PHARMACOLOGY · ANALGESIA | NGN NCLEX 2026 | HIGH-YIELD · PRIORITY DRUG CLASS

NSAIDs
The Seven You Must Know

Ibuprofen · Naproxen · Aspirin · Ketorolac · Celecoxib · Indomethacin · Diclofenac — pain, inflammation, fever, and the GI/renal/cardiac price tag.

CLASS: NONSTEROIDAL ANTI-INFLAMMATORY DRUGS **TARGET:** COX-1 / COX-2 ENZYMES

PRIMARY RISKS: GI BLEED · RENAL INJURY · CARDIOVASCULAR

1

SECTION ONE

Definition & Overview

NSAIDs are a drug class that blocks **cyclooxygenase (COX)** enzymes, which produce **prostaglandins** — chemicals that drive pain, inflammation, and fever.

Because prostaglandins also protect the stomach lining, support kidney perfusion, and regulate platelet function, blocking them creates the classic NSAID side-effect profile: **GI ulceration, renal injury, and bleeding risk.**

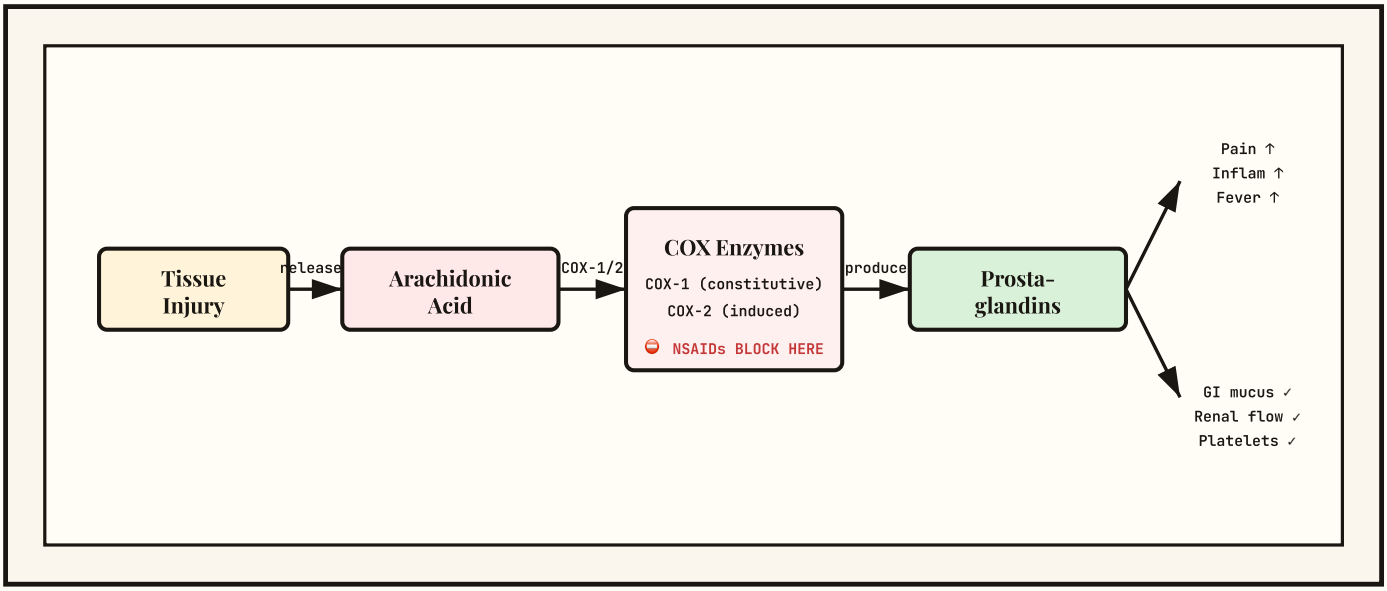
Tested heavily on the NGN NCLEX 2026 because NSAIDs are **OTC, widely used, and frequently interact** with anticoagulants, antihypertensives, lithium, and methotrexate.

The Triple Effect

- A **Analgesic** — mild to moderate pain (musculoskeletal, dental, headache, dysmenorrhea).
- A **Anti-inflammatory** — RA, OA, gout, bursitis, tendonitis.
- A **Antipyretic** — fever reduction (avoid aspirin in children with viral illness).
- \+ **Antiplatelet** (Aspirin only, irreversibly) — used for MI/stroke prevention.

SECTION TWO

2 Pathophysiology — Mechanism of Action



COX-1

"HOUSEKEEPING" — ALWAYS PRESENT

→ Protects gastric mucosa (mucus, bicarb)

→ Maintains renal blood flow

→ Promotes platelet aggregation (TXA_2)

→ **Block it → ulcers, AKI, bleeding**

COX-2

"INDUCIBLE" — ACTIVATED BY INJURY

→ Triggered by inflammation/injury

→ Drives pain, swelling, fever

→ Produces PGI_2 (vasodilator, antiplatelet)

→ **Selective block (Celebrex) → ↑ clot/CV risk**

SECTION THREE

3 Adverse Effects & Toxicity

Early / Mild Adverse Effects

- Dyspepsia, heartburn, nausea
- Abdominal discomfort
- Headache, dizziness, drowsiness
- Mild fluid retention / ankle edema
- Easy bruising (antiplatelet effect)
- **Tinnitus** — EARLIEST sign of salicylate toxicity (aspirin)

Late / Severe Adverse Effects

- **GI bleed**: hematemesis, melena, coffee-ground emesis
- **Peptic ulcer** / perforation
- **Acute kidney injury**: ↑ BUN/Cr, oliguria, ↑ K^+
- **MI / stroke** (especially COX-2 selective)
- **Hepatotoxicity** (diclofenac > others)
- Bronchospasm (aspirin-sensitive asthma)
- Stevens-Johnson syndrome (rare)

RED FLAGS — STOP & CALL PROVIDER

- **Black tarry stools or coffee-ground emesis** → active GI bleed
- **Urine output < 30 mL/hr** or sudden weight gain → acute kidney injury
- **Tinnitus, hyperventilation, confusion** → salicylate (aspirin) toxicity
- **Chest pain, sudden dyspnea, unilateral weakness** → MI / stroke
- **RUQ pain, jaundice, dark urine** → hepatotoxicity (diclofenac)
- **Reye's syndrome warning signs** in a child given aspirin: vomiting + altered mental status

SECTION FOUR

4 Priority Nursing Interventions (ABC + Safety)

A

AIRWAY / ALLERGY

Assess for aspirin-sensitive asthma triad (asthma + nasal polyps + aspirin sensitivity). Stop drug at first sign of bronchospasm or anaphylaxis. AVOID CELEBREX IN SULFA ALLERGY.

B

BLEEDING & BP

Monitor H&H, platelets, stool guaiac. Hold ≥ 7 days before surgery (aspirin), 24–48 hr for others. Check BP — NSAIDs BLUNT THE EFFECT OF ACE INHIBITORS, ARBS, AND DIURETICS.

C

CIRCULATION / CARDIAC / CREATININE

Assess for chest pain, edema, weight gain. Monitor BUN, creatinine, K^+, urine output. Use cautiously in HF, CKD, dehydration, and elderly. Ketorolac MAX 5 days total — renal failure risk.

D

DRUG INTERACTIONS

Watch with WARFARIN/HEPARIN/DOACS (bleed), LITHIUM (toxicity ↑), METHOTREXATE (toxicity ↑), SSRIS (GI bleed ↑), CORTICOSTEROIDS (ulcer risk ↑), ALCOHOL (GI bleed ↑).

E

EDUCATE & EVALUATE

Give WITH FOOD, MILK, OR FULL GLASS OF WATER. Teach S/S of GI bleed, AKI, MI/stroke. Reassess pain 30–60 min after PO dose. Use lowest effective dose for shortest duration.

SECTION FIVE

5 The Seven NSAIDs — Comparison Table

DRUG	CLASS / MOA	KEY USES	CRITICAL SIDE EFFECTS / WARNINGS	NURSING PEARLS
Ibuprofen *Motrin, Advil*	Nonselective COX inhibitor (reversible)	Mild–moderate pain, fever, RA/OA, dysmenorrhea	GI BLEED · AKI · ↑ BP	OTC. Take with food. Max 3200 mg/day Rx; 1200 mg/day OTC. Avoid 3rd-trimester pregnancy.
Naproxen *Aleve, Naprosyn*	Nonselective COX inhibitor (reversible)	RA/OA, gout, pain, dysmenorrhea	GI BLEED · CV RISK · EDEMA	Long half-life — BID dosing. Lower CV risk than other non-selectives but still present.
Aspirin (ASA) *Bayer, Ecotrin*	Irreversible COX-1 > COX-2 inhibitor; antiplatelet	MI/stroke prevention, pain, fever, anti-inflammatory at high dose	REYE'S SYNDROME · TINNITUS · SALICYLISM · BLEED	**NEVER in children < 19 with viral illness.** Tinnitus = earliest toxicity sign. Hold 7 days pre-op. Therapeutic level 15–30 mg/dL.
Ketorolac *Toradol*	Nonselective COX inhibitor (IV/IM/PO)	Short-term moderate–severe pain (post-op)	MAX 5 DAYS · SEVERE GI BLEED · AKI	**5-day maximum (all routes combined).** Most potent NSAID. Avoid in renal impairment, elderly, bleeding risk.
Celecoxib *Celebrex*	Selective COX-2 inhibitor	OA, RA, ankylosing spondylitis, acute pain	MI/STROKE · SULFA ALLERGY	**Contraindicated in sulfa allergy.** Less GI bleed than nonselective NSAIDs but ↑ thrombotic risk. Use lowest dose, shortest time.
Indomethacin *Indocin*	Nonselective COX inhibitor (potent)	Acute gout, ankylosing spondylitis, PDA closure in neonates	SEVERE HA · CNS EFFECTS · GI BLEED	Take with food. Frontal headache is common — assess. In neonates, monitor urine output and platelets when closing PDA.
Diclofenac *Voltaren, Cataflam*	Nonselective COX inhibitor (PO & topical gel)	OA, RA, acute pain; topical for localized joint/muscle pain	HEPATOTOXICITY · CV RISK	**Highest hepatotoxicity risk of the group.** Monitor LFTs at baseline, 4–8 wk, periodically. Topical → wash hands after applying.

SECTION SIX

6 NCLEX Test Traps ⚠️

✕ WRONG ANSWER
"Give the child aspirin for fever."

✓ RIGHT ANSWER
Use **acetaminophen or ibuprofen**. Aspirin in children with viral illness causes **Reye's syndrome**.

✕ WRONG ANSWER
"Continue ketorolac for 10 days for severe back pain."

✓ RIGHT ANSWER
Maximum 5 days, all routes combined. Switch to another agent or scheduled non-NSAID after day 5.

✕ WRONG ANSWER
"Celebrex is safer — no GI or cardiac concerns."

✓ RIGHT ANSWER
Less GI bleed risk, but **higher MI/stroke risk**. Contraindicated in **sulfa allergy**.

✕ WRONG ANSWER
"Tinnitus from aspirin will go away — keep taking the same dose."

✓ RIGHT ANSWER
Tinnitus is the **earliest sign of salicylate toxicity**. Hold the drug and notify provider.

✕ WRONG ANSWER
"NSAIDs and warfarin together are fine — different mechanisms."

✓ RIGHT ANSWER
NSAIDs displace warfarin from albumin AND damage gastric mucosa → **major bleed risk**. Monitor INR & stool.

✕ WRONG ANSWER
"Take ibuprofen on an empty stomach for faster action."

✓ RIGHT ANSWER
Always with food, milk, or a full glass of water to reduce GI irritation.

✕ WRONG ANSWER
"BP is up on lisinopril — increase the lisinopril."

✓ RIGHT ANSWER
Check for new NSAID use first — **NSAIDs blunt antihypertensive effect** of ACE inhibitors, ARBs, and diuretics.

✕ WRONG ANSWER
"Continue NSAIDs throughout pregnancy as needed."

✓ RIGHT ANSWER
Avoid in 3rd trimester — causes premature closure of the fetal ductus arteriosus. FDA warns against use ≥ 20 wk.

SECTION SEVEN

7 Patient & Family Education

How to Take

- ✓ Always with **food, milk, or 8 oz water**
- ✓ Take the **lowest effective dose for the shortest time**
- ✓ Don't crush enteric-coated aspirin or extended-release tablets
- ✓ Stay upright for 30 minutes after taking
- ✓ Do **NOT combine multiple NSAIDs** (check OTC labels)

Report Immediately

- ✓ Black/tarry stools or vomiting blood
- ✓ Persistent stomach pain or heartburn
- ✓ Decreased urine, swelling of hands/feet, sudden weight gain
- ✓ Ringing in ears, dizziness, confusion (aspirin)
- ✓ Chest pain, shortness of breath, weakness on one side
- ✓ Yellow skin/eyes, dark urine (diclofenac)

Avoid / Use Caution

- ✓ **Alcohol** — multiplies GI bleed risk
- ✓ Other OTC pain/cold products with NSAIDs hidden inside
- ✓ NSAIDs in **3rd trimester of pregnancy**
- ✓ **Aspirin in children < 19** with fever/viral illness (Reye's)
- ✓ Driving until you know how it affects you

Surgery & Procedures

- ✓ Tell all providers and dentists you take NSAIDs
- ✓ **Hold aspirin ≥ 7 days** before surgery (per provider)
- ✓ Hold other NSAIDs 24–48 hours pre-procedure
- ✓ Bring a list of OTC and prescription NSAIDs to every visit

SECTION EIGHT

8 Memory Boosters & Mnemonics

"N·S·A·I·D"

- **N** SAIDs & ephrotoxicity — watch BUN/Cr/UOP
- **S** tomach ulcers & bleeding
- **A** llergy/Asthma triad (aspirin)
- **I** ncreased BP & fluid retention
- **D** rug interactions (warfarin, lithium, MTX)

"A·S·P·I·R·I·N" Toxicity

- **A** cidosis / Alkalosis (mixed)
- **S** alicylism (tinnitus, sweating)
- **P** yrexia (hyperthermia)
- **I** ncreased respirations (early)
- **R** eye's syndrome in children
- **I** ncreased bleeding
- **N** ausea, vomiting

"5 & 7" Rule

- **5** — Ketorolac (Toradol) max **5 days** total
- **7** — Hold aspirin **7 days** before surgery
- **1** — Take NSAID with at least **1 full glass of water**
- **3** — Avoid in **3rd trimester** pregnancy

"COX-2 = CV²"

- **C** elecoxib (Celebrex) =
- **C** ardiovascular ↑↑ risk
- **V** essels clot more (↓ PGI_2)
- **V** oid for sulfa allergy patients!

Less GI bleed but more thrombotic events

"R·E·Y·E" Warning

- **R** eye's = aspirin + viral illness in kids
- **E** ncephalopathy (altered LOC, seizures)
- **Y** ellow liver (fatty infiltration)
- **E** arly vomiting then confusion → FATAL

Use acetaminophen instead in children

Drug-to-Damage Pairing

- **K** etorolac → **K**idneys (renal failure)
- **D** iclofenac → **L**iver (LFTs ↑)
- **I** ndomethacin → **H**eadache (frontal)
- **A** spirin → **E**ars (tinnitus first!)
- **C** elebrex → **C**lots (MI/stroke)

SECTION NINE

9 NCJMM Clinical Judgment Scenario

CASE SCENARIO

A 74-year-old client with osteoarthritis, hypertension (taking lisinopril and hydrochlorothiazide), and atrial fibrillation (on warfarin) is admitted for evaluation of **fatigue, dark stools, and mild dyspnea**. Family reports the client has been taking **OTC ibuprofen 600 mg three times daily for 3 weeks** for knee pain. Vital signs: BP 92/58, HR 108, RR 22, SpO_2 94%, Temp 98.0°F. Labs: Hgb 7.8 g/dL, INR 4.2, BUN 38, Creatinine 1.9 (baseline 1.0).

STEP 1

Recognize Cues

Relevant: Dark stools, low Hgb (7.8), elevated INR (4.2), hypotension, tachycardia, elevated BUN/Cr, ibuprofen + warfarin + diuretic combination, age 74.
Irrelevant: Temp normal, SpO_2 adequate, OA history.

STEP 2

Analyze Cues

Triad of GI bleed (dark stools, ↓ Hgb, hypotension/tachycardia) + supratherapeutic INR from **NSAID + warfarin interaction** + acute kidney injury from **NSAID + ACE inhibitor + diuretic ("triple whammy")**. Classic NSAID-induced complications in an elderly polypharmacy patient.

STEP 3

Prioritize Hypotheses

#1 Priority: Active upper GI bleed with hemodynamic instability.
#2: NSAID-induced AKI.
#3: Supratherapeutic anticoagulation.
#4: Risk for hypovolemic shock.

STEP 4

Generate Solutions

Hold ibuprofen, warfarin, lisinopril, HCTZ. Establish 2 large-bore IVs. Type & crossmatch for PRBCs. Anticipate vitamin K for INR reversal. NPO for likely EGD. IV PPI (pantoprazole) drip. Strict I&O, daily weights, continuous cardiac monitoring.

STEP 5

Take Action

Stop all NSAIDs immediately. Hold warfarin and antihypertensives. Initiate 0.9% NS bolus per protocol. Notify provider STAT. Place on cardiac monitor. Insert second IV. Send type & crossmatch, repeat CBC, BMP, coags. Prepare for endoscopy & possible transfusion.

STEP 6

Evaluate Outcomes

Expected: BP > 100/60, HR < 100, Hgb stabilizing, INR < 3.0, BUN/Cr trending down, no further melena, UOP > 30 mL/hr. **Teach:** Never combine OTC NSAIDs with anticoagulants/ACE-Is/diuretics without provider review.

SOURCE TRANSPARENCY

This topic was not present in the uploaded reference notes. Content compiled from standard NGN NCLEX 2026 references and current clinical guidelines:

- Silvestri, L. A., & Silvestri, A. E. *Saunders Comprehensive Review for the NCLEX-RN Examination* (9th ed.).
- ATI Nursing Education. *RN Pharmacology for Nursing Review Module* (Edition 8.0).
- Karch, A. M. *Lippincott Illustrated Reviews: Pharmacology* (current edition).
- American Heart Association/American College of Cardiology — NSAID cardiovascular risk statement.
- American College of Gastroenterology — NSAID-related GI complications guidelines.
- U.S. FDA Drug Safety Communication — NSAID use during pregnancy (≥ 20 wk warning).

For clinical reference and NCLEX preparation only. Always follow institutional protocols and current prescribing information.