NGN NCLEX 2026 | RENAL / GENITOURINARY

VISUAL STUDY LIBRARY · VOLUME — ASSESSMENT SERIES

Renal System *Assessment*

Systematic head-to-toe evaluation of kidney structure and function — subjective history, objective physical exam, laboratory data, and diagnostic studies. The kidneys are silent organs; assessment is the difference between catching early dysfunction and missing it.

SOURCE DISCLOSURE **This topic was not present in your uploaded reference notes.** Content is drawn from standard NGN NCLEX 2026 references: *Saunders Comprehensive Review for the NCLEX-RN* (Silvestri), *ATI RN Adult Medical-Surgical Nursing*, *Lippincott Illustrated Reviews: Pharmacology*, and current KDIGO clinical practice guidelines for AKI/CKD assessment.

01

DEFINITION · WHY IT MATTERS

Overview of Renal Assessment

Renal system assessment is the systematic gathering of subjective and objective data about kidney structure, urine production, fluid balance, electrolyte status, and acid-base regulation. Because the kidneys regulate nearly every body system, abnormal findings here often present as findings *elsewhere* — neurologic, cardiac, respiratory, musculoskeletal, and integumentary.

What it covers

History, urinary patterns, physical exam (inspect → auscultate → percuss → palpate), labs (BUN, Cr, GFR, electrolytes, UA), and diagnostics (ultrasound, CT, biopsy).

Why kidneys matter

They filter ~180 L plasma/day, excrete waste, balance fluids/electrolytes, regulate BP (RAAS), produce erythropoietin, activate vitamin D, and maintain acid-base balance.

Clinical priority

Urine output is a **first-line indicator** of perfusion. A drop to <30 mL/hr (or 0.5 mL/kg/hr) is reportable — within 30 minutes.

02

PATHOPHYSIOLOGY · FUNCTIONAL MAP

What the Kidneys Do (and What Breaks)

Each kidney holds ~1 million nephrons. Blood enters via the renal artery → afferent arteriole → glomerulus (filtration) → tubules (reabsorption + secretion) → collecting duct → urine. When any step fails, the consequences cascade.

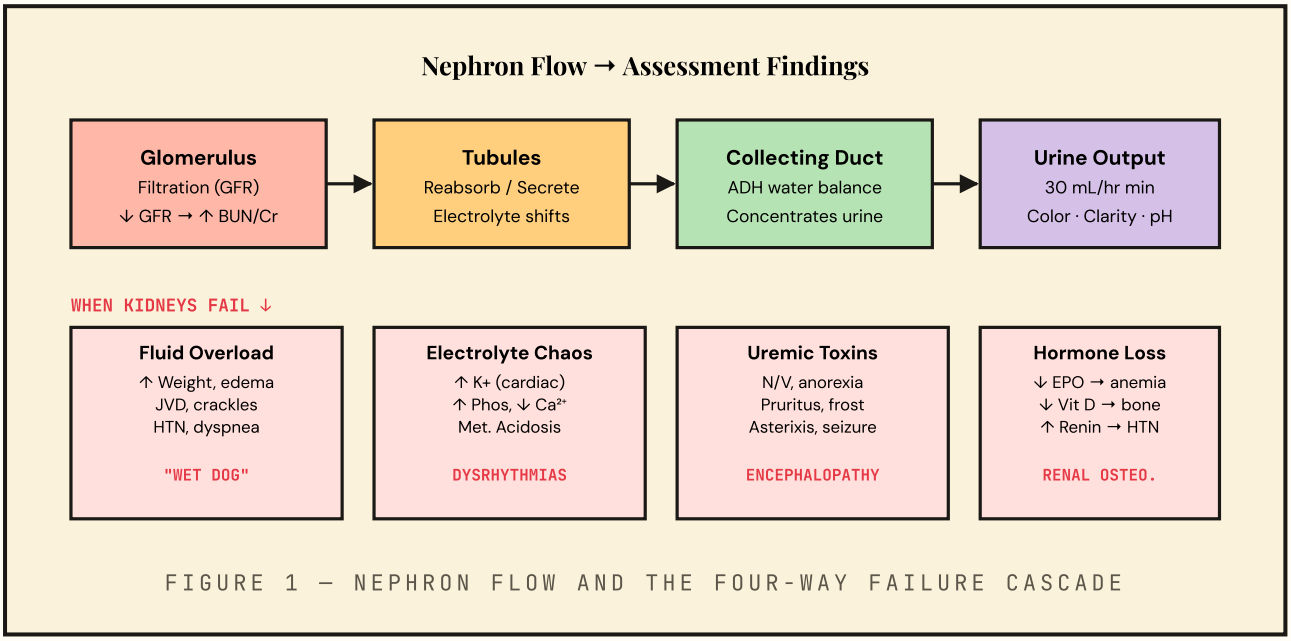

FIGURE 1 — NEPHRON FLOW AND THE FOUR-WAY FAILURE CASCADE

A WET BED — The 7 kidney jobs: *A*cid-base balance, *W*ater removal, *E*rythropoietin, *T*oxin removal, *B*lood pressure (renin), *E*lectrolytes, *D* (Vitamin D activation).

03

SUBJECTIVE & OBJECTIVE DATA

What to Ask · What to Look For

SUBJECTIVE — History & Patient-Reported

- **Urinary pattern:** frequency, urgency, hesitancy, retention
- **Urine character:** color (clear → tea/cola), odor, foam, hematuria
- **Volume changes:** oliguria (<400 mL/24h), anuria (<100 mL/24h), polyuria (>3 L/24h), nocturia
- **Pain:** flank (kidney), suprapubic (bladder), CVA (pyelo/stone), dysuria (UTI)
- **Systemic:** fatigue, anorexia, nausea, pruritus, leg cramps, restless legs
- **PMH/Family:** DM, HTN, recurrent UTI, kidney stones, PKD, autoimmune
- **Medications:** NSAIDs, ACE-I/ARB, aminoglycosides, contrast dye, herbals

OBJECTIVE — Physical Exam (IAPP order)

- **INSPECT:** skin (pallor, uremic frost, bruising), edema (periorbital → sacral → peripheral), JVD, abdomen contour, flank asymmetry
- **AUSCULTATE:** renal artery bruits (epigastrium/flanks) *before* palpating; lungs for crackles; heart for friction rub or S3
- **PERCUSS:** CVA tenderness (fist over costovertebral angle = pyelo/stones); bladder dullness above symphysis = retention
- **PALPATE:** kidneys (rarely palpable in adults), bladder distention, peripheral edema (pitting scale 1+ to 4+)
- **Vital signs:** BP both arms, weight (same scale/clothes/time), I&O
- **Mental status:** orientation, asterixis ("liver flap" also seen in uremia)

URINE FINDING	LIKELY MEANING	ACTION
Cloudy, foul-smelling	UTI (bacteria, WBCs)	UA + C&S, report

URINE FINDING	LIKELY MEANING	ACTION
Tea / cola colored	Hematuria, myoglobin, rhabdo, glomerulonephritis	UA, CK, notify HCP RED FLAG
Frothy / foamy	Proteinuria (nephrotic syndrome)	UA dipstick, 24-h protein
Bright red blood	Lower UTI source, stones, trauma, cancer	Notify HCP RED FLAG
Dilute / pale & high volume	DI, diuretics, hyperglycemia	Check glucose, specific gravity, Na+
Dark amber, low volume	Dehydration, prerenal AKI	Assess perfusion, fluid status

RED FLAGS — ESCALATE Anuria (<100 mL/24h) · Urine output <30 mL/hr × 2 hr · Gross hematuria · Severe flank pain with fever (pyelo) · New asterixis or confusion · Pericardial friction rub · Kussmaul breathing.

04

ABCS · SAFETY · PRIORITIZATION

Priority Nursing Interventions

A Airway / Breathing

- Auscultate lungs Q shift — crackles = overload
- Monitor for Kussmaul respirations (metabolic acidosis)
- Pulse ox; HOB up if dyspneic
- Watch for pleural effusion (CKD)

C Circulation

- BP both arms; report HTN or hypotension
- Cardiac monitor if K+ abnormal (peaked T = hyperkalemia)
- Assess pulses, capillary refill, JVD
- Listen for pericardial friction rub (uremic pericarditis)

D Disability / Safety

- Neuro checks — uremic encephalopathy
- Fall precautions (anemia + orthostasis)
- Seizure precautions if severe uremia
- Skin integrity — pruritus → excoriation

Core Assessment Routine

- **Strict I&O** — every shift; report UO <30 mL/hr or <0.5 mL/kg/hr *within 30 minutes*
- **Daily weights** — same time, same scale, same clothes; **1 kg = 1 L fluid**
- **Assess edema** — periorbital (early AM) → sacral (bedbound) → dependent extremities; document pitting depth

- **Monitor labs** — BUN, creatinine, GFR, K+, Na+, Ca^{2+}, Phos, Mg, pH, Hgb/Hct
- **Inspect urine** — color, clarity, odor, sediment; specific gravity (1.005–1.030)
- **Skin/oral care** — bath without harsh soaps for pruritus; oral hygiene (uremic breath, metallic taste)
- **Hold nephrotoxins** — NSAIDs, aminoglycosides, IV contrast (verify creatinine first), high-dose vancomycin
- **Pre-contrast protocol** — hydrate, hold metformin 48 h pre/post, baseline creatinine

PRIORITY RULE **Daily weight is the MOST accurate fluid-status indicator** — more reliable than I&O alone, because I&O misses insensible losses and inaccurate measurements.

05

LABS · DIAGNOSTICS · PHARM CONSIDERATIONS

The Data Behind the Assessment

Key Labs & Normal Values

LAB	NORMAL	INTERPRETATION
BUN	10–20 mg/dL	↑ in dehydration, GI bleed, high protein, kidney disease; NOT kidney-specific
Creatinine (serum)	0.6–1.2 mg/dL	**Most specific to kidney function**; ↑ = ↓ GFR
BUN:Creatinine ratio	10:1 to 20:1	>20:1 = prerenal (dehydration); ~10:1 = intrinsic renal
eGFR	>90 mL/min/1.73m²	**BEST overall indicator of kidney function**; <60 × 3 mo = CKD
Potassium (K^+)	3.5–5.0 mEq/L	↑ in renal failure → cardiac dysrhythmias RED FLAG
Sodium (Na^+)	135–145 mEq/L	↓ dilutional (overload) or ↑ (dehydration)
Calcium / Phosphorus	9–10.5 / 3–4.5 mg/dL	CKD: ↓ Ca^{2+}, ↑ Phos (inverse relationship)
Hgb / Hct	12–17 / 36–52%	↓ in CKD (loss of erythropoietin)
Urine specific gravity	1.005–1.030	↑ = concentrated (dehydration); ↓ = dilute (DI, overload)
Urinalysis pH	4.6–8.0	Alkaline urine + UTI = possible struvite stones

Diagnostic Studies & Nursing Prep

STUDY	PURPOSE	NURSING CARE
Renal ultrasound	Size, hydronephrosis, stones, masses	No prep, no contrast — safest first-line
CT with contrast / IVP	Detailed anatomy & function	Check creatinine, hydrate, hold metformin 48 h, ask about iodine/shellfish allergy

STUDY	PURPOSE	NURSING CARE
24-hour urine	Creatinine clearance, protein, GFR	**Discard first void**, save all urine for 24 h, keep on ice/refrigerated; if any missed → restart
Urinalysis (UA)	Protein, glucose, blood, WBC, casts	Clean-catch midstream; first AM specimen most concentrated
Renal biopsy	Tissue diagnosis	Post-op: prone × 30–60 min, flat bedrest × 24 h, monitor for bleeding (flank pain, ↓ BP, hematuria) RED FLAG
Cystoscopy	Bladder/urethra visualization	Pink-tinged urine OK; bright red bleeding NOT; warm sitz baths

Pharmacology — Drugs That Touch the Kidney

DRUG / CLASS	ACTION / USE	RENAL ASSESSMENT FOCUS
Loop diuretics (furosemide)	Inhibit Na/K/2Cl reabsorption	Monitor K^+ (↓), BP, weight, UO, hearing (ototoxic at high IV doses)
Thiazides (HCTZ)	Distal tubule diuresis	↓ K^+, ↓ Na^+, ↑ Ca^{2+}, ↑ uric acid
K-sparing (spironolactone)	Aldosterone antagonist	↑ K^+ — avoid K supplements & salt substitutes
ACE-I / ARBs	Block RAAS; renoprotective in DM	Monitor K^+ ↑, Cr (small bump OK), dry cough (ACE-I), angioedema
NSAIDs	Anti-inflammatory	**Nephrotoxic** — vasoconstrict afferent arteriole; avoid in CKD/AKI
Aminoglycosides (gentamicin)	Antibiotic	Trough levels, Cr, hearing — both nephrotoxic & ototoxic
IV contrast dye	Imaging	Hydrate, baseline/24–72 h Cr; hold metformin
Erythropoietin (epoetin)	↑ RBC production in CKD	Target Hgb 10–11 — higher = stroke/clot risk; check BP
Phosphate binders	Bind dietary phosphate	Give **WITH meals**; monitor Ca/Phos

DRUG / CLASS	ACTION / USE	RENAL ASSESSMENT FOCUS
(sevelamer, Ca acetate)		

06

WRONG VS RIGHT · COMMON CONFUSIONS

NCLEX Test Traps ⚠

✕ COMMON WRONG ANSWER

"I&O is the most accurate way to monitor fluid balance."

✓ RIGHT ANSWER

Daily weights are most accurate — they capture insensible losses I&O can miss. *1 kg gained = 1 L fluid retained.*

✕ COMMON WRONG ANSWER

"BUN is the best indicator of kidney function."

✓ RIGHT ANSWER

eGFR is the best overall indicator. **Serum creatinine** is most kidney-specific. BUN is affected by hydration, protein intake, and GI bleeding.

✕ COMMON WRONG ANSWER

"Palpate the kidneys first, then auscultate."

✓ RIGHT ANSWER

Auscultate BEFORE palpating in the abdomen — palpation alters bowel sounds and could dislodge an aneurysm. Listen for renal bruits.

✕ COMMON WRONG ANSWER

"Save urine for 24 hours starting with the first void."

✓ RIGHT ANSWER

Discard the first void, then collect every drop for 24 hours. The bladder must start empty. If one void is missed, the test restarts.

✕ COMMON WRONG ANSWER

"Urine output of 25 mL/hr is acceptable in an adult."

✓ RIGHT ANSWER

Adult minimum is **30 mL/hr (or 0.5 mL/kg/hr)**. Less than that for 2 hr → report to HCP within 30 minutes.

✕ COMMON WRONG ANSWER

"Pink-tinged urine after cystoscopy is an emergency."

✓ RIGHT ANSWER

Pink-tinged is expected after cystoscopy. **Bright red bleeding or**

clots = report. After renal biopsy, even small flank pain or BP drop is a red flag.

Trap Watch: Do NOT palpate the abdomen in a patient with suspected *Wilms tumor* (pediatric) or known *polycystic kidney disease* — risk of rupture / tumor seeding.

07

HEALTH PROMOTION · SELF-MONITORING

Patient & Family Education

Self-Monitoring at Home

- Weigh same time daily — report ≥2 lb/day or 5 lb/week gain
- Watch for swelling (rings tight, sock marks, puffy eyes)
- Track urine — color, smell, volume, blood, foam
- Check BP at home; log readings
- Report decreased UO, severe fatigue, breathlessness

Hydration & Diet

- If healthy kidneys: aim for ~2 L/day fluids (unless restricted)
- If CKD/HF: follow individual fluid restriction
- Limit sodium (HTN, edema), processed foods
- Discuss K^+/phos restriction with HCP — no salt substitutes (most contain KCl)
- Cranberry products may reduce UTI recurrence (adjunct only)

Avoid Kidney-Toxic Exposures

- Avoid chronic NSAID use (ibuprofen, naproxen, ketorolac)
- Tell every provider about CKD before imaging/meds
- Avoid OTC herbal "kidney cleanses" without HCP review
- Stay current on flu/pneumonia vaccines
- Stop smoking — accelerates kidney decline

UTI / Stone Prevention

- Void after intercourse; wipe front to back
- Empty bladder Q 2–4 h; do not hold urine
- Drink water throughout the day to keep urine pale
- If stone-former: dietary modification per stone type (e.g., ↓ oxalate, moderate Ca)
- Report fever + flank pain + dysuria immediately

08

MNEMONICS · PATTERN RECOGNITION

Memory Boosters

A WET BED

The 7 kidney functions

- **A** cid-base balance
- **W** ater removal
- **E** rythropoietin
- **T** oxin removal
- **B** lood pressure (renin)
- **E** lectrolytes
- **D** – Vitamin D activation

AEIOU

Indications to start dialysis

- **A** cidosis (refractory)
- **E** lectrolytes (↑ K^+)
- **I** ntoxications
- **O** verload (fluid)
- **U** remia (sx: pericarditis, encephalopathy)

WET DOG

Fluid overload signs

- **W** eight gain
- **E** dema
- **T** achypnea / Tachycardia
- **D** yspnea / Distended neck veins
- **O** rthopnea
- **G** allop (S3)

30 in 30

UO escalation rule

- Adult minimum: 30 mL/hr
- If <30 mL/hr → report
- Within 30 minutes
- Pediatric: 1 mL/kg/hr

IAPP

Abdominal exam order (renal/abd)

I nspect

A uscultate

P ercuss

P alpate

Different from other systems — palpation last to avoid disrupting bowel sounds & renal bruits.

PRE · INTRA · POST

AKI categories

P re-renal: ↓ perfusion (hypovolemia, HF)

I ntra-renal: tubule damage (ATN, nephrotoxins)

P ost-renal: obstruction (stones, BPH)

09

NEXT-GENERATION CLINICAL JUDGMENT MODEL

NCJMM Scenario — 6 Steps

📋 Scenario

A 72-year-old client is admitted with a 3-day history of nausea, vomiting, and decreased oral intake following a course of ibuprofen for back pain. PMH: hypertension, type 2 DM, recent CT with contrast. Vital signs: BP 96/58, HR 108, RR 22, T 37.8°C, SpO_2 95%. Urine output over the last 8 hours: 90 mL, dark amber. Labs: BUN 48, Cr 2.6 (baseline 1.0), K^+ 5.6, Na^+ 132, HCO_3^- 18.

1

STEP 1 — RECOGNIZE CUES

What stands out?

Oliguria (90 mL / 8 hr ≈ 11 mL/hr — well below 30 mL/hr), elevated Cr (2.6 vs baseline 1.0 = 2.6× rise), elevated BUN, hyperkalemia 5.6, metabolic acidosis (HCO_3 18), hypotension, tachycardia, recent nephrotoxic exposures (NSAID + IV contrast).

2

STEP 2 — ANALYZE CUES

What do the data mean together?

The pattern fits **acute kidney injury** — likely combined prerenal (vomiting → hypovolemia → ↓ perfusion) and intrarenal (NSAID + contrast nephrotoxicity). Rising BUN:Cr ratio and oliguria support this. Hyperkalemia + acidosis raise cardiac dysrhythmia risk.

3

STEP 3 — PRIORITIZE HYPOTHESES

What's most urgent?

#1 Hyperkalemia — risk of life-threatening dysrhythmia (peaked T, widened QRS). **#2 Hypovolemia / AKI progression. #3 Metabolic acidosis.** All converge on cardiac stability.

4

STEP 4 — GENERATE SOLUTIONS

Plan of care

Place on cardiac monitor; obtain 12-lead ECG; hold all nephrotoxins (NSAIDs, ACE-I, metformin); IV access × 2; isotonic IV fluid resuscitation as ordered; strict I&O with hourly UO; daily weights; K-restricted diet; prepare

for possible kayexalate / insulin + D50 / calcium gluconate per orders; reassess Cr and K^+ q6h; notify HCP of trends.

5

STEP 5 — TAKE ACTION

What does the nurse do first?

Apply cardiac monitor → call HCP with critical K^+ → initiate ordered IV fluids → recheck VS and rhythm. Hold nephrotoxic meds before next dose. Insert Foley if ordered for strict UO measurement.

6

STEP 6 — EVALUATE OUTCOMES

What tells me it's working?

UO climbing toward ≥30 mL/hr; Cr trending downward; K^+ <5.0; HCO_3^- rising toward 22; BP ≥90/60; HR <100; no ECG changes; mental status intact. If UO remains <30 mL/hr or K^+ rises despite treatment → escalate; consider nephrology consult and dialysis (AEIOU criteria).

REFERENCES: SAUNDERS · ATI · LIPPINCOTT · KDIGO