Alternatives: nicardipine drip, labetalol with caution, nitroprusside. 5) Lower MAP by ≤25% in first hour to avoid hypoperfusion injury.
AVOID	β-blocker alone (unopposed α stimulation), clonidine (variable), sympathomimetics in resuscitation.
PREVENTION/TEACHING	Strict diet; medical-alert bracelet; carry list of foods/drugs; carry written instructions to ED staff; periodic dietitian visits.

NGN CUE · *Patient on tranylcypromine ate aged cheddar pizza, now severe pounding HA + neck stiffness + BP 224/126 — classic MAOI HTN crisis.*

PRIORITY QUESTION

An ED nurse expects which medication for a confirmed MAOI hypertensive crisis?

A. Metoprolol IV alone

B. Inducible clonus, mydriasis, hyperreflexia, onset within hours of new serotonergic drug
C. Bradykinesia, tremor, severe sweating only
D. Catatonia and autonomic stability

Correct: B. Clonus + mydriasis + hyperreflexia + fast onset = serotonin syndrome. A describes NMS. C is parkinsonism. D is not characteristic.

✱ **TEST-TAKING TIP —** *"Hyper-reflexia & clonus + new serotonergic drug" → serotonin syndrome. "Lead-pipe rigidity + antipsychotic" → NMS.*

B. Phentolamine 5 mg IV
C. Pseudoephedrine PO
D. Norepinephrine infusion

Correct: B. Phentolamine, an α-blocker, is the agent of choice for catecholamine-driven crises. A — β-blockade alone causes unopposed α stimulation and worsens HTN. C and D would worsen the crisis (more sympathomimetic load).

✱ **TEST-TAKING TIP —** *"MAOI + crisis = phentolamine." Never β-blocker alone in catecholamine-mediated crises.*

Cyproheptadine

EMERGENCY

PERIACTIN · SEROTONIN SYNDROME ANTIDOTE

MECHANISM	First-generation H1 antihistamine with potent 5-HT2_a antagonism → counteracts excess serotonin.
INDICATION	Off-label for serotonin syndrome (not FDA-approved but standard of care); also used for cold urticaria, appetite stimulation.
DOSING IN SS	Loading 12 mg PO/NG, then 2 mg q2h until clinical response, up to 32 mg/24 hr.
PRE-ASSESSMENT	Airway protection (NG route may aspirate in altered patients); narrow-angle glaucoma; BPH; pediatric weight-based dosing.
LABS/MONITOR	Mental status, vital signs, clonus, hyperreflexia resolution, sedation.
WORST AE	Anticholinergic effects, sedation/respiratory depression in already compromised SS patients.
SIDE EFFECTS	Sedation, dry mouth, weight gain, urinary retention, constipation.
TEACHING	(For acute setting) "This medicine helps reverse the dangerous reaction. You will feel sleepy."
NURSING	Confirm route is safe; co-administer with benzodiazepines and active cooling; document clonus and reflex changes hourly.

NGN CUE · *Patient with severe SS; clonus and hyperthermia persist after 30 min of benzodiazepines and cooling → escalate to cyproheptadine.*

PRIORITY QUESTION

A patient with severe serotonin syndrome is unresponsive to fluids, benzodiazepines, and cooling. Which order does the nurse expect next?

A. Cyproheptadine 12 mg via NG tube
B. Bromocriptine PO
C. Phentolamine IV
D. Dantrolene IV

Correct: A. Cyproheptadine is the serotonin antagonist used in serotonin syndrome. Bromocriptine is for NMS. Phentolamine is for catecholamine-mediated HTN crisis. Dantrolene is for malignant hyperthermia/NMS (off-label).

✱ TEST-TAKING TIP — *Antidote map: Serotonin → cyproheptadine. NMS → bromocriptine + dantrolene. MH → dantrolene. MAOI HTN → phentolamine.*

Antidepressant Black-Box

HIGH RISK

SUICIDALITY <25 Y/O

WHAT IT IS	FDA black-box warning on all antidepressants: increased risk of suicidal thinking/behavior in children, adolescents, and young adults <25 yrs during the first months of therapy and after dose changes.
WHY	Energy and psychomotor activity often improve before mood and hopelessness — gives a depressed person the means to act on prior intent.
HIGHEST-RISK WINDOW	First 1–4 weeks of treatment, after dose changes, and during discontinuation.
REQUIRED ACTIONS	Suicidality screening (C-SSRS, ASQ, PHQ-9 #9) at **every** contact during initiation phase; close follow-up (often weekly × 4 weeks, then biweekly × 2, then monthly).
MEANS RESTRICTION	Counsel on locking firearms, removing leftover prescriptions, securing medications, limiting access to dangerous heights/substances. Single most evidence-based intervention to reduce completed suicide.
FAMILY ROLE	Teach the family/support person specific warning signs: increased agitation, irritability, sleep changes, withdrawal, giving away possessions, "saying goodbye," sudden calm after distress.
SAFETY PLAN	Specific written plan with warning signs, coping strategies, supportive contacts, professional contacts, ways to make environment safe, and reasons for living. 988 Suicide & Crisis Lifeline.

NGN CUE · *A 19-year-old started fluoxetine 14 days ago; today gives away her favorite headphones to a friend "as a present" and says she's "finally at peace." That's a red flag — assess suicidality now.*

PRIORITY QUESTION

When is the suicide risk highest for a 19-year-old starting fluoxetine?

A. After 3 months of treatment
B. Within the first 1–4 weeks of treatment

C. Only after dose discontinuation
D. Only if there is a prior attempt history

Correct: B. First 1–4 weeks (and after any dose change) carry the highest risk because energy returns before mood lifts. A is later/lower. C and D are incorrect generalizations.

✱ **TEST-TAKING TIP —** *"Energy before mood = window of risk." Treat the early-improvement period as the most dangerous window.*

§ 02 Five Must-Not-Miss Safety Rules

RULE 01

14-day washout in both directions for MAOIs (5 weeks if switching from fluoxetine)

Never start an MAOI within 14 days of stopping any serotonergic drug (SSRI, SNRI, TCA, tramadol, triptan, linezolid, methylene blue, dextromethorphan, meperidine, lithium, St. John's wort, ondansetron). For **fluoxetine**, wait **5 weeks** due to its long half-life. Same waiting period applies in the reverse direction. Mixing → fatal serotonin syndrome.

RULE 02

Black-box suicidality in patients <25 — assess at every contact for 12 weeks

Antidepressants increase suicidal ideation and behavior in young people during the early weeks of treatment and at dose changes. Screen explicitly at each visit, teach the family warning signs, restrict access to means (firearms, leftover meds), and provide 988 Suicide & Crisis Lifeline. Risk window: weeks 1–4 and after dose changes.

RULE 03

Serotonin syndrome triad: AMS + autonomic instability + neuromuscular excitation

Suspect within hours of a new serotonergic drug or dose change. Clonus (especially ankle, spontaneous or inducible), hyperreflexia, hyperthermia >38 °C, mydriasis, diaphoresis, agitation. Stop offending drugs, ABCs, cool aggressively, benzodiazepines, **cyproheptadine 12 mg load → 2 mg q2h**. Antipyretics are useless. Intubate if T >41.1 °C.

RULE 04

MAOI = strict tyramine-restricted diet for life of therapy

Banned: **aged cheeses** (cheddar, blue, parmesan, brie), **cured/smoked meats** (salami, pepperoni, prosciutto), **fermented soy** (soy sauce, miso, tempeh), **draft and unpasteurized beer**, **red wines**, **sauerkraut**, **pickled herring**, **fava beans**, **overripe avocado/banana**, brewer's yeast, MSG-heavy foods. Also banned: pseudoephedrine, phenylephrine, dextromethorphan, ephedra. Patient must check every OTC.

RULE 05

Wide QRS + TCA = sodium bicarbonate (not flumazenil, not physostigmine)

Tricyclic overdose with QRS >100 ms, hypotension, or arrhythmia → **sodium bicarbonate 1–2 mEq/kg IV bolus**, then maintenance infusion targeting pH 7.45–7.55. Avoid flumazenil (precipitates seizure), physostigmine (precipitates asystole), and class IA/IC antiarrhythmics (worsen Na-channel block).

§ 03

Five Medication Calculation & Dosage-Safety Questions

Calc 1 — Sertraline pediatric OCD dose

A 9-year-old (weight 30 kg) is prescribed sertraline 25 mg PO daily for OCD. The pediatric range for OCD ages 6–12 is 25–200 mg/day starting low. Available: 25 mg scored tablets. How many tablets per dose?

```
Ordered dose: 25 mg
Available: 25 mg scored tablet
25 mg ÷ 25 mg/tab = 1 tablet
```

Answer: 1 tablet PO daily. Safety check: dose is within the FDA-approved pediatric OCD range (25–200 mg/day starting at 25 mg).

Calc 2 — Cyproheptadine for serotonin syndrome

An ED patient with serotonin syndrome receives cyproheptadine. The provider orders "12 mg load via NG tube now, then 2 mg via NG every 2 hours up to a 24-hour maximum of 32 mg." If the patient receives the load at 0800 and four follow-up 2 mg doses, what is the total 24-hour dose?

```
Load: 12 mg
Follow-up: 2 mg × 4 = 8 mg
Total: 12 + 8 = 20 mg
Maximum allowed: 32 mg/24 hr
20 mg < 32 mg ✓ within limits
```

Answer: 20 mg in 24 hours; within the 32 mg/24 hr ceiling. Continue monitoring clonus and temperature q1h.

Calc 3 — Bupropion XL conversion check

A client takes bupropion IR 100 mg PO TID. Provider orders conversion to bupropion XL once daily. What is the equivalent XL dose, and is it within the daily maximum?

```
IR total daily dose: 100 mg × 3 = 300 mg
XL equivalent: 300 mg PO daily
Single-dose XL max: 450 mg
Total daily max: 450 mg
300 mg ≤ 450 mg ✓ safe
```

Answer: Bupropion XL 300 mg PO daily; within the 450 mg/day max. Verify no seizure or eating-disorder history; single dose ≤ 450 mg.

Calc 4 — Phentolamine bolus for MAOI HTN crisis

BP is 224/128 on a tranylcypromine patient who ate cured sausage. Order: phentolamine 5 mg IV push, may repeat 5 mg q10 min × 2 PRN BP >180/110. Phentolamine on hand: 5 mg/vial reconstituted to 5 mL (1 mg/mL). How many mL per dose?

```
Desired: 5 mg
Available: 1 mg/mL
5 mg ÷ 1 mg/mL = 5 mL per push
Total possible (3 doses if BP persists): 5 mg × 3 = 15 mg
```

Answer: 5 mL IV push slowly; recheck BP q2–5 min; have continuous cardiac monitor and BP cuff cycling q3 min. Never give as bolus through a small peripheral IV without confirming patency.

Calc 5 — Fluoxetine taper for switch to MAOI

A patient currently on fluoxetine 40 mg/day is switching to phenelzine. The provider orders fluoxetine to be stopped today and the washout completed before starting phenelzine. How many days must elapse before the first dose of phenelzine?

```
Fluoxetine washout (long half-life): 5 weeks
5 weeks × 7 days = 35 days minimum
Start phenelzine on day 36 or later
```

Answer: ≥ 35 days. For all other SSRIs/SNRIs/TCAs/tramadol etc., the washout is 14 days. Document the washout clearly on the MAR transition note.

§ 04 Five NGN-Style Items

MATRIX · MULTIPLE-RESPONSE GRID

NGN 1 — Differentiating Serotonin Syndrome, NMS, and Anticholinergic Toxicity

A 22-year-old started sertraline 6 days ago. The provider added tramadol for dental pain 8 hours ago. Now in the ED: T 39.4 °C, HR 130, BP 168/100, agitation, inducible bilateral ankle clonus, hyperreflexia, mydriasis, diaphoresis. Click the cell that best fits each finding.

FINDING	SEROTONIN SYNDROME	NMS	ANTICHOLINERGIC TOXICITY
Onset within hours of new serotonergic drug	✓		
Inducible clonus, hyperreflexia	✓		
Lead-pipe rigidity, hyporeflexia		✓	
"Hot, dry, red, blind, mad" (no sweating)			✓
Diaphoresis, mydriasis	✓		
Develops over days to weeks after antipsychotic		✓	

Rationale: Serotonin syndrome features **rapid onset, neuromuscular hyperactivity, mydriasis, and diaphoresis**. NMS develops more slowly with **lead-pipe rigidity and hyporeflexia**. Anticholinergic toxicity classically presents **dry** ("dry as a bone, red as a beet, hot as a hare, blind as a bat, mad as a hatter"). Sweating discriminates the first two from the third.

BOW-TIE · LINKING ACTIONS TO OUTCOMES

NGN 2 — MAOI Hypertensive Crisis from Tyramine

A 47-year-old on phenelzine attended a charcuterie-and-wine dinner two hours ago. EMS arrives at home: severe throbbing occipital headache, neck stiffness, vomiting, BP 226/124, HR 122, T 37.6 °C. Drag the correct items into the bow-tie diagram below.

TOP 2 ACTIONS TO TAKE

1. Establish IV access, attach continuous BP and cardiac monitoring.
2. Prepare **phentolamine 5 mg IV push**, may repeat every 5–10 min until BP controlled.

CONDITION MOST LIKELY

MAOI hypertensive crisis from dietary tyramine.

TOP 2 PARAMETERS TO MONITOR

1. BP every 2–5 min during titration (target ≤25% MAP reduction in first hour).
2. Neurologic exam q15 min for signs of stroke/ICH; ECG for ischemia or dysrhythmia.

Rationale: Aged cheese + cured meat + red wine = high tyramine. MAOI prevents tyramine breakdown → massive NE release. Phentolamine (α-blocker) is the targeted antidote. Avoid β-blocker monotherapy (unopposed α stimulation worsens HTN). Slow BP reduction prevents hypoperfusion injury.

SELECT ALL THAT APPLY

NGN 3 — Discharge Teaching for a Patient Starting Sertraline

The nurse is discharging a 28-year-old started on sertraline 50 mg PO daily for panic disorder. Select all statements that should be included in teaching.

A. ✓ "It may take 4–6 weeks for the full effect on your panic symptoms."
B. ✓ "Do not stop the medication abruptly — call before you run out so we can taper safely."
C. ✓ "Avoid tramadol, St. John's wort, and over-the-counter cough medicines containing dextromethorphan."
D. ✗ "You can drink alcohol with this medicine without restrictions."
E. ✓ "Tell us right away about new or worsening thoughts of suicide, especially in the first few weeks."
F. ✓ "If you become pregnant or plan to, contact us before stopping or continuing."
G. ✗ "Start St. John's wort to boost the medication's effect naturally."

Rationale: Correct teaching: delayed onset, no abrupt discontinuation, avoid serotonergic interactions (especially OTC dextromethorphan), report suicidal thoughts, and pregnancy planning. Alcohol is not safe — it worsens depression and increases sedation. St. John's wort is serotonergic — adding it risks serotonin syndrome.

ORDERED RESPONSE

NGN 4 — Suspected Serotonin Syndrome in the ED

> A patient on venlafaxine started tramadol 6 hours ago. They arrive agitated, T 39.6 °C, HR 138, BP 170/100, with ankle clonus and hyperreflexia. Place the nurse's actions in the correct order.

1. **Stop all serotonergic medications** (hold venlafaxine, tramadol, any triptans/St. John's wort/dextromethorphan).
2. **Establish ABCs:** patent airway, high-flow O_2, continuous SpO_2; large-bore IV access × 2; continuous cardiac monitor and frequent BP.
3. **Aggressive external cooling** (ice packs to groin/axillae, cooling blanket, evaporative cooling); avoid antipyretics — they don't help.
4. **IV benzodiazepine** (lorazepam 1–2 mg IV) for agitation, hyperthermia from muscle activity, and to lower seizure risk.
5. **Cyproheptadine 12 mg PO/NG load**, then 2 mg q2h until clonus resolves (max 32 mg/24 hr).
6. **Frequent reassessment** (q15 min): temperature, clonus, mental status, BP, HR; intubate & paralyze if T >41.1 °C unresolved.

> **Rationale:** Stop the source first. ABCs always precede definitive treatment. Cooling and benzodiazepines blunt muscle hyperactivity (the source of fever). Cyproheptadine is the antagonist. Reassessment closes the loop. Antipyretics fail because the heat is muscle-generated, not hypothalamic.

CLOZE · DROP-DOWN

NGN 5 — Starting an Adolescent on an Antidepressant

> The nurse is teaching the parents of a 15-year-old being started on fluoxetine for major depression. Complete each blank with the correct option.

The medication may take **[4–6 weeks]** to reach full effect. The most concerning side effect to monitor for in the first weeks is **[new or worsening suicidal thoughts or behavior]**. To reduce risk of self-harm, the family should **[remove leftover medications and lock firearms]**. The teen should avoid **[tramadol, dextromethorphan, and St. John's wort]** to prevent serotonin syndrome. If discontinuing in the future, the medication should be **[gradually tapered with the provider's guidance]**.

> **Rationale:** Onset of full effect is several weeks. Black-box warning for <25 yrs: suicidality. Lethal-means restriction is the most evidence-based suicide-prevention intervention. Serotonergic OTC and prescription combinations cause serotonin syndrome. Tapering avoids discontinuation syndrome — though fluoxetine self-tapers, the principle of "never stop antidepressants abruptly" is patient-safe.

§ 05 NCJMM Mini Case Study

> *A 64-year-old woman with treatment-resistant depression has been on phenelzine 45 mg PO daily for 4 months. She attends a friend's retirement dinner where she eats aged Manchego cheese, prosciutto, sauerkraut, and drinks two glasses of red wine. Ninety minutes later she develops a "splitting" occipital headache and stiff neck. EMS finds her diaphoretic with BP 226/126, HR 118, T 37.4 °C, GCS 14. Pupils dilated. On ED arrival she vomits and complains of chest pain and visual blurring. Cardiac monitor: sinus tachycardia, no ST changes. Past medical history: HTN, GAD. Home medications: phenelzine 45 mg daily, multivitamin, calcium with vitamin D. PRN: acetaminophen.*

STEP 1

Recognize Cues

- Severe HA + neck stiffness + diaphoresis + mydriasis + vomiting
- BP 226/126 (hypertensive emergency)
- Chest pain + visual changes (end-organ symptoms)
- Recent ingestion of tyramine-rich foods on an MAOI
- Ninety-minute onset after meal

STEP 2

Analyze Cues

- Tyramine + MAOI = blocked tyramine breakdown → massive NE release → catastrophic catecholamine surge
- End-organ findings (visual changes, chest pain) elevate this from urgency to emergency
- BP target: lower MAP ≤25% in first hour to avoid stroke from hypoperfusion
- Not serotonin syndrome — no clonus, no fever, no hyperreflexia, classic dietary trigger; not NMS — no antipsychotic, no rigidity

STEP 3

Prioritize Hypotheses

- **Most likely:** MAOI-induced hypertensive crisis from dietary tyramine
- Less likely: subarachnoid hemorrhage (still requires brain imaging if neuro deficits or persistent severe HA after BP control)
- Less likely: pheochromocytoma (history doesn't support, but BP pattern overlaps)
- Rule out: aortic dissection if BP discrepancy between arms, tearing chest/back pain

STEP 4

Generate Solutions

- Hold phenelzine; remove from MAR
- Two large-bore IVs; continuous BP every 2–5 min; continuous ECG, SpO_2
- **Phentolamine 5 mg IV push**, may repeat 5 mg q5–10 min until BP <180/110
- Alternative: nicardipine drip 5 mg/hr titrate up to 15 mg/hr
- Antiemetic that is **not** serotonergic — avoid ondansetron; prefer prochlorperazine or promethazine
- Neuro checks q15 min; consider CT head if persistent neuro deficits or worsening LOC
- 12-lead ECG and troponin (rule out demand ischemia from BP surge)

STEP 5

Take Action

- Position semi-Fowler; HOB 30° to reduce ICP if elevated
- Administer phentolamine 5 mg IV slow push; document time and BP response
- Initiate continuous cardiac monitoring; cycle NIBP q3 min initially
- Place IDC if mental status declines; strict I/O
- Notify pharmacy and physician of all MAOI-incompatible drugs (no meperidine, no dextromethorphan, no ondansetron, no sympathomimetics)
- Reorient and reassure between interventions; therapeutic communication

STEP 6

Evaluate Outcomes

- Target reached: BP <180/110 within 1 hr; HA pain <3/10 by 2 hr; vision and chest pain resolved
- No new neuro deficits; GCS returns to 15
- Negative troponin, no ECG ischemia
- Patient verbalizes 3 high-tyramine foods to avoid before discharge
- Outpatient psychiatry follow-up arranged within 48 hr; dietitian referral; written diet card and medical-alert bracelet ordered
- Re-teach safer non-MAOI options if recurrent dietary errors

§ 06 Red Flags — Stop / Hold / Call / Antidote

STOP · SEROTONIN SYNDROME

Inducible ankle clonus + new serotonergic drug + T >38 °C + agitation.

STOP · MAOI HYPERTENSIVE CRISIS

BP >180/110 + severe occipital HA + neck stiffness + recent aged/fermented/cured

HOLD · CITALOPRAM & QTC

QTc >500 ms, hypokalemia, hypomagnesemia, syncope, or daily dose

STOP

all serotonergic agents. Initiate benzodiazepine + cooling + **CYPROHEPTADINE 12 MG LOAD**. Intubate if T >41.1 °C.

food.

STOP

MAOI; prepare **PHENTOLAMINE 5 MG IV**; continuous BP and neuro monitoring.

>40 mg (>20 mg if ≥60 yrs).

HOLD

citalopram, replace K^+/Mg^{2+}, recheck ECG, notify provider.

HOLD · TCA CARDIOTOXICITY

QRS >100 ms or terminal R wave in aVR + signs of overdose (altered mentation, hypotension, dilated pupils, dry skin).

HOLD

TCA and give **SODIUM BICARBONATE 1–2 MEQ/KG IV BOLUS**; avoid flumazenil/physostigmine.

CALL · SUICIDALITY IN YOUNG ADULTS

New or worsening suicidal thoughts, plan, or behavior in patients <25 in the first weeks of any antidepressant.

CALL

provider/crisis line; restrict means; safety plan; do not leave alone if intent + plan + means.

CALL · BUPROPION SEIZURE

Any seizure on bupropion, especially if dose >450 mg/day, eating disorder, alcohol or sedative withdrawal, or head injury history.

CALL

rapid response; ABCs; **HOLD ALL FUTURE DOSES**; benzodiazepine if active seizure.

CALL · VENLAFAXINE HTN

SBP >180 or DBP >110 with HA at doses ≥225 mg/day.

HOLD

next dose; call for dose reduction or change; do not abruptly discontinue without taper plan (severe withdrawal).

ANTIDOTE · TRAZODONE PRIAPISM

Erection >4 hours = urologic emergency.

STOP

trazodone; ED; intracavernous phenylephrine, aspiration, or surgical decompression. Educate male patients explicitly to remove the embarrassment barrier.

§ 07 Confusing Drugs — Side-by-Side

SEROTONIN SYNDROME VS NEUROLEPTIC MALIGNANT SYNDROME (NMS)	
TRIGGER	**SS:** SSRI/SNRI/MAOI/TCA + serotonergic add-on (tramadol, triptans, linezolid, MDMA, lithium, DXM, ondansetron). **NMS:** antipsychotic (esp. high-potency typical), withdrawal of dopaminergic in Parkinson's.
ONSET	**SS:** hours (often <24 hr). **NMS:** days to weeks.
NEUROMUSCULAR	**SS:** hyperreflexia, **clonus**, tremor. **NMS: lead-pipe rigidity**, hyporeflexia, bradykinesia.
PUPILS	**SS:** mydriasis. **NMS:** normal.
ANTIDOTE	**SS: cyproheptadine**. **NMS:** bromocriptine ± dantrolene.
COMMON LABS	**SS:** elevated CK (less than NMS). **NMS:** markedly elevated CK, AKI from myoglobinuria.

SSRIS VS SNRIS VS TCAS	
MECHANISM	**SSRI:** 5-HT only. **SNRI:** 5-HT + NE. **TCA:** 5-HT + NE + muscarinic + H_1 + α_1 + Na^+ channel.
INDICATIONS	**SSRI:** first-line anxiety/depression. **SNRI:** pain syndromes + depression. **TCA:** neuropathic pain, migraine, refractory depression.
CARDIAC	**SSRI:** rare QT (citalopram dose-related). **SNRI:** HTN (venlafaxine). **TCA:** wide QRS, fatal overdose.
OVERDOSE	**SSRI:** rarely fatal. **SNRI:** low risk. **TCA:** high lethality — bicarb for QRS.
ANTICHOLINERGIC LOAD	**SSRI:** low (paroxetine highest). **SNRI:** low. **TCA:** high (amitriptyline highest).
PREGNANCY	**SSRI:** sertraline preferred. **SNRI:** generally avoid if able. **TCA:** nortriptyline if needed.

BUPROPION (WELLBUTRIN) VS BUSPIRONE (BUSPAR)	
CLASS	**Bupropion:** NDRI antidepressant. **Buspirone:** 5-HT_{1a} partial agonist anxiolytic.
INDICATION	**Bupropion:** depression, smoking cessation, SAD. **Buspirone:** generalized anxiety disorder.
KEY RISKS	**Bupropion: seizures**; contraindicated in eating disorders & seizure history. **Buspirone:** serotonin syndrome with MAOIs; otherwise low-risk.
DEPENDENCE/WITHDRAWAL	**Bupropion:** no dependence; mild discontinuation. **Buspirone: none**.
ONSET	**Bupropion:** 2–4 weeks. **Buspirone:** 2–4 weeks (not for acute or PRN use).
SIDE EFFECTS	**Bupropion:** insomnia, dry mouth, anorexia, HTN. **Buspirone:** dizziness, mild HA, nausea.

MAOIS VS SSRIS (WHEN TO SWITCH & WASH OUT)	
RISK IF COMBINED	Fatal serotonin syndrome; never combine.
SSRI → MAOI	14 days off SSRI before starting MAOI. **5 weeks** if SSRI was fluoxetine.
MAOI → SSRI	14 days off MAOI before starting SSRI (any).
OTHER CONTRAINDICATED COMBOS	MAOI + tramadol, triptans, meperidine, dextromethorphan, methylene blue, linezolid, St. John's wort, sympathomimetics.
MAOI + FOOD	Tyramine-rich foods → hypertensive crisis. SSRIs have no tyramine restriction.
MONITORING FOCUS	MAOI: BP & food/drug interactions. SSRI: suicidality, sodium, bleeding, sexual side effects.

§ 08

One-Page Infographic Summary

DAY 10 · ANTIDEPRESSANTS & SEROTONIN CRISIS · AT A GLANCE

The 5-Drug-Group Decision Map

SSRIS — FIRST LINE

- Sertraline · fluoxetine · escitalopram · paroxetine · citalopram
- **Sertraline** safest in pregnancy
- **Fluoxetine** = 5-week washout
- **Paroxetine** = teratogenic + worst withdrawal
- **Citalopram** = QTc; max 20 mg ≥60 yrs
- **Watch:** SS · suicidality · SIADH

ONSET **4–6 weeks**

SNRIS — PAIN + MOOD

- Venlafaxine · duloxetine
- **Venlafaxine**: BP rises dose-dependent; worst withdrawal
- **Duloxetine**: hepatotoxic + alcohol = stop
- Good for diabetic neuropathy, fibromyalgia
- **Watch:** HTN · LFTs · withdrawal · suicidality

ONSET **1–4 wk pain · 4–6 wk mood**

TCAS — NARROW WINDOW

- Amitriptyline (anticholinergic ↑↑) · nortriptyline (tolerated)
- Pain > depression nowadays
- **Overdose:** QRS >100 → Na bicarb 1–2 mEq/kg
- **Never:** flumazenil · physostigmine in tox
- **Watch:** ECG · falls · constipation

NORTRIPTYLINE LEVEL **50–150 ng/mL**

MAOIS — LIFESTYLE HEAVY

- Phenelzine · tranylcypromine · selegiline (patch)
- **Diet:** no aged/cured/fermented · no draft beer · no red wine · no fava
- **Drugs to avoid:** SSRIs/SNRIs/TCAs/tramadol/triptans/DXM John's wort
- **Washout:** 14 days (5 weeks if from fluoxetine)
- **Crisis:** phentolamine 5 mg IV

ANTIDOTE **Phentolamine**

OTHER AGENTS

- **Bupropion:** no SS · no sex SE · no weight gain · seizure risk · NO in eating disorders
- **Trazodone:** sleep aid · priapism · falls in elderly
- **Mirtazapine:** sedation + weight gain (geriatric depression)
- **Buspirone:** scheduled · no dependence · 2–4 wk onset

BUPROPION MAX **450 mg/day · 200 mg/dose**

SEROTONIN SYNDROME (HOURS)

- Triad: AMS · autonomic ↑ · neuromuscular ↑
- Inducible clonus + mydriasis + diaphoresis
- Stop all serotonergics
- Benzos · cool · cyproheptadine 12 mg load → 2 mg q2h
- Intubate if T >41.1 °C unresolved

ANTIDOTE **Cyproheptadine**

HTN CRISIS ON MAOI (MIN–HR)

- Severe occipital HA + neck stiffness + BP >180/110
- Trigger: aged cheese, cured meat, red wine, draft beer, pseudoephedrine
- Phentolamine 5 mg IV q5–10 min
- Never β-blocker alone (unopposed α)
- Lower MAP ≤25% in first hour

ANTIDOTE **Phentolamine**

BLACK-BOX SUICIDALITY <25

- Highest risk: first 1–4 weeks & dose changes
- "Energy returns before mood lifts"
- Screen at every contact
- Means restriction: lock firearms, remove leftover meds
- 988 Suicide & Crisis Lifeline

PEDIATRIC SSRI **Fluoxetine ≥8 (depression) · sertraline ≥6 (OCD)**

TOP 4 ANTIDOTE PAIRINGS

- Serotonin syndrome → **cyproheptadine**
- MAOI HTN crisis → **phentolamine**
- TCA overdose (wide QRS) → **sodium bicarbonate**
- NMS → **bromocriptine ± dantrolene**

TEST TRAP **"Energy returns before mood lifts" = suicide window**