ANTIEPILEPTIC DRUGS

NCLEX-RN Pharmacology Infographic · 2026 Test Plan

Neuro System | ⚡ Seizure Management | Clinical Judgment

PHENYTOIN	LAMOTRIGINE	CARBAMAZEPINE	LEVETIRACETAM
Dilantin	Lamictal	Tegretol	Keppra

Master-Level Priorities for All AEDs:

- NEVER stop abruptly → status epilepticus
- Monitor for suicidal ideation (FDA black box for ALL AEDs)
- Seizure precautions: pad rails, suction, O_2 at bedside
- Teratogenic risk → contraception counseling
- Maintenance of airway is the #1 priority during seizure

PHENYTOIN (Dilantin)

Class: Hydantoin Anticonvulsant · Class 1B Antiarrhythmic

Neurologic System

1 DRUG OVERVIEW

- Tonic-clonic (grand mal) seizures
- Complex partial (focal) seizures
- Status epilepticus (2nd-line after benzos)
- Prevention of post-neurosurgery seizures
- Off-label: digoxin toxicity-induced dysrhythmias

2 MECHANISM OF ACTION

Blocks voltage-gated Na^+ channels →
Stabilizes neuronal membranes →
Slows recovery of Na^+ channels →
↓ repetitive neuronal firing →
Seizure suppression

3 THERAPEUTIC EFFECTS

- ↓ frequency & severity of seizures
- Normalized EEG activity
- Therapeutic drug level maintained
- No breakthrough seizure activity

THERAPEUTIC RANGE
10 – 20 mcg/mL

4 SIDE EFFECTS & ADVERSE REACTIONS

COMMON

- Gingival hyperplasia
- Hirsutism (↑ body hair)
- Coarsening of facial features
- GI upset, drowsiness
- Pink/red-brown urine (harmless)

SERIOUS

- **Nystagmus** = early toxicity
- Ataxia, slurred speech
- **Purple glove syndrome** (IV)
- Stevens-Johnson Syndrome
- Agranulocytosis, aplastic anemia
- Hepatotoxicity
- Osteoporosis (long-term)

TOXICITY LADDER: Nystagmus → Ataxia → Slurred speech → Confusion → Coma

5 PRIORITY NURSING CONSIDERATIONS

- **ASSESS** oral cavity → report gum overgrowth
- **MONITOR** serum levels, CBC, LFTs
- **HOLD** if level >20 mcg/mL or nystagmus present
- **NOTIFY** provider for rash → possible SJS
- **CONTRAINDICATED:** sinus bradycardia, AV block, pregnancy (Cat. D)
- Interactions: warfarin, OCPs, digoxin, valproate, antacids
- Induces CYP450 → reduces OCP effectiveness

PHENYTOIN (Dilantin) · continued

6 LABS & DIAGNOSTICS

- **Phenytoin level:** 10–20 mcg/mL (draw trough)
- <10 = subtherapeutic → seizure risk
- >20 = toxicity → nystagmus, ataxia
- >30 = severe toxicity → coma possible
- **CBC:** monitor for agranulocytosis
- **LFTs:** AST/ALT for hepatotoxicity
- **Albumin:** low albumin → ↑ free phenytoin → toxicity
- **Vit D, Ca^{2+}:** long-term use ↓ bone density

7 ADMINISTRATION & SAFETY

- **IV: ONLY with Normal Saline** (precipitates in D5W)
- IV rate ≤ 50 mg/min (adults) → cardiac arrest risk
- Use in-line filter for IV administration
- Flush line with NS before & after IV dose
- PO: shake suspension well, consistent timing
- Do NOT mix suspension with enteral feeds (↓ absorption)
- Hold tube feeds 1–2 hr before/after PO dose
- **Fosphenytoin (Cerebyx)** = safer IV alternative

8 PATIENT EDUCATION

- Take at **same time every day** — never skip
- Brush & floss daily → prevent gingival hyperplasia
- See dentist every 3–6 months
- Medical alert bracelet required
- No alcohol (↑ CNS depression)
- Use **backup contraception** (↓ OCP effect)
- Report: rash, bruising, fever, sore throat immediately
- Urine color change is harmless
- Never stop abruptly → status epilepticus

9 NCLEX TEST TRAPS ⚠

- IV phenytoin + D5W = **WRONG** (crystallizes) → always NS
- Nystagmus ≠ side effect → it's **TOXICITY**, hold dose
- Pink urine is **harmless**, not a complication
- Gingival hyperplasia → teach oral care, NOT stop drug
- Low albumin patient → measure **free** phenytoin level
- Do not confuse with fosphenytoin dose (mg PE)

10 MEMORY BOOSTERS

"PHENYTOIN" → **P**urple glove, **H**irsutism, **E**nzyme inducer, **N**ystagmus, **Y**ellow-brown urine, **T**eeth (gums), **O**steoporosis, **I**ncreased coagulation issues, **N**arrow therapeutic range

"10-20 or TOXIC" → therapeutic 10–20; above that = toxic

NS ONLY → "Phenytoin is a PicKy drug — Picks only normal Saline"

CLINICAL JUDGMENT SNAPSHOT — PHENYTOIN

#1 PRIORITY RISK:
IV infiltration causing **purple glove syndrome** & cardiac arrest from rapid IV push

WHAT HARMS FIRST:
Rapid IV = hypotension, bradycardia, cardiac arrest; precipitation in D5W = tissue necrosis

FIRST NURSING ACTION (toxicity):
STOP infusion → assess airway → VS → draw phenytoin level → notify provider

LAMOTRIGINE (Lamictal)

Class: Phenyltriazine Anticonvulsant · Mood Stabilizer

Neurologic / Psychiatric System

1 DRUG OVERVIEW

- Partial (focal) seizures — adjunct & monotherapy
- Primary generalized tonic-clonic seizures
- Lennox-Gastaut syndrome
- **Bipolar I maintenance** (prevents depressive episodes)
- Often preferred in pregnancy (lower teratogenic risk)

2 MECHANISM OF ACTION

```
Blocks voltage-gated Na⁺ channels →
Inhibits presynaptic glutamate release →
↓ excitatory neurotransmission →
Stabilizes neuronal membranes →
Mood & seizure control
```

3 THERAPEUTIC EFFECTS

- ↓ seizure frequency
- Mood stabilization (bipolar)
- ↓ depressive episodes in bipolar
- Improved EEG patterns

THERAPEUTIC RANGE
3 – 14 mcg/mL

4 SIDE EFFECTS & ADVERSE REACTIONS

COMMON

- Dizziness, headache
- Diplopia, blurred vision
- Nausea, vomiting
- Ataxia, somnolence
- Insomnia, tremor

SERIOUS

- **Stevens-Johnson Syndrome**
- **Toxic Epidermal Necrolysis (TEN)**
- DRESS syndrome
- Aseptic meningitis
- Hemophagocytic lymphohistiocytosis
- Suicidal ideation (black box)

BLACK BOX: Life-threatening rash (SJS/TEN) — highest risk in first 2–8 weeks. Risk ↑↑ if dose titrated too fast or combined with valproate.

5 PRIORITY NURSING CONSIDERATIONS

- **ASSESS** skin DAILY during titration
- **MONITOR** for ANY rash, fever, lymphadenopathy, mucosal lesions
- **HOLD** immediately and notify if ANY rash
- **NOTIFY** for suicidal thoughts, behavior changes
- **Titrate SLOWLY** over weeks — NEVER skip titration
- Valproate DOUBLES lamotrigine level → lower dose
- Carbamazepine/phenytoin ↓ lamotrigine level → higher dose
- OCPs ↓ lamotrigine level (pill-free week → ↑ level)

LAMOTRIGINE (Lamictal) · continued

6 LABS & DIAGNOSTICS

- **Lamotrigine level:** 3–14 mcg/mL (used selectively)
- Routine blood monitoring **NOT required**
- CBC if clinical concern (DRESS, hematologic)
- LFTs at baseline & with symptoms
- Renal function baseline
- Pregnancy test before initiation

7 ADMINISTRATION & SAFETY

- **Oral only** — tablet, chewable, ODT, ER
- **SLOW titration is the #1 safety rule**
- Typical start: 25 mg daily × 2 wk, then 50 mg × 2 wk...
- If dose missed >5 days → restart titration
- If >5 days off → **DO NOT** resume at previous dose
- Can take with or without food
- ODT: dissolve on tongue, no water needed

8 PATIENT EDUCATION

- **STOP & call 911 for ANY rash**
- Especially rash + fever + mouth sores = emergency
- Take at same time daily — do NOT double-up
- Do not stop abruptly
- Report suicidal thoughts or mood changes
- Avoid alcohol
- Medical alert bracelet
- May take weeks to reach full effect
- Tell all providers before any dose change

9 NCLEX TEST TRAPS ⚠

- "Mild rash" on lamotrigine = **NOT mild** → HOLD drug
- Do not "wait and see" with rash — any rash = stop
- Rapid titration is the #1 error → SJS risk
- Combining with valproate? → dose must be HALVED
- Missed >5 days → restart titration, don't resume full
- Used for bipolar maintenance, NOT acute mania
- Unlike most AEDs, does not cause sedation at therapeutic doses

10 MEMORY BOOSTERS

"LAMO-TRIGGERS RASH" → the L-drug = Life-threatening rash

"SLOW & LOW" → titrate slowly, start low — SJS prevention

"LAMB = BIPOLAR" → Lamotrigine preferred for bipolar depression

VALPROATE + LAMO = ½ DOSE → valproate doubles the level

CLINICAL JUDGMENT SNAPSHOT — LAMOTRIGINE

#1 PRIORITY RISK:
Stevens-Johnson Syndrome / TEN — skin sloughing, can be fatal

WHAT HARMS FIRST:
Rapid dose escalation; any new rash within first 2–8 weeks is a medical emergency

FIRST NURSING ACTION (new rash):
HOLD drug → assess mucosa, fever, lymph nodes → notify provider STAT → prepare for hospitalization

CARBAMAZEPINE (Tegretol)

Class: Iminostilbene Anticonvulsant · Mood Stabilizer

Neurologic / Psychiatric System

1 DRUG OVERVIEW

- Partial (focal) seizures — 1st line
- Tonic-clonic (grand mal) seizures
- Mixed seizure patterns
- **Trigeminal neuralgia** — drug of choice
- Bipolar disorder (acute mania/maintenance)
- Glossopharyngeal neuralgia

2 MECHANISM OF ACTION

Blocks voltage-gated Na^+ channels →
Stabilizes hyperexcited neural membranes →
↓ synaptic transmission →
↓ repetitive action potentials →
Seizure & pain suppression

3 THERAPEUTIC EFFECTS

- ↓ seizure frequency
- ↓ trigeminal neuralgia pain
- Mood stabilization in bipolar
- Therapeutic serum level maintained

THERAPEUTIC RANGE
4 – 12 mcg/mL

4 SIDE EFFECTS & ADVERSE REACTIONS

COMMON

- Dizziness, drowsiness
- Nausea, vomiting
- Diplopia, blurred vision
- Ataxia
- Dry mouth

SERIOUS

- **Agranulocytosis**
- **Aplastic anemia**
- Thrombocytopenia
- **SJS/TEN** (esp. HLA-B*1502)
- **Hyponatremia / SIADH**
- Hepatotoxicity
- Cardiac conduction defects

BLACK BOX: Serious dermatologic (SJS/TEN) and hematologic (aplastic anemia, agranulocytosis) reactions. Screen Asian patients for HLA-B*1502 BEFORE starting.

6 PRIORITY NURSING CONSIDERATIONS

- **ASSESS** for infection (fever, sore throat) = agranulocytosis
- **MONITOR** CBC, platelets, Na^+, LFTs
- **HOLD** if WBC drops, ANC <1500, or Na^+ <125
- **NOTIFY** for rash, bleeding, bruising, jaundice
- Contraindicated: bone marrow suppression, AV block
- Avoid MAOIs (wait 14 days)
- **Autoinduces own metabolism** → level drops in 2–4 wk → may need dose ↑
- Grapefruit juice ↑ levels → avoid
- ↓ effectiveness of OCPs, warfarin, doxycycline

CARBAMAZEPINE (Tegretol) · continued

6 LABS & DIAGNOSTICS

- **Carbamazepine level:** 4–12 mcg/mL
- >12 = toxicity → ataxia, diplopia, coma
- **CBC** baseline, weekly × 1 mo, then q3 mo
- WBC <3000, ANC <1500 → HOLD
- Platelets <100,000 → notify provider
- **Sodium:** watch for SIADH — Na <135 = hyponatremia
- **LFTs:** AST/ALT, bilirubin
- **HLA-B*1502 genotype** before starting in Asian patients
- ECG at baseline (conduction defects)

7 ADMINISTRATION & SAFETY

- **Oral only** — tablet, chewable, XR, suspension
- Take with food → ↓ GI upset, ↑ absorption
- Shake suspension well
- **Do NOT crush XR** formulations
- Do NOT give suspension with other liquid meds (precipitates)
- Consistent timing with meals
- Store at room temp, protect from humidity

8 PATIENT EDUCATION

- Report: **fever, sore throat, easy bruising, bleeding**
- Report: rash, jaundice, dark urine
- Avoid **grapefruit juice** (↑ toxicity risk)
- Use **backup contraception** (↓ OCP efficacy)
- Avoid alcohol (↑ CNS depression)
- Rise slowly (orthostatic hypotension)
- No driving until stabilized (dizziness, diplopia)
- Medical alert bracelet
- Never stop abruptly → status epilepticus

9 NCLEX TEST TRAPS ⚠

- Sore throat + fever = **AGRANULOCYTOSIS**, not a simple infection
- New confusion + low Na^+ = **SIADH**, not "just dehydration"
- Grapefruit juice causes toxicity — NOT just a GI interaction
- Asian patient without HLA testing = SJS risk
- Level may DROP after 2–4 wks (autoinduction) → NOT non-compliance
- First choice for **trigeminal neuralgia**, not opioids
- Do not confuse with OXcarbazepine (similar but different)

10 MEMORY BOOSTERS

"CARBAMAZEPINE" = **C**BC watch, **A**granulocytosis, **R**ash (SJS), **B**one marrow, **A**taxia, **M**ood stabilizer, **A**utoinduction, **Z**ero grapefruit, **E**dema/hypoNa

"TEG-retol → TRIG-eminal" → drug of choice for trigeminal neuralgia

"4 to 12 = HEAVEN" → therapeutic range 4–12 mcg/mL

"SIADH with TEG" → hyponatremia is classic

CLINICAL JUDGMENT SNAPSHOT — CARBAMAZEPINE

#1 PRIORITY RISK:
Bone marrow suppression (agranulocytosis, aplastic anemia) & **SJS/TEN**

WHAT HARMS FIRST:
Infection from neutropenia; hyponatremia causing seizures/confusion; life-threatening rash

FIRST NURSING ACTION (fever/sore throat):
HOLD next dose → STAT CBC with differential → assess for infection → notify provider → reverse isolation if neutropenic

LEVETIRACETAM (Keppra)

Class: Pyrrolidine Anticonvulsant · Broad-Spectrum AED

Neurologic System

1 DRUG OVERVIEW

- **Broad-spectrum** AED — works on multiple seizure types
- Partial (focal) seizures — adjunct or monotherapy
- Primary generalized tonic-clonic seizures
- Myoclonic seizures (juvenile myoclonic epilepsy)
- Status epilepticus (alternative to phenytoin)
- **Preferred in pregnancy, ICU, polypharmacy**

2 MECHANISM OF ACTION

Binds to **SV2A** (synaptic vesicle protein 2A) →
Modulates neurotransmitter release →
↓ excessive neuronal excitability →
Broad anticonvulsant effect

Unique MOA — no Na^+ channel or GABA effect. Why Keppra has FEW drug interactions.

3 THERAPEUTIC EFFECTS

- ↓ seizure frequency (all types)
- Improved quality of life, cognition preserved
- Effective within days (fast onset)

THERAPEUTIC RANGE (NOT ROUTINE)
12 – 46 mcg/mL

4 SIDE EFFECTS & ADVERSE REACTIONS

COMMON

- Somnolence, fatigue
- Dizziness, headache
- Weakness, asthenia
- Nasopharyngitis
- Decreased appetite

SERIOUS

- **Behavioral changes ("Keppra rage")**
- Agitation, hostility, aggression
- **Suicidal ideation** (black box)
- Depression, psychosis
- SJS/TEN (rare)
- DRESS syndrome (rare)
- Anaphylaxis / angioedema

"KEPPRA RAGE" — irritability, mood swings, aggression. Often responds to vitamin B6 (pyridoxine) supplementation.

5 PRIORITY NURSING CONSIDERATIONS

- **ASSESS** mood, behavior, suicidal ideation
- **MONITOR** renal function (BUN, creatinine, eGFR)
- **HOLD** / adjust for renal impairment
- **NOTIFY** for suicidal thoughts, aggression, new depression
- Few drug interactions — a major advantage
- No hepatic metabolism concerns
- Safe in pregnancy compared to older AEDs
- Dose adjustment for CrCl <80 mL/min

LEVETIRACETAM (Keppra) · continued

6 LABS & DIAGNOSTICS

- **Renal function (BUN, Cr, eGFR)** = most important
- Dose reduction required for CrCl <80 mL/min
- **Routine drug levels NOT required** (unlike phenytoin)
- CBC at baseline (rare hematologic effects)
- Pregnancy test before starting
- Mental status / PHQ-9 screening baseline

7 ADMINISTRATION & SAFETY

- Routes: PO (tablet, ER, solution) and **IV**
- IV: dilute in 100 mL NS/D5W/LR, infuse over 15 min
- PO can be given with or without food
- No titration required for initial dose (in most cases)
- **Do NOT stop abruptly** → status epilepticus
- ER tablet: do not crush or split
- Flexible — preferred for NPO/ICU patients

8 PATIENT EDUCATION

- Report **mood changes, aggression, depression**
- Report suicidal thoughts immediately — CALL 911 if urgent
- Avoid alcohol (↑ drowsiness)
- No driving until effects known
- Take at same time daily
- Do NOT stop abruptly — taper required
- Tell all providers you're on Keppra
- Medical alert bracelet
- Ask provider about **vitamin B6** for irritability

9 NCLEX TEST TRAPS ⚠

- Behavioral changes = **drug side effect**, not a new diagnosis
- "Keppra rage" is real — assess aggression carefully
- Renal dosing is the #1 safety issue
- NO drug level monitoring required routinely
- Don't confuse with other AEDs — Keppra has **few interactions**
- Fatigue is common ≠ toxicity
- Preferred AED in pregnancy (with lamotrigine)

10 MEMORY BOOSTERS

"KEPPRA" = **K**idneys (renal dosing), **E**motional (rage), **P**sych (suicidal), **P**regnancy-safe, **R**are interactions, **A**gitation

"B6 for Keppra 6-SESS" → pyridoxine helps mood side effects

"KEPPRA = CLEAN" → no liver enzyme issues, few drug interactions

"Keppra Rage" → remember aggression/irritability is drug-induced

CLINICAL JUDGMENT SNAPSHOT — LEVETIRACETAM

#1 PRIORITY RISK:
Behavioral/psychiatric effects — suicidal ideation, aggression, depression

WHAT HARMS FIRST:
Missed suicidal ideation; renal accumulation if kidney function declines and dose not adjusted

FIRST NURSING ACTION (mood/SI):
Assess suicidality with direct questioning → ensure safety → notify provider → NEVER stop abruptly without taper plan

CLASS COMPARISON — MOST TESTED AEDs

Side-by-side comparison for rapid NCLEX recall

Feature	PHENYTOIN (Dilantin)	LAMOTRIGINE (Lamictal)	CARBAMAZEPINE (Tegretol)	LEVETIRACETAM (Keppra)
Class	Hydantoin	Phenyltriazine	Iminostilbene	Pyrrolidine
MOA	Na^+ channel blocker	Na^+ channel + ↓ glutamate	Na^+ channel blocker	Binds SV2A protein
Primary use	Tonic-clonic, status epilepticus	Partial, bipolar maintenance	Partial, trigeminal neuralgia, bipolar	Broad-spectrum, status, ICU
Therapeutic range	**10–20 mcg/mL**	3–14 mcg/mL	**4–12 mcg/mL**	12–46 mcg/mL (rarely checked)
Signature toxicity	Nystagmus, gingival hyperplasia, purple glove	SJS / TEN rash	Agranulocytosis, aplastic anemia, SIADH	"Keppra rage," suicidal ideation
Key labs	Drug level, CBC, LFTs, albumin	Skin exam; level rarely checked	CBC weekly × 1mo, Na^+, LFTs, HLA-B*1502	BUN / Creatinine / eGFR
IV use	Yes — NS ONLY, <50 mg/min, filter	No IV form	No IV form	Yes — easy, dilute in 100 mL
Pregnancy	Category D — teratogenic	Preferred in pregnancy	Category D — teratogenic	Preferred in pregnancy
Drug interactions	MANY (CYP450 inducer)	Moderate (valproate ↑↑)	MANY (CYP450 inducer, autoinduction)	FEW — advantage
Black box warning	Suicidal ideation (AED class)	SJS/TEN rash	Aplastic anemia, SJS/TEN	Suicidal ideation, behavioral
#1 Priority	IV safety + toxicity monitoring	Any rash → STOP	CBC + Na^+ monitoring	Mood / SI + renal dose

CLASS-WIDE PEARLS (ALL AEDs)

- **Black box for ALL AEDs:** suicidal ideation → assess at every visit
- **NEVER stop abruptly** → precipitates **status epilepticus**
- Status epilepticus = seizure >5 min or repeated without recovery → **airway is priority #1**
- Status epilepticus order: **Benzo (lorazepam)** → Phenytoin/Fosphenytoin or Levetiracetam → Phenobarbital/anesthesia
- All AEDs: assess seizure precautions (O_2, suction, pad rails, bed low)
- Avoid alcohol — additive CNS depression
- Teratogenic risk → preconception counseling, folic acid 4 mg/day
- Medical alert ID required
- Bone health: vitamin D, calcium, weight-bearing exercise

MASTER CLINICAL JUDGMENT — AED CLASS

IF SEIZURE IN PROGRESS:
AIRWAY FIRST — turn on side, do NOT restrain, do NOT put anything in mouth, time the seizure, suction available

IF STATUS EPILEPTICUS (>5 min):
IV lorazepam (Ativan) 4 mg IV → then loading dose phenytoin/fosphenytoin or levetiracetam → if continues: phenobarbital → RSI/anesthesia

IF PATIENT REFUSES AED:
Explore cause (cost, side effects, stigma) → NEVER just agree to stop — taper required to prevent status

IF PREGNANT PATIENT ON AED:
Do not stop without consultation — uncontrolled seizure harms fetus MORE than most AEDs; switch to lamotrigine or levetiracetam; folic acid 4 mg/day

IF NEW RASH ON ANY AED:
HOLD drug → assess mucosa, fever, lymph → consider SJS/TEN → notify provider STAT