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Polycystic *Ovary* Syndrome *(PCOS)*

ENDOCRINE | REPRODUCTIVE | METABOLIC

The most common endocrine disorder in reproductive-age women — a metabolic, reproductive, and cardiovascular triad

Source note: *Polycystic Ovary Syndrome was not present in your uploaded personal notes. This deliverable was built from standard NGN NCLEX 2026 references (Saunders Comprehensive Review for the NCLEX-RN, ATI RN Maternal Newborn / Adult Medical-Surgical, Lippincott Q&A Review) with cross-reference to ACOG and Endocrine Society clinical practice guidelines. Metformin mealtime guidance has been cross-referenced with your Medications and Mealtime notes.*

SECTION ONE

1 Definition & Overview

PCOS is a **complex endocrine-metabolic disorder** characterized by ovulatory dysfunction, hyperandrogenism, and polycystic ovarian morphology. It affects **6–12% of reproductive-age women** and is the leading cause of anovulatory infertility.

- **Endocrine root:** Hormonal imbalance — excess androgens (testosterone), elevated LH, insulin resistance.
- **Reproductive impact:** Irregular/absent menses, infertility, increased miscarriage risk.
- **Metabolic impact:** Insulin resistance, obesity, dyslipidemia, ↑ risk of type 2 diabetes and cardiovascular disease.
- **Why it matters for NCLEX:** PCOS is a lifelong systemic condition, not just an ovarian problem. Management spans menstrual regulation, fertility, metabolic protection, and cancer prevention.

📋 Rotterdam Diagnostic Criteria

Diagnosis requires **2 out of 3** of the following (after excluding other causes):

1
Oligo- or anovulation — irregular or absent ovulation (cycles >35 days or <8/year).

2
Hyperandrogenism — clinical (hirsutism, acne) *or* biochemical (↑ testosterone).

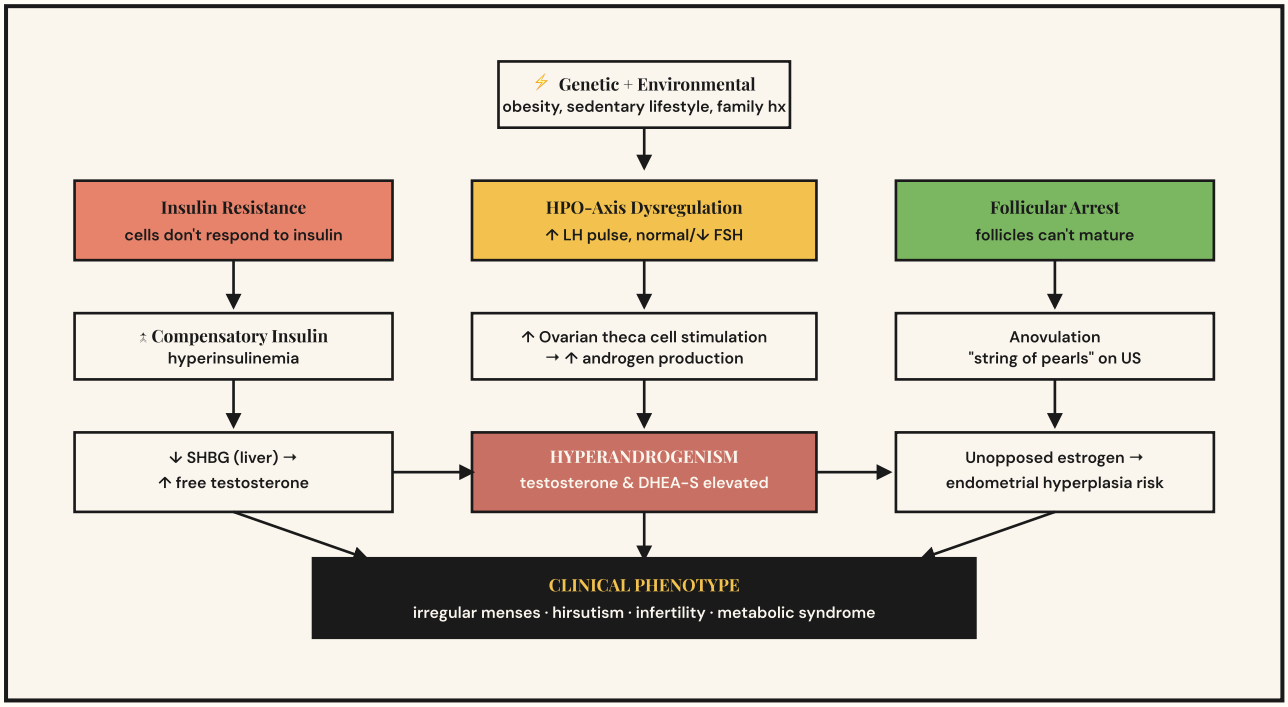
3
Polycystic ovaries — ≥12 follicles per ovary on ultrasound (the "string of pearls" sign).

⚠️ **A patient can be diagnosed with PCOS *without* visible cysts. The name is misleading — the diagnosis is clinical.**

SECTION TWO

2 Pathophysiology — The Vicious Cycle

PCOS is driven by **two interlocking loops**: (1) HPO-axis dysregulation and (2) insulin resistance. They feed each other and amplify androgen excess.



Key insight: The disease is a feedback loop — **insulin resistance drives androgen excess, and androgen excess worsens insulin resistance**. That's why weight loss (5–10%) can dramatically improve every aspect of PCOS.

SECTION THREE

3 Signs & Symptoms

PCOS presents across three domains. Look for the **full clinical picture**, not just one finding.

🩸 Reproductive Signs

- **Oligomenorrhea** — cycles >35 days, fewer than 8/year
- **Amenorrhea** — no menses for 3+ months
- **Anovulatory infertility** — inability to conceive
- **Heavy/prolonged bleeding** when menses do occur
- **Recurrent pregnancy loss**
- **Polycystic ovaries** on transvaginal US

👤 Hyperandrogenic Signs

- **Hirsutism** — coarse, dark hair on face, chest, abdomen, back
- **Acne** — especially cystic, jawline, persistent
- **Androgenic alopecia** — male-pattern thinning
- **Oily skin**
- **Deepening voice** (rare, severe cases)

⚖️ Metabolic Signs

- **Central obesity** — apple-shape, ↑ waist circumference
- **Acanthosis nigricans** — velvety dark patches on neck, axillae, groin (insulin resistance marker)
- **Skin tags** (acrochordons)
- **Dyslipidemia** — ↑ LDL, ↑ triglycerides, ↓ HDL
- **Impaired glucose tolerance / T2DM**
- **Hypertension**

🧠 Psychosocial & Other

- **Depression & anxiety** (2–3x general population)
- **Body image disturbance**
- **Obstructive sleep apnea**
- **Fatigue**
- **Decreased libido**

🚨 **RED FLAG — Rapid virilization or sudden hirsutism:** Rule out androgen-secreting tumor (not classic PCOS).

- **RED FLAG — Postmenopausal bleeding or prolonged amenorrhea + spotting:** Evaluate for **endometrial hyperplasia or cancer** — unopposed estrogen exposure increases risk.
- **RED FLAG — Severe acanthosis nigricans + rising A1c:** Likely progressing to overt T2DM.

SECTION FOUR

4 Priority Nursing Interventions

Apply **ABCs → safety → prioritization**. PCOS rarely causes acute decompensation, but priority focuses on **metabolic protection, fertility/menstrual support, and cancer prevention**.

🔍 Assessment Priorities

- ✓ **Vital signs:** BP (HTN risk), HR
- ✓ **Anthropometrics:** Weight, BMI, waist circumference
- ✓ **Menstrual history:** Cycle length, frequency, flow, last menstrual period
- ✓ **Skin exam:** Hirsutism (Ferriman-Gallwey score), acne, acanthosis nigricans
- ✓ **Mental health screening:** PHQ-9, GAD-7 — depression/anxiety often missed
- ✓ **Family hx:** T2DM, CVD, PCOS

🧪 Monitor / Labs

- ✓ **OGTT or A1c** at diagnosis, then yearly
- ✓ **Lipid panel** annually
- ✓ **Total & free testosterone, DHEA-S**
- ✓ **LH:FSH ratio** (classically >2:1, but not diagnostic)
- ✓ **TSH, prolactin, 17-OH progesterone** — rule out mimics
- ✓ **Pelvic US** for ovarian morphology
- ✓ **Endometrial biopsy** if prolonged anovulation

💊 Implement / Action

- ✓ **Lifestyle modification FIRST** — 5–10% weight loss can restore ovulation
- ✓ **Mediterranean or low-glycemic diet**
- ✓ **Exercise:** ≥150 min/week moderate intensity
- ✓ **Administer prescribed pharmacotherapy** (see Section 5)
- ✓ **Smoking cessation** — CVD risk compounds
- ✓ **Refer:** reproductive endocrinology if infertility; dermatology for hirsutism; mental health

🛡️ Safety & Prevention

- ✓ **Endometrial protection:** Ensure cyclic progestin or COC if anovulatory — prevents hyperplasia/cancer
- ✓ **VTE screening** before starting COCs (smoking, obesity, immobility, migraine with aura)
- ✓ **Pregnancy precaution** when on spironolactone or statins (teratogenic)
- ✓ **Hold metformin** 48 hrs before IV contrast (lactic acidosis risk)
- ✓ **Suicide screening** — depression risk elevated

SECTION FIVE

5 Pharmacology

Drug choice depends on the patient's **primary goal**: regulate menses, treat hirsutism, manage metabolic risk, or achieve pregnancy.

Metformin (Glucophage)

BIGUANIDE / INSULIN SENSITIZER

USE	First-line for insulin resistance; may restore ovulation; supports weight loss.
MECHANISM	↓ hepatic glucose production, ↑ peripheral insulin sensitivity.
SIDE FX	GI upset (N/V/D), metallic taste, B12 deficiency (long-term), **lactic acidosis** (rare but life-threatening).
NURSING	**Give WITH MEALS** to reduce GI side effects (per your Mealtime notes). **Hold 48 hrs before/after IV contrast** — check creatinine before resuming. Monitor B12 yearly. Teach signs of lactic acidosis: muscle pain, weakness, hyperventilation, malaise.

Combined Oral Contraceptives (COCs)

ESTROGEN + PROGESTIN

USE	Regulate menses, ↓ androgens, ↓ hirsutism & acne, protect endometrium.
MECHANISM	Suppress LH → ↓ ovarian androgens; ↑ SHBG → ↓ free testosterone.
SIDE FX	**VTE/PE/stroke**, HTN, breast tenderness, mood changes, nausea, breakthrough bleeding.
NURSING	**Screen for VTE risk:** smoking >35 yo, BMI >35, migraine with aura, history of clot. Teach **ACHES**: Abdominal pain, Chest pain, Headache, Eye changes, Severe leg pain → seek care immediately.

Spironolactone (Aldactone)

ANTIANDROGEN / K-SPARING DIURETIC

USE	Hirsutism, acne (off-label antiandrogen).
MECHANISM	Blocks androgen receptors; inhibits androgen synthesis.
SIDE FX	**Hyperkalemia**, menstrual irregularities, breast tenderness, dizziness.
NURSING	**Give with meals** (per your Mealtime notes). Monitor K+ (avoid salt substitutes containing potassium, ACE inhibitors, ARBs without monitoring). **Teratogenic** — feminizes male fetus → must use reliable contraception. Effects on hair take **≥6 months**.

Letrozole (Femara) / Clomiphene (Clomid)

OVULATION INDUCTION

USE	Anovulatory infertility. **Letrozole is now first-line** per current guidelines (higher live-birth rate).

MECHANISM	Letrozole: aromatase inhibitor → ↓ estrogen → ↑ FSH. Clomiphene: SERM → blocks negative feedback → ↑ FSH/LH.
SIDE FX	Hot flashes, mood swings, headache, **multiple gestation**, **ovarian hyperstimulation syndrome (OHSS)**.
NURSING	Teach patient to report **severe abdominal pain, rapid weight gain, decreased urine output** (OHSS). Counsel on multiple-gestation risk. Monitor with US.

Eflornithine (Vaniqa) — Topical

HAIR GROWTH INHIBITOR

USE	Reduces facial hirsutism (slows hair growth, does not remove).
NURSING	Apply BID to affected area; wait 5 min before makeup. Effects take 4–8 weeks. Use with other hair-removal methods.

SECTION SIX

6 NCLEX Test Traps ⚠

Common **wrong-answer logic** versus the correct clinical-judgment response.

✕ WRONG THINKING

"PCOS is a problem of ovarian cysts — surgery will fix it."

✓ CORRECT THINKING

PCOS is a **systemic endocrine-metabolic disorder**. Cysts are a sign, not the cause. *Treatment is lifestyle + hormonal/metabolic management.*

✕ WRONG THINKING

"She's trying to get pregnant — stop the spironolactone, she can finally start a family."

✓ CORRECT THINKING

Spironolactone is **teratogenic** — feminizes a male fetus. Reliable contraception is **required while on it**. Discontinue **before** attempting conception.

✕ WRONG THINKING

"She missed her period for 6 months — that's just PCOS, no further action needed."

✓ CORRECT THINKING

Prolonged anovulation = **unopposed estrogen** = endometrial hyperplasia/cancer risk. *Cyclic progestin or COC is needed for endometrial protection*; evaluate with biopsy if indicated.

✕ WRONG THINKING

"Continue metformin through the CT with contrast — don't interrupt her diabetes care."

✓ CORRECT THINKING

Hold metformin 48 hrs before and after IV iodinated contrast. Verify normal creatinine/eGFR before resuming. Risk: **lactic acidosis**.

✕ WRONG THINKING

"She's 28 with PCOS — she has plenty of time to worry about heart disease later."

✓ CORRECT THINKING

PCOS is an **early CVD risk factor**. Screen lipids, BP, glucose *now*. Lifestyle counseling starts at diagnosis, not at age 50.

✕ WRONG THINKING

"Hair removal cream worked — she should see results in a week."

✓ CORRECT THINKING

Antiandrogen effects on hair take **≥6 months**. Eflornithine takes 4–8 weeks. *Set realistic expectations to prevent treatment dropout.*

✕ WRONG THINKING

"Refer her for fertility treatment first — that's the priority."

✓ CORRECT THINKING

Lifestyle modification is first-line. A 5–10% weight loss often **restores ovulation** without medications and improves response to fertility drugs.

✕ WRONG THINKING

"Heavy menstrual bleeding rules out PCOS — PCOS means no periods."

✓ CORRECT THINKING

PCOS commonly causes **oligomenorrhea OR heavy/prolonged bleeding** when menses occur — from estrogen buildup with no progesterone to oppose it.

SECTION SEVEN

7 Patient & Family Education

🌱 Lifestyle Foundations

- **Diet:** Mediterranean or low-glycemic-index pattern. Whole grains, lean protein, healthy fats, abundant vegetables. Limit refined sugar and processed carbs.
- **Exercise:** ≥150 min/week moderate aerobic + 2x/week resistance training. Reduces insulin resistance independent of weight loss.
- **Weight goal:** A **5–10% reduction** can restore ovulation and dramatically improve labs.
- **Sleep:** 7–9 hrs/night; evaluate for sleep apnea if snoring or daytime fatigue.
- **Stress management:** Cortisol worsens insulin resistance.

💊 Medication Adherence

- **Take metformin with meals** to reduce GI upset.
- **COCs daily at the same time**; do not skip.
- **Spironolactone requires contraception** — teratogenic.
- **Hold metformin 48 hrs around contrast imaging.**
- Antiandrogen hair improvements take **≥6 months** — be patient and consistent.

🤰 Fertility & Family Planning

- PCOS is the #1 cause of anovulatory infertility — but **most can conceive** with treatment.
- Lose weight *before* conception when possible — improves fertility and pregnancy outcomes.
- Once pregnant, monitor closely for **gestational diabetes, preeclampsia, miscarriage**.
- Discuss contraception when not actively trying to conceive — ovulation may still occur intermittently.

📞 When to Call the Provider

- 🚨 **ACHES** on a COC (chest, leg, severe headache, vision change)
- 🚨 Severe abdominal pain or rapid weight gain on fertility drugs (OHSS)
- 🚨 Postmenopausal or unusually heavy/prolonged bleeding
- 🚨 Symptoms of lactic acidosis on metformin (muscle aches, weakness, hyperventilation)
- 🚨 Depression, hopelessness, thoughts of self-harm

SECTION EIGHT

8 Memory Boosters & Mnemonics

🧠 The "PCOS" Mnemonic — Core Features

P	C	O	S
PERIODS	**CYSTS**	**OBESITY**	**SKIN/HAIR**
irregular / absent	"string of pearls" on US	+ insulin resistance	hirsutism, acne, acanthosis

⚠️ "ACHES" — COC Warning Signs

A	C	H	E	S
ABDOMINAL	**CHEST**	**HEADACHE**	**EYE**	**SEVERE LEG**
severe pain	pain or SOB (PE)	severe / sudden	vision changes	pain (DVT)

🔑 Quick Pattern-Recognition Rules

- **LH:FSH ratio reversed** — normally 1:1, in PCOS often **2:1 or 3:1**. (Think: "*L*arge *H*ormone wins" in PCOS.)
- **Rotterdam = 2 of 3** — Oligo-ovulation + Hyperandrogenism + Polycystic ovaries (don't need all three).
- **"Dop" hurts the kidneys, but PCOS hurts the endometrium"** — unopposed estrogen is silent but dangerous (mirrors logic in your *Titration* notes for organ-targeted toxicity).
- **5–10% rule** — small weight change, massive metabolic and reproductive impact.
- **String of Pearls** — the classic ultrasound appearance: many small follicles arranged peripherally.
- **"Apple shape"** — central/visceral obesity = insulin resistance signal.
- **Spironolactone = K↑ & pregnancy ↓** — watch potassium, never use without contraception.
- **Metformin + Contrast = STOP** — 48 hrs before and after; same rule on your med-admin priorities.

9

SECTION NINE

Long-Term Complications

PCOS is a **lifelong condition**. The NCLEX expects you to anticipate downstream risks and counsel patients proactively.

Type 2 Diabetes

5–10x risk. Annual OGTT or A1c. Onset often before age 40.

Cardiovascular Disease

↑ HTN, dyslipidemia, atherosclerosis. CVD risk equivalent to T2DM in many studies.

Endometrial Cancer

2–6x risk from unopposed estrogen / chronic anovulation. Cyclic progestin protects.

Metabolic Syndrome

Central obesity + ↑ BP + ↑ glucose + dyslipidemia. ~33–50% of women with PCOS.

Obstructive Sleep Apnea

5–10x risk independent of BMI. Screen if snoring or daytime fatigue.

NAFLD

Non-alcoholic fatty liver disease — common, often silent. Check LFTs.

Depression & Anxiety

2–3x prevalence. Screen routinely with PHQ-9 / GAD-7.

Infertility

Most common cause of anovulatory infertility — but treatable in the majority.

Pregnancy Complications

↑ gestational diabetes, preeclampsia, preterm birth, miscarriage.

10

SECTION TEN · NGN 2026

NCJMM Clinical Judgment Scenario

📋 **SCENARIO:** A **26-year-old female** presents to the clinic with concerns of irregular periods (last menstrual period 4 months ago), **weight gain** (~22 lb over 18 months), worsening **facial hair**, and **acne**. She and her husband have been trying to conceive for 14 months.

Vitals: BP 138/86, HR 84, BMI 32.4. **Exam:** velvety dark patches at posterior neck and axillae; coarse hair on chin and upper lip. **Labs:** total testosterone 78 ng/dL (↑), LH/FSH ratio 2.8, fasting glucose 112 mg/dL, HDL 38, triglycerides 220, A1c 6.1%.

STEP 1 · RECOGNIZE CUES

What information is clinically relevant?

Relevant cues: Oligomenorrhea (4 months), 22-lb weight gain, hirsutism, cystic acne, acanthosis nigricans, BMI 32.4, BP 138/86 (prehypertension), ↑ testosterone, LH:FSH >2:1, fasting glucose 112 (prediabetes), A1c 6.1% (prediabetes), low HDL, high triglycerides, 14 months of infertility.

STEP 2 · ANALYZE CUES

How are the cues related?

The cluster matches **Rotterdam criteria for PCOS (2 of 3 met)**: oligo-ovulation + clinical & biochemical hyperandrogenism. The acanthosis nigricans + abnormal glucose + low HDL + ↑ triglycerides indicate **insulin resistance and metabolic syndrome**. The 14 months of failure to conceive is consistent with anovulatory infertility.

STEP 3 · PRIORITIZE HYPOTHESES

What is most likely going on?

#1 Polycystic Ovary Syndrome with prediabetes, metabolic syndrome, and anovulatory infertility. *Differential to rule out:* thyroid dysfunction (TSH), hyperprolactinemia, non-classic congenital adrenal hyperplasia (17-OH progesterone), and androgen-secreting tumor (DHEA-S, total T). Order pelvic US.

STEP 4 · GENERATE SOLUTIONS

What interventions are needed?

Lifestyle (foundation): Mediterranean / low-GI diet, 150+ min/wk exercise, aim for 5–10% weight loss. **Pharmacologic:** initiate metformin (with meals) for insulin resistance; discuss letrozole as first-line ovulation induction once metabolic optimization begins. **Endometrial**

protection with cyclic progestin if conception delayed. **Risk monitoring:** annual A1c, lipids, BP; mental health screen. **Referrals:** reproductive endocrinology; nutrition.

STEP 5 · TAKE ACTION

What does the nurse do now?

Provide education on PCOS as a systemic disorder. Teach metformin administration **with meals** and signs of lactic acidosis. Counsel on the 48-hour metformin hold for contrast imaging. Set expectation that hair/skin improvements take ≥6 months. Discuss contraception while metabolic optimization occurs. Screen for depression with PHQ-9. Reinforce the **5–10% weight-loss goal** as the highest-yield intervention.

STEP 6 · EVALUATE OUTCOMES

How will the nurse know it's working?

Expected outcomes (3–6 months): 5–10% weight reduction, return of more regular menses, A1c trending toward <5.7, improved lipids, BP <130/80, decreased acne, slowed hair growth on antiandrogen therapy (effects fully visible at ~6 months), no signs of OHSS if on fertility meds, no VTE symptoms if on COC, mood stable on PHQ-9, eventual pregnancy if desired. **Reassess and adjust** if goals not met.