NGN NCLEX 2026 · VISUAL STUDY LIBRARY · RENAL & UROLOGICAL SYSTEM

Urinary Tract *Infection*

Cystitis, pyelonephritis & the atypical face of UTI in the older adult — the most commonly missed infection on the NCLEX.

RENAL / URO | INFECTIOUS | GERIATRICS | PRIORITY-SETTING | PHARM

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01 Definition & Overview

WHAT IT IS · WHY IT MATTERS

- **UTI** = infection of any part of the urinary tract — *urethra (urethritis), bladder (cystitis), ureters, or kidneys (pyelonephritis).*
- Most common cause: **Escherichia coli** (≈ 80–85% of uncomplicated UTIs) — bacteria normally found in the GI tract.
- The #1 most common healthcare-associated infection (HAI) is **CAUTI** — Catheter-Associated UTI. Every indwelling catheter is a direct highway for bacteria.
- Women are at far higher risk than men due to a **short, straight urethra** close to the rectum.
- In older adults, untreated UTI is a top trigger of **delirium, falls, and urosepsis**.

02 Pathophysiology

FROM PERINEUM TO KIDNEY — THE ASCENDING ROUTE

UTIs are **ascending** infections — bacteria from the perineum climb upward. The higher they climb, the more dangerous.

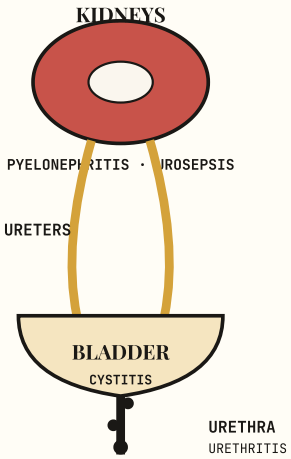
⑤ Enter bloodstream → UROSEPSIS

④ Travel up ureters → pyelonephritis

③ Multiply in stagnant urine → cystitis

② Ascend urethra → adhere to bladder wall

① Bacteria (E. coli) colonize perineum



RISK FACTORS:

- Female anatomy (short urethra)
- Indwelling Foley catheter
- Urinary stasis · retention
- BPH · neurogenic bladder
- Diabetes · immunosuppression
- Pregnancy · menopause
- Sexual activity ("honeymoon")
- Spermicides · diaphragms
- Dehydration · poor hygiene
- Recent instrumentation

03 Signs & Symptoms

CLASSIC PRESENTATION VS. THE OLDER ADULT TRAP

🧍 Younger / Classic Adult

- **Dysuria** (burning on urination)
- **Frequency & urgency**
- **Suprapubic pain / pressure**
- Hematuria (gross or microscopic)
- Cloudy, foul-smelling urine
- Low-grade fever (< 101°F / 38.3°C)
- Nocturia

👵 Older Adult — ATYPICAL 🚨

- **NEW-ONSET CONFUSION / DELIRIUM** (often the only sign)
- Sudden change in functional status
- New urinary incontinence
- Falls · unsteady gait
- Anorexia · lethargy · weakness
- Tachypnea · tachycardia
- **May have NO fever — or hypothermia**

🚨 RED FLAG · PYELONEPHRITIS / UROSEPSIS

The Infection Has Climbed

If any of these appear, the infection is no longer "just a UTI" — escalate immediately.

- **CVA tenderness** (costovertebral angle pain on percussion) — hallmark of pyelonephritis
- **Flank pain** radiating to groin · high fever (> 101°F) · shaking chills
- Nausea, vomiting · abdominal pain
- **Hypotension, tachycardia, altered LOC** → urosepsis · septic shock
- ↓ urine output (renal involvement)

DIAGNOSTIC CUES

TEST	KEY FINDING IN UTI
Urinalysis (UA)	+ Leukocyte esterase, + nitrites, WBC > 10/hpf, RBCs, cloudy
Urine C&S (gold standard)	> 100,000 CFU/mL identifies organism & antibiotic sensitivity
CBC	Elevated WBC, left shift (bandemia)
BUN / Creatinine	↑ if pyelonephritis or sepsis (renal involvement)
Blood cultures × 2	Drawn if fever > 101°F or suspected urosepsis
Specimen collection	Midstream *clean-catch*; from Foley → sterile sample port, never the bag

04 Priority Nursing Interventions

ABC + SAFETY + NCLEX PRIORITIZATION

A · Airway / Acute

- Assess LOC every 4 hr (older adults — confusion = sepsis until proven otherwise)
- Monitor for tachypnea, tachycardia, hypotension → **SIRS / sepsis**
- Stay alert for septic shock: cool extremities, ↓ urine output, mottling

B · Bacterial Source Control

- **Obtain urine C&S BEFORE first antibiotic dose**
- Administer empiric antibiotics within 1 hr if sepsis suspected
- Remove unnecessary indwelling catheter ASAP
- Strict aseptic technique for catheter care

C · Comfort / Continued Care

- **Push fluids 2–3 L/day** (unless contraindicated by HF, CKD)
- Strict I&O — monitor urine output ≥ 30 mL/hr
- Apply heating pad to suprapubic area
- Administer urinary analgesic (Pyridium) PRN

STANDING PRIORITY ACTIONS

- → **Vital signs** q 4 hr — watch the fever trend; document temperature method consistently
- → **Urine assessment:** color, clarity, odor, sediment, output volume
- → **Pain scale:** evaluate dysuria, suprapubic, flank pain (0–10) with each set of vitals
- → **Foley care:** peri-care BID with soap & water · keep bag below bladder · never let it touch the floor · empty q 8 hr or at ⅔ full
- → **Catheter discontinuation:** evaluate need DAILY — every extra day = ~ 5% added CAUTI risk
- → **Hydration:** 240 mL water q 1–2 hr while awake; offer at every interaction
- → **Voiding schedule:** q 2–3 hr to flush bacteria — never delay urge
- → **Reorient older adults** q shift; soft lighting, glasses on, hearing aids in, family at bedside, sleep-wake cycle protection
- → **Fall precautions** — bed alarm, call light in reach, non-skid socks, clear path to bathroom

05 Pharmacology

ANTIBIOTICS · ANALGESICS · WATCH-OUTS

DRUG	CLASS · USE	KEY ADVERSE EFFECTS	NURSING CONSIDERATIONS
Trimethoprim-Sulfamethoxazole (Bactrim, Septra)	Sulfonamide 1st-line uncomplicated UTI	Photosensitivity · Stevens-Johnson · hyperkalemia · crystalluria · hypoglycemia	Encourage 8 glasses of water/day; sunscreen; check sulfa allergy; avoid in last trimester pregnancy
Nitrofurantoin (Macrobid, Macrodantin)	Anti-infective Uncomplicated cystitis	Pulmonary fibrosis (long-term) · neuropathy · GI upset · turns urine *brown*	Give **with food**; **avoid if CrCl < 30** (won't reach therapeutic urine levels & toxic); on Beers list — caution in elderly
Ciprofloxacin (Cipro)	Fluoroquinolone Complicated UTI · pyelonephritis	**Tendon rupture** (esp. Achilles) · QT prolongation · C. diff · CNS effects · ↑ blood glucose	Avoid in < 18 y/o & pregnancy; separate from antacids/Ca/iron/dairy by 2 hr; report tendon pain immediately
Fosfomycin (Monurol)	Anti-infective Single-dose uncomplicated UTI	Diarrhea · headache · vaginitis	Mix 1 packet in 3–4 oz cold water; **single dose only**; take on empty stomach
Cephalexin (Keflex)	1st-gen cephalosporin	GI upset · rash · C. diff · cross-reactivity in PCN allergy (~1%)	Take with food if GI upset; complete full course
Phenazopyridine (Pyridium, AZO)	**Urinary analgesic** — NOT an antibiotic	⚠ Turns urine & tears **orange-red** · headache · GI upset · stains contact lenses · hemolytic anemia in G6PD	Symptomatic relief only — does *not* treat infection; use ≤ 2 days; warn pt about urine color (expected, not a reaction); avoid contacts

💊 Always Pair With

- Probiotics if on prolonged abx (prevent yeast / C. diff)
- Antiemetics PRN
- Adequate hydration with every dose

🚫 Older Adult Caution

- Nitrofurantoin contraindicated if CrCl < 30 mL/min
- Fluoroquinolones — fall & tendon risk
- Bactrim — hyperkalemia + ACE/ARB combo
- **Do NOT treat asymptomatic bacteriuria**

06 NCLEX Test Traps

WRONG-VS-RIGHT · WHERE STUDENTS LOSE POINTS

✗ Looks Right · Actually Wrong

- ✗ "Confused 82-year-old needs psych referral" — first *rule out UTI*
- ✗ "Asymptomatic bacteriuria → start antibiotics" — usually NOT treated, esp. elderly
- ✗ "Restrict fluids because of urinary frequency"
- ✗ "Wait until antibiotics are running, then send urine"
- ✗ "Send urine from the Foley collection bag"
- ✗ "Reassure patient that orange urine on Pyridium = drug reaction"
- ✗ "Encourage cranberry juice as treatment instead of antibiotics"
- ✗ "Hold the Cipro because the patient drinks milk with meds"
- ✗ "Wipe back to front after toileting"
- ✗ "Leave Foley in place for convenience overnight"

✓ Correct NCLEX Action

- ✓ Acute confusion in older adult → assess for UTI / sepsis FIRST
- ✓ Treat only if symptomatic (or pregnant / pre-urologic procedure)
- ✓ Push fluids 2–3 L/day to flush bacteria
- ✓ **Obtain C&S BEFORE** first antibiotic dose
- ✓ Collect from **sterile sample port** on Foley tubing
- ✓ Orange-red urine with Pyridium is *expected* — educate, don't escalate
- ✓ Cranberry may help *prevention*, never replaces antibiotics
- ✓ Separate Cipro from dairy/antacids/iron by ≥ 2 hr — don't hold the drug
- ✓ Always front-to-back; teach patient & family
- ✓ Reassess daily — remove Foley as soon as clinically possible

PRIORITY PITFALLS

⚠ Trap: "Just a UTI"

In an older adult or immunocompromised pt, UTI can decompensate into **urosepsis within hours**. Don't downplay vague symptoms — confusion, lethargy, or a fall *is* the presentation.

⚠ Trap: Specimen Source

Never send urine from the **collection bag** — it's colonized. Always use the **sterile aspiration port** on the tubing after cleaning with alcohol.

07 Patient & Family Education

PREVENTION IS THE ASSIGNMENT

💧 Hydration & Voiding

- Drink at least **8 glasses of water/day** (~ 2–3 L) unless restricted
- Void every 2–3 hr while awake — **never "hold it"**
- Empty bladder **fully**; double-void technique helps
- Void **before AND after** sexual intercourse

🧼 Perineal Hygiene

- **Wipe front to back** — every time
- Cotton, breathable underwear; change daily
- Shower preferred over bubble baths
- Avoid feminine sprays, douches, scented products
- Change tampons/pads frequently

🍎 Diet & Bladder Health

- Cranberry products (juice / tablets) — may reduce *recurrence*, not treat active infection
- Avoid bladder irritants: caffeine, alcohol, carbonation, spicy/acidic foods during infection
- Vitamin C may acidify urine slightly

💊 Medication Adherence

- **Complete the FULL antibiotic course** — even if feeling better
- Pyridium will turn urine orange-red & stain underwear/contact lenses
- Report no improvement in 48 hr · new fever · flank pain · vomiting
- Return to clinic if confusion / falls in older family member

08 Memory Boosters

MNEMONICS & PATTERN RECOGNITION

CONFUSED

The older adult UTI mnemonic — symptoms you must not miss.

- C **Confusion** · new delirium
- O **Off balance** · new falls
- N **New incontinence**
- F **Fatigue** · lethargy
- U **Urine** changes (color, odor)
- S **Sudden** functional decline
- E **Eating** poorly · anorexia
- D **Decreased** activity / ADLs

F · U · N · D

Classic younger-adult cystitis cluster.

- F **Frequency**
- U **Urgency**
- N **Nocturia**
- D **Dysuria**

+ The 3 "F"s of UA:

Foul · Frothy/cloudy · Filled with WBCs

QUICK ASSOCIATIONS

🟧 Orange Urine

Phenazopyridine (Pyridium) → expected, harmless, will stain contacts. Educate — don't hold the drug.

🟤 Brown Urine

Nitrofurantoin (Macrobid) → expected pigment change. Different from hematuria (red) or jaundice (tea-colored).

⚡ CVA Tenderness

Sharp pain on costovertebral angle percussion = **pyelonephritis** until proven otherwise. Escalate.

🦴 Achilles Pain on Cipro

Stop drug, notify provider, immobilize. Tendon rupture risk ↑ with age, steroids, transplant.

🛏️ Foley = #1 CAUTI

"Foley today, sepsis tomorrow." Reassess daily. Remove ASAP.

🧪 C&S First

"Culture before cure." Always collect before the first antibiotic — or sensitivities are useless.

09 NCJMM Clinical Judgment Scenario

NEXT-GEN NCLEX · 6-STEP MODEL

Case

A **78-year-old female** is brought to the ED by her daughter, who states, "She has been acting strange since yesterday — confused, not eating, and she fell trying to get to the bathroom this morning." History: HTN, osteoarthritis, mild dementia (baseline oriented × 2). Indwelling Foley placed 4 days ago after a hip procedure. Current VS: **T 99.1°F · HR 108 · RR 22 · BP 102/64 · SpO_2 95%**. Cloudy urine in the Foley bag with sediment. Patient is restless, oriented × 1, refusing PO intake.

STEP 01

Recognize Cues

Acute confusion (Δ from baseline · 2), new fall, anorexia, low-grade temp, tachycardia, tachypnea, borderline BP, indwelling Foley × 4 days, cloudy urine with sediment.

STEP 02

Analyze Cues

Cluster points to **CAUTI evolving toward urosepsis**. Older adult atypical presentation — confusion is the cue, not fever. SIRS criteria emerging (HR > 90, RR > 20, temp trending).

STEP 03

Prioritize Hypotheses

① Urosepsis (highest — life-threatening, perfusion at risk) ② CAUTI ③ Delirium ④ Dehydration / electrolyte imbalance ⑤ Medication effect. Treat #1 first.

STEP 04

Generate Solutions

Obtain urine C&S from **sterile port**, blood cultures × 2, CBC, BMP, lactate. Start IV NS bolus. Initiate broad-spectrum IV antibiotics per sepsis bundle. Reassess Foley need / remove. Fall precautions. Reorient.

STEP 05

Take Actions

Collect cultures FIRST → give antibiotics within 1 hr. NS 30 mL/kg bolus. Continuous VS / SpO_2 monitoring. Strict I&O. Hold sedating meds. Initiate sepsis protocol & notify provider for ICU consult if hypotension persists.

STEP 06

Evaluate Outcomes

Goals: MAP ≥ 65 · UOP ≥ 30 mL/hr · lactate trending down · LOC returning to baseline · culture-directed antibiotic by 48–72 hr · Foley DC'd · no further falls. Reassess q 1 hr in acute phase.

References: Saunders Comprehensive Review for the NCLEX-RN (Silvestri) · ATI RN Adult Medical-Surgical Nursing · Lippincott Illustrated Reviews: Pharmacology · IDSA Clinical Practice Guidelines for the Treatment of Acute Uncomplicated Cystitis and Pyelonephritis · AGS Beers Criteria · CDC CAUTI Prevention Guidelines