ESTROGEN & PROGESTINS

Sex Hormones • Contraceptives • Hormone Replacement Therapy

System: Endocrine | Reproductive

NGN NCLEX • 2026 Test Plan • High-Yield Review

1. DRUG OVERVIEW

KEY DRUGS IN THIS CLASS

- **Estrogens:** conjugated estrogens (Premarin), estradiol (Estrace, Climara patch, Vagifem), ethinyl estradiol (in OCPs)
- **Progestins:** medroxyprogesterone (Provera / Depo-Provera), norethindrone, levonorgestrel (Plan B, Mirena IUD), drospirenone
- **Combined OCPs:** ethinyl estradiol + progestin (Yaz, Ortho Tri-Cyclen, Loestrin)

INDICATIONS — WHY WE GIVE IT

- Contraception (combined & progestin-only pills, patches, rings, IUDs, injections)
- Menopausal hormone therapy → hot flashes, night sweats, vaginal atrophy
- Hypogonadism & primary ovarian insufficiency
- Dysfunctional/abnormal uterine bleeding
- Endometriosis & PCOS
- Emergency contraception (levonorgestrel — Plan B)
- Prevention of osteoporosis (limited — not first-line)
- Endometrial cancer palliation (high-dose progestins)
- Gender-affirming hormone therapy

2. MECHANISM OF ACTION (SIMPLIFIED)

ESTROGEN →

- Binds estrogen receptors → promotes endometrial proliferation
- ↑ Negative feedback on hypothalamus/pituitary → ↓ FSH & LH
- → Suppresses ovulation
- Maintains secondary sex characteristics, bone density, lipid profile

PROGESTIN →

- Binds progesterone receptors → thickens cervical mucus (blocks sperm)
- Thins endometrium → prevents implantation
- Suppresses LH surge → ↓ ovulation
- Stabilizes endometrial lining (protects uterus from estrogen-driven CA)

COMBINED OCP →

- Dual ovulation suppression + hostile cervical mucus + thin endometrium → 99% efficacy w/ perfect use

3. THERAPEUTIC EFFECTS

- Prevention of pregnancy (99% perfect use / 91% typical use)
- Regular, predictable, lighter menses
- ↓ Hot flashes, night sweats, vaginal dryness (HRT)
- ↓ Dysmenorrhea, acne, hirsutism (PCOS)
- ↓ Endometrial & ovarian cancer risk with long-term OCP use
- Slowed bone loss in postmenopausal women
- ↓ Abnormal uterine bleeding

4. SIDE EFFECTS & ADVERSE REACTIONS

COMMON	SERIOUS 🚨
• Nausea, bloating, breast tenderness • Breakthrough bleeding / spotting • Weight changes • Mood changes, depression • Headache • Chloasma (melasma / facial hyperpigmentation) • ↓ Libido (esp. progestin-only) • Acne (some progestins)	• 🚨 VTE — DVT / PE (BLACK BOX) • 🚨 MI, stroke (↑↑ in smokers >35) • 🚨 HTN (new or worsening) • 🚨 Hepatic adenoma / hepatotoxicity • 🚨 Breast cancer (long-term HRT) • 🚨 Endometrial CA (estrogen-alone + intact uterus) • 🚨 Gallbladder disease / cholestasis • 🚨 Ectopic pregnancy (progestin-only failures) • 🚨 Angioedema (rare)

⚠️ TOXICITY / RED-FLAG SIGNS — STOP THE DRUG

- Sudden severe headache (→ stroke)
- Chest pain, SOB, hemoptysis (→ PE)
- Unilateral calf pain, swelling, warmth (→ DVT)
- Visual changes, slurred speech, focal weakness (→ stroke/TIA)
- RUQ pain + jaundice (→ hepatic/gallbladder)
- Severe abdominal pain (→ hepatic adenoma rupture, ectopic)

5. PRIORITY NURSING CONSIDERATIONS

ASSESS / MONITOR

- → assess BP at EVERY visit
- → assess weight, edema, Homan's sign / calf tenderness
- → monitor for ACHES warning signs (see Memory Boosters)
- → monitor LFTs, lipid panel, glucose
- → annual breast exam, Pap, mammogram per guidelines
- → assess smoking hx and age (combined OCP red flag)

HOLD / ABSOLUTE CONTRAINDICATIONS

- Hx of VTE, DVT, PE, thrombophilia
- Known or suspected breast CA, endometrial CA, estrogen-dependent tumor
- Undiagnosed abnormal vaginal bleeding
- Pregnancy (Category X for many; teratogenic risk)
- Active liver disease / hepatic tumor
- Hx MI, stroke, CAD
- Uncontrolled HTN
- Migraine WITH aura
- Smoker ≥35 years old (combined OCP)
- Major surgery / prolonged immobilization (stop 4 wks pre-op)
- Diabetes with vascular complications

DRUG & SUBSTANCE INTERACTIONS (↓ contraceptive efficacy)

- Rifampin, rifabutin
- Anticonvulsants: phenytoin, carbamazepine, phenobarbital, topiramate
- St. John's Wort (herbal)
- Some antiretrovirals (ritonavir-boosted)
- ↓ effect of warfarin, lamotrigine, some antihyperglycemics
- Smoking → massive ↑ thromboembolic risk

6. LABS & DIAGNOSTICS

- **Pregnancy test:** MUST be negative before starting (estrogens = Category X)
- **BP:** baseline + at each visit → HOLD if ≥140/90 sustained
- **Lipid panel:** monitor TG (estrogen ↑ triglycerides)
- **LFTs (ALT, AST):** baseline + PRN → HOLD if ↑↑
- **Glucose / HbA1c:** can worsen insulin resistance
- **Mammogram:** baseline + per age-based guidelines
- **Pap smear:** per cervical cancer screening guidelines

- **D-dimer / Doppler US:** if VTE suspected
- **Bone density (DEXA):** baseline for long-term Depo-Provera (>2 yr)

7. ADMINISTRATION & SAFETY

ROUTES & TIMING

- **Oral OCPs:** same time daily — consistency critical for efficacy
- **Transdermal patch:** weekly x 3, patch-free week 4; rotate site; NEVER on breast
- **Vaginal ring:** in x 3 weeks, out x 1 week
- **Depo-Provera IM:** every 11–13 weeks; max 2 years (bone loss)
- **Levonorgestrel IUD:** effective 3–8 yrs per device
- **Plan B:** within 72 hrs of unprotected sex (sooner = better)
- **HRT patches/gels:** rotate sites; lowest effective dose, shortest duration

MISSED DOSE RULES (combined OCP)

- 1 missed pill → take ASAP + next at usual time (even 2 in 1 day)
- 2+ missed pills → take most recent + use BACKUP method x 7 days
- Missed in week 3 → skip placebo, start new pack

⚠ HIGH-ALERT PRECAUTIONS

- Discontinue 4 weeks before major surgery (↓ VTE risk)
- Do NOT give during breastfeeding <6 wks postpartum (combined — ↑VTE, ↓milk); progestin-only OK
- Estrogen ALONE only if no intact uterus

8. PATIENT EDUCATION

- Take at the SAME time every day — set a phone alarm
- Use BACKUP contraception x 7 days at initiation and after missed doses
- STOP SMOKING — especially if ≥35 yrs (life-threatening clot risk)
- Report ACHES symptoms IMMEDIATELY (see Memory Boosters)
- Does NOT protect against STIs — still use condoms
- Perform monthly breast self-exams; keep annual exams
- Expect spotting first 1–3 months (breakthrough bleeding)
- Report missed period → pregnancy test before continuing
- Avoid St. John's Wort and notify all providers of hormone use
- Take with food if nausea occurs
- HRT: use lowest dose, shortest time; re-evaluate yearly
- After discontinuation: fertility may return within weeks (except Depo, which can delay 6–12 mo)

9. NCLEX TEST TRAPS ⚠

- 🚫 TRAP: Combined OCP in a smoker age ≥35 → CONTRAINDICATED (stroke/MI)
- 🚫 TRAP: Estrogen-only in woman WITH intact uterus → ↑↑ endometrial CA (must add progestin)
- 🚫 TRAP: Migraine WITH aura = absolute contraindication (NOT just any headache)
- 🚫 TRAP: 'Calf pain & swelling' on OCP → HOLD + notify HCP (not 'apply warm compress')
- 🚫 TRAP: Breastfeeding mother wanting OCP <6 wks postpartum → give PROGESTIN-ONLY (mini-pill)
- 🚫 TRAP: Depo-Provera > 2 years → osteoporosis risk; reassess need
- 🚫 TRAP: Patient on OCP + rifampin for TB → efficacy ↓↓, needs BACKUP method
- 🚫 TRAP: Plan B = emergency contraception, NOT abortifacient; effective up to 72 hrs
- 🚫 TRAP: Sudden severe unilateral leg pain = DVT until proven otherwise — NOT a muscle cramp
- 🚫 TRAP: 'Most important teaching' on starting OCP = when to stop smoking / ACHES signs (priority over timing tips)
- 🚫 TRAP: Don't confuse progestin-only mini-pill with combined pill — mini-pill has NARROW 3-hr dosing window

10. MEMORY BOOSTERS

🔑 ACHES — When to STOP the Pill & Notify HCP

- **A** — Abdominal pain (liver, gallbladder, hepatic adenoma)
- **C** — Chest pain / SOB (MI, PE)
- **H** — Headaches — sudden, severe (stroke)
- **E** — Eye problems — vision loss, diplopia (stroke, HTN)
- **S** — Severe leg pain / swelling (DVT)

🔑 PATTERN: 'Clots Love Estrogen'

- Estrogen is prothrombotic → #1 killer complication = VTE
- Anything that compounds clot risk (smoking, immobility, surgery, Factor V Leiden) is contraindicated

🔑 PATTERN: 'Unopposed Estrogen = Angry Endometrium'

- Estrogen alone → endometrial hyperplasia → cancer
- Add progestin to protect the uterus (unless uterus is absent)

🔑 QUICK COMPARE

- **Combined OCP:** highest efficacy, most contraindications, VTE risk

- **Progestin-only:** safer post-partum/breastfeeding, strict dosing window
- **Depo-Provera:** q12wks IM, bone density loss
- **Plan B (levonorgestrel):** emergency, <72 hrs
- **HRT:** lowest dose, shortest time, assess CV/breast risk annually

💊 MOST TESTED DRUGS IN THIS CLASS

Drug	Type	Route / Frequency	NCLEX Key Point
Conjugated estrogens (Premarin)	Estrogen	PO daily	HRT — must add progestin if uterus intact
Estradiol (Estrace, Climara)	Estrogen	PO / patch / vaginal	Rotate patch sites; not on breast
Ethinyl estradiol + progestin	Combined OCP	PO daily, same time	Contraindicated: smoker ≥35, migraine w/ aura
Medroxyprogesterone (Provera)	Progestin	PO daily (HRT) / IM q12wk (Depo)	Depo > 2yr → bone loss (DEXA)
Norethindrone (mini-pill)	Progestin-only	PO daily — strict 3hr window	Preferred in breastfeeding
Levonorgestrel (Plan B)	Progestin	PO x 1 within 72 hrs	Emergency contraception; NOT abortion
Levonorgestrel IUD (Mirena)	Progestin	Intrauterine 3–8 yr	Check for string monthly
Drospirenone (Yaz)	Progestin	PO in OCP	↑ K^+ — caution w/ ACEi, ARBs, K^+ sparing

🧠 CLINICAL JUDGMENT SNAPSHOT

NCJMM — Recognize → Analyze → Prioritize → Act

❓ #1 PRIORITY RISK

VENOUS THROMBOEMBOLISM (DVT / PE) — the single deadliest complication; risk ↑↑ with smoking, age, obesity, immobility, clotting disorders.

❓ WHAT WILL HARM THE PATIENT FIRST?

An occult clot. Progression: calf pain/swelling → embolization → sudden dyspnea, pleuritic chest pain, hypoxia → cardiovascular collapse. Stroke and MI follow the same clot-driven pathway.

❓ FIRST NURSING ACTION (classic NGN scenario)

- **1.** HOLD the next dose of the hormone.
- **2.** ASSESS airway, breathing, circulation — VS, SpO_2, lung sounds, calf exam.
- **3.** NOTIFY the HCP / provider STAT.
- **4.** ANTICIPATE orders: D-dimer, Doppler U/S, CT-PA, anticoagulation.
- **5.** EDUCATE the patient: discontinue the hormone permanently if VTE is confirmed; explore non-hormonal contraception.

🎯 ONE-LINER TO REMEMBER

"Estrogen clots, progestin protects, smoking kills — and ACHES gets the nurse on the phone."