NCLEX-RN · PHARMACOLOGY · 2026 TEST PLAN

Antiretroviral *Therapy*

HAART / cART — Combination regimens for HIV-1

CLASS · ANTIVIRALS (MULTIPLE) | SYSTEM · IMMUNE / ID | HIGH-ALERT · ADHERENCE-CRITICAL

01 Drug Overview

- **Indication:** HIV-1 infection — suppresses viral replication. *Not a cure.*
- **Combination therapy (HAART):** ≥ 3 drugs from ≥ 2 classes to prevent resistance.
- **Goal of therapy:** undetectable viral load (< 20–50 copies/mL) + CD4 restoration > 500.
- **U = U:** Undetectable = Untransmittable (sexual transmission).
- **Uses beyond treatment:**
  - **PrEP** — pre-exposure prophylaxis (tenofovir/emtricitabine; cabotegravir LA).
  - **PEP** — post-exposure prophylaxis, start within **72 hr** × 28 days.
  - **PMTCT** — prevention of mother-to-child transmission.

i DRUG CLASSES (SIX MAIN TARGETS)

NRTIs · NNRTIs · Protease Inhibitors (PIs) · Integrase Inhibitors (INSTIs) · Entry/Fusion Inhibitors · CCR5 antagonists. Pharmacokinetic boosters (ritonavir, cobicistat) are paired to extend half-lives.

02 Mechanism of Action

Each class blocks a different step of the HIV life cycle. Combining classes prevents resistance.

ENTRY HIV binds CD4 + CCR5/CXCR4 → fuses with cell
↓ blocked by Maraviroc (CCR5), Enfuvirtide (fusion), Fostemsavir (attachment)

REVERSE TRANSCRIPTION Viral RNA → viral DNA
↓ blocked by NRTIs (chain termination) · NNRTIs (bind RT directly)

INTEGRATION Viral DNA → inserts into host genome
↓ blocked by INSTIs "-tegravir"

MATURATION Viral proteins cleaved → mature virion
↓ blocked by PIs "-navir" → produces non-infectious virions

🔑 **WHY COMBINATION THERAPY?**

HIV mutates rapidly. Hitting 3 different steps simultaneously makes resistance statistically improbable — *unless* adherence drops below ~95%.

03 Therapeutic Effects

What "working" looks like

- Viral load **drops ≥ 1 log** within 4 wk; undetectable by **6 months**.
- CD4 count rises (~50–150 cells/μL in first year).
- Fewer opportunistic infections (PCP, TB, candida, CMV, Kaposi sarcoma).
- Weight stabilization; improved energy; reduced lymphadenopathy.
- Reduced transmission risk → **U = U.**

> ⚠ **IRIS — IMMUNE RECONSTITUTION INFLAMMATORY SYNDROME**
>
> As CD4 recovers, latent infections "wake up." Fever, worsening symptoms of old infections, new lymphadenopathy within weeks of starting ART. **Do NOT stop ART** — treat the opportunistic infection.

04 Side Effects & Adverse Reactions

COMMON (ALL CLASSES)

- N / V / diarrhea
- Headache, fatigue, insomnia
- Rash (mild)
- Weight gain (esp. INSTIs, TAF)
- ↑ LFTs (transient)

SERIOUS / LIFE-THREATENING

- **Lactic acidosis + hepatic steatosis** (NRTIs) — Kussmaul, RUQ pain
- **Abacavir hypersensitivity** — fever, rash, GI, dyspnea
- **Stevens-Johnson / TEN** (nevirapine, efavirenz)
- **Hepatotoxicity** — esp. nevirapine, PIs
- **IRIS** (early in therapy)
- **Pancreatitis** (didanosine, stavudine)

Class-Specific Red Flags

- **Tenofovir (TDF):** nephrotoxicity + ↓ bone mineral density. TAF is safer.
- **Zidovudine (AZT):** bone marrow suppression → anemia, neutropenia.
- **Abacavir:** *life-threatening hypersensitivity* — HLA-B*5701 screen before starting.
- **Efavirenz:** CNS — vivid dreams, dizziness, depression, suicidality; take at bedtime.
- **Nevirapine:** SJS + fulminant hepatitis (esp. women with CD4 > 250).
- **PIs ("-navir"):** metabolic syndrome — hyperglycemia, hyperlipidemia, fat redistribution, ↑ cardiac risk.
- **INSTIs ("-tegravir"):** generally well-tolerated; weight gain, insomnia, myopathy (rare).
- **Dolutegravir:** historically NTD concern at conception — current guidance permits use with counseling.

05 Priority Nursing Considerations

→ *ASSESS*

- **Adherence** — > 95% required; missed doses drive resistance.
- Baseline CD4, viral load, HIV genotype, HLA-B*5701, HBV/HCV, pregnancy, renal/hepatic function.
- Signs of opportunistic infection: fever, night sweats, weight loss, cough, oral thrush.
- Mental health — depression, suicidality (efavirenz).

→ *MONITOR*

- Viral load + CD4 at 4–8 wk, then q3–6 mo.
- CBC (zidovudine), LFTs, BUN/Cr, urinalysis (tenofovir), lipids, glucose (PIs).
- Skin — rash onset + progression (SJS).
- Vitals — fever is a red flag in the first weeks.

→ *HOLD / NOTIFY*

- **HOLD abacavir** if HLA-B*5701 positive OR any hypersensitivity sign — *never rechallenge* (fatal).
- **HOLD + notify** for new rash + fever, jaundice, Kussmaul breathing, RUQ pain.
- Renal decline on tenofovir → notify provider.
- New/worsening depression or suicidal ideation on efavirenz.

→ *Contraindications & Interactions*

- **CYP3A4 interactions** are the big NCLEX minefield — ritonavir + cobicistat inhibit CYP3A4.
- **Contraindicated with PIs:** simvastatin, lovastatin (rhabdomyolysis), rifampin (↓ PI levels), St. John's wort, sildenafil (standard dose).

- **PPIs & H2 blockers ↓ atazanavir** absorption — separate doses.
- **Antacids / polyvalent cations** (Ca, Mg, Fe, Al) chelate INSTIs — separate by 2–6 hr.
- **Hormonal contraceptives** — efficacy reduced by some PIs/NNRTIs → dual contraception.

06 Labs & Diagnostics

CD4 Count
`Normal 500-1600 · AIDS < 200`
< 200 → initiate PCP prophylaxis (Bactrim).

HIV Viral Load (RNA PCR)
`Goal: undetectable < 20-50 copies/mL`
Most sensitive indicator of ART success + adherence.

HIV Genotype
`Baseline & on failure`
Guides drug selection; detects resistance mutations.

HLA-B*5701
`Must be NEGATIVE before abacavir`
Positive → do not give abacavir. Ever.

CBC
`Hgb / ANC`
Zidovudine → anemia, neutropenia.

LFTs (AST/ALT)
`> 3× ULN → notify`
Nevirapine, PIs — hepatotoxicity.

BUN / Cr / eGFR / UA
`Tenofovir monitoring`
Proteinuria, glycosuria, ↑ Cr → Fanconi / AKI.

Lipids + Glucose / A1C
`PI-related metabolic sx`
New-onset DM + hyperlipidemia common on PIs.

Lactate / ABG
`Elevated lactate + anion gap acidosis`
NRTI lactic acidosis — medical emergency.

HBV / HCV Serology
`Before start`
Coinfection changes regimen (TDF/FTC covers HBV).

07 Administration & Safety

- **Route:** oral is standard. Enfuvirtide = SubQ. Cabotegravir/rilpivirine LA = IM q1–2 mo.
- **Same time every day** — missed doses = resistance.
- **With food:** atazanavir, rilpivirine, darunavir — ↑ absorption.
- **Empty stomach / bedtime:** efavirenz — ↓ CNS side effects.
- **Separate from antacids / polyvalent cations:** INSTIs — chelation risk.
- **Do NOT stop abruptly** — partial suppression drives resistance.
- **Never skip + double-dose** — take missed dose if remembered; if near next dose, skip.
- **Pregnancy:** continue ART — preferred regimens exist (dolutegravir now accepted with counseling).

HIGH-ALERT SAFETY

Never restart abacavir after a suspected hypersensitivity reaction — rechallenge can be fatal. Document allergy clearly in record.

08 Patient Education

- **Lifelong therapy** — ART controls, does not cure.
- **Adherence above 95%** is non-negotiable; use pill boxes, alarms, calendar apps.
- **U = U:** undetectable viral load = no sexual transmission risk — but *still use barrier protection* (other STIs, pregnancy).
- **Do not share** needles, razors, toothbrushes.
- **No breastfeeding** per US guidelines (evolving — shared decision-making).
- **Avoid St. John's wort** — major interaction.
- Check with pharmacist before any new OTC, herbal, or prescription drug.
- **Seek care immediately for:** rash + fever, yellow skin/eyes, severe abdominal pain, difficulty breathing, muscle aches + weakness, new depression or thoughts of self-harm.
- Keep all lab & clinic appointments — viral load is your report card.

09 NCLEX Test Traps ⚠

- **"ART cures HIV"** — *wrong.* It suppresses, does not eradicate.
- **"It's okay to skip a dose occasionally"** — *never.* Sub-therapeutic levels breed resistance.
- **"Undetectable means HIV-negative"** — no. Still HIV-positive, still on lifelong therapy.
- **PrEP ≠ PEP ≠ ART:** PrEP = before risk. PEP = after exposure (within 72 hr × 28 d). ART = treatment.
- **Abacavir:** must have HLA-B*5701 result before first dose; positive = never give.
- **Fever + new rash on ART** → STOP drug + notify provider (SJS risk).
- **CD4 < 200** → start PCP prophylaxis (Bactrim), not "just monitor."
- **Simvastatin + PI** = contraindicated (rhabdomyolysis). Use pravastatin/rosuvastatin.
- **PPIs** markedly reduce atazanavir absorption — separate or avoid.
- **St. John's wort** induces CYP3A4 → treatment failure.
- **Breastfeeding** on ART — *not recommended* in US even if undetectable (though guidance is shifting toward shared decision-making).
- **Lactic acidosis presentation** — N/V + abdominal pain + Kussmaul + fatigue, not simply "GI upset."
- **IRIS** after starting ART is *not* an indication to stop ART — treat the OI.
- **Needlestick exposure** — start PEP within hours, don't wait for HIV test results.

10 Memory Boosters

Suffix patterns (drug-class giveaways)

"-NAVIR" = Protease Inhibitor

ritoNAVIR, darNAVIR, atazaNAVIR → metabolic syndrome, CYP3A4 drama.

"-TEGRAVIR" = INSTI

doluTEGRAVIR, bicTEGRAVIR, ralTEGRAVIR → well-tolerated, weight gain, watch cation spacing.

"-VIRINE" / "-RAPINE" = NNRTI

rilpiVIRINE, nevirAPINE, efaVIRENZ → rash, SJS, CNS (efavirenz).

High-yield drug tricks

ABC → "Always Blood Check"

Abacavir — HLA-B*5701 before every first dose.

AZT → "Anemia Z Thing"

Zidovudine — bone marrow suppression (monitor CBC).

TDF → "Toxic to kidneys + bones"

Tenofovir DF — nephrotoxic, ↓ BMD. TAF is newer/safer.

EFV → "Extreme Freaky Visions"

Efavirenz — vivid dreams, CNS, mood changes; dose at bedtime.

NVP → "Never Vary the Pill"

Nevirapine — SJS + hepatotoxicity; 2-week lead-in dose.

Big-picture recall

`U = U`

Undetectable = Untransmittable (sexual). Cornerstone of modern HIV education.

`"3 from 2" Rule`

≥ 3 drugs from ≥ 2 classes — the HAART backbone.

`72 & 28`

PEP within **72 hours** of exposure × **28 days**.

11 Most Tested Drugs in This Class

NRTIs · "-vudine / -tabine / tenofovir / abacavir"

DRUG	NCLEX PEARL	WATCH
Zidovudine (AZT)	Historical PMTCT drug	Anemia, neutropenia — *CBC*
Tenofovir (TDF/TAF)	Also in PrEP	Nephro · bone · TAF is safer
Abacavir (ABC)	HLA-B*5701 mandatory	Fatal hypersensitivity
Emtricitabine (FTC)	Well-tolerated backbone	Mild GI, hyperpigmentation
Lamivudine (3TC)	Also treats HBV	Generally gentle

NNRTIs · "-virine / -rapine / efavirenz"

DRUG	NCLEX PEARL	WATCH
Efavirenz	Bedtime, empty stomach	CNS, mood, suicidality
Nevirapine	2-wk lead-in dosing	SJS, hepatotoxicity
Rilpivirine	Take *with food*	PPI = contraindicated
Doravirine	Newer; fewer interactions	Generally well-tolerated

Protease Inhibitors · "-navir" PI

DRUG	NCLEX PEARL	WATCH
Ritonavir	Used mainly as a *booster*	CYP3A4 inhibitor — interaction king

DRUG	NCLEX PEARL	WATCH
Darunavir	Sulfa component	Rash, metabolic syndrome
Atazanavir	Indirect hyperbilirubinemia (benign)	PPIs ↓↓ absorption
Lopinavir/Ritonavir	Older combo	GI, lipids, QT prolongation

INSTIs · "-tegravir" INSTI

DRUG	NCLEX PEARL	WATCH
Dolutegravir	First-line in most regimens	Weight gain, insomnia; space from antacids
Bictegravir (Biktarvy)	Single-tablet regimen	Excellent tolerability
Raltegravir	Twice daily	Myopathy (rare)
Cabotegravir LA	IM q1–2 mo (with rilpivirine)	Injection-site reactions

Entry / Fusion / Attachment

DRUG	NCLEX PEARL	WATCH
Enfuvirtide (T-20)	*SubQ* twice daily — rare	Injection-site reactions
Maraviroc	Requires CCR5 tropism test first	Hepatotoxicity
Fostemsavir	Multi-drug-resistant HIV	QT prolongation
Lenacapavir	Long-acting capsid inhibitor	Heavily experienced / resistant patients

FINAL SECTION · THINK LIKE THE NCLEX

Clinical Judgment Snapshot

#1 priority risk of ART?

Non-adherence driving viral resistance. A resistant strain is harder to treat than the original infection.

What harms the patient FIRST?

Early-therapy hypersensitivity: **abacavir reaction**, **Stevens-Johnson** (nevirapine/efavirenz), and **lactic acidosis** (NRTIs) — all can be fatal in days to weeks.

FIRST action — patient on abacavir develops fever, rash, N/V, dyspnea?

STOP the drug immediately and notify the provider. Never rechallenge — rechallenge can be fatal.

FIRST action before initiating abacavir?

Verify **HLA-B*5701 result is negative** in the chart — do not administer without it.

FIRST action for a new HIV patient with CD4 < 200?

Start **PCP prophylaxis (TMP-SMX)** in addition to ART — don't wait for an infection.

FIRST action after occupational needlestick from an HIV-positive source?

Start PEP within hours (ideally < 2 hr, absolute window 72 hr). Do not wait for labs.

FIRST action — patient on ART develops worsening fever + new lymphadenopathy 3 weeks in?

Assess for **IRIS and active opportunistic infection**. **Continue ART**; treat the OI.

Canva-ready · NCLEX-RN 2026 Test Plan · NCJMM-aligned · Click any section header to collapse.