

CAUTI · Catheter-Associated UTI

CAUTI is a bladder infection that happens because the catheter gives bacteria a place to stick, grow, and then invade.

THE ONE-LINE TRUTH

When a catheter stays in the bladder, bacteria stick to it, grow, and then attack the bladder tissue — that attack is the infection.

The chain — how it unfolds

1. Catheter is placed and stays in for days — why: The catheter is a foreign object made of plastic. Bacteria from the skin, the catheter insertion, or the collection bag stick to the tube's surface within hours. Because the catheter bypasses normal bladder emptying, those bacteria are never flushed out — they just sit and multiply.
2. Biofilm forms on the catheter — why: Bacteria make a slimy coating (biofilm) that glues them to the catheter and protects them from the immune system and many antibiotics. Think of it like a fortress — once built, it is very hard to break down. The longer the catheter stays in, the thicker the biofilm grows.
3. Bacteria multiply in the urine and invade the bladder lining — why: Protected by biofilm, bacteria reproduce rapidly in the urine. Eventually, some break free and attach to the bladder wall. They burrow through the thin protective mucus layer and enter the tissue underneath — that invasion is what turns colonization (bacteria just present) into infection (bacteria attacking tissue).
4. Immune system launches a response: fever, pain, cloudy or bloody urine — why: Once bacteria invade tissue, immune cells detect them and release chemicals (cytokines, prostaglandins) that cause inflammation. Blood vessels dilate (pain, redness), white blood cells flood the area (cloudy urine, pus), and the brain raises body temperature (fever) to help fight the infection. Each symptom is a defense, not the disease itself.
5. Older patients show confusion or delirium instead of classic UTI symptoms — why: In elderly people, the brain is more vulnerable to inflammation and changes in blood chemistry. Infection triggers confusion, agitation, or a sudden drop in alertness before you see pain or burning. This atypical presentation is why doctors often miss CAUTI as the fever source in hospitalized older adults.

6. If untreated, bacteria spread to the kidneys or bloodstream (urosepsis) — why: Bacteria can travel up the ureters from the bladder to the kidneys (pyelonephritis), causing flank pain, high fever, and kidney damage. Or they break into the bloodstream through inflamed bladder tissue, triggering sepsis — blood pressure drops, organs get less oxygen, and the body spirals toward shock. Mortality jumps once sepsis sets in.
7. Remove the catheter and give the right antibiotic — the whole chain reverses — why: Pulling out the catheter removes the biofilm nidus and lets the bladder return to normal flushing. Antibiotics kill the invading bacteria in the tissue. Once the upstream break is fixed (catheter out, bacteria cleared), all the downstream findings — fever, pain, confusion, cloudy urine — resolve together because they were all caused by the same problem. That is why early removal of unnecessary catheters is the single best prevention.
8. Prevention: only use catheters when truly needed, and remove them as soon as possible — why: Every day a catheter stays in, the risk of CAUTI goes up by about 3-7%. Most hospitalized patients do not need a catheter — if they can urinate on their own or use a bedpan or bedside commode, that is safer. Nurse-driven protocols that prompt daily review ('Does this patient still need the catheter?') cut CAUTI rates in half. The best treatment is prevention.

Spot it — what you see, and why

- Fever (temperature above 100.4°F or 38°C): Bacteria from the catheter climb into the bladder and multiply. Your immune system responds by raising your body temperature to fight the infection.
- Chills or shaking: Your body is trying to warm itself up even more to kill bacteria. This happens when the infection triggers a strong immune response.
- New confusion or feeling very sleepy (especially in older adults): The infection releases chemicals into the blood that affect how the brain works. Older brains are more sensitive to these changes.
- Pain or tenderness above the pubic bone (lower belly): The bladder wall gets inflamed and swollen from bacteria irritating it. This swelling presses on nearby nerves and causes pain.
- Pain in the lower back or side (flank pain): Bacteria have traveled up from the bladder through the tubes (ureters) to the kidneys, causing inflammation there.
- Blood in the urine (pink, red, or tea-colored): Bacteria and inflammation damage tiny blood vessels in the bladder lining, so red blood cells leak into the urine.

Red flags — act now

- New confusion or big change in mental state
- Very low blood pressure (systolic under 90) or signs of shock

- Severe back or side pain suggesting kidney infection
- High fever with shaking chills that won't stop
- Not urinating at all or catheter completely blocked

Treat it — in this order

1. Remove the urinary catheter immediately, or replace it with a new sterile catheter if it must stay in → Removes the surface where bacteria hide in biofilm. Lets the bladder start emptying and flushing bacteria out naturally. A new catheter gives a clean sample for culture and stops reinfection from the old, contaminated tube.
2. Collect urine culture and sensitivity from the new catheter (or via straight catheterization if catheter is removed) BEFORE starting antibiotics. Draw blood cultures if fever or sepsis signs are present. → Identifies exactly which bacteria are causing the infection and which antibiotics will work. Blood cultures catch bacteria that have escaped into the bloodstream.
3. Start empiric (best-guess) antibiotics immediately based on local hospital resistance patterns. Common choices: fluoroquinolone (ciprofloxacin or levofloxacin), third-generation cephalosporin (ceftriaxone), or if high resistance, a carbapenem (meropenem or ertapenem). Switch to targeted therapy once culture results return. → Kills the bacteria invading the bladder wall and stops the fever, pain, and confusion. Targets the root cause: uncontrolled bacterial growth.
4. Treat for 7 days if the infection is straightforward (fever resolves, no sepsis, normal anatomy). Extend to 10–14 days if the patient has high fever, bloodstream infection, kidney involvement, or structural problems in the urinary tract. → Shorter courses work for mild infections and lower the risk of antibiotic resistance. Longer courses are needed when infection is deeper or the immune system is weaker.
5. Do NOT treat asymptomatic bacteriuria (bacteria in urine with no fever, pain, or confusion) unless the patient is pregnant or about to have urologic surgery. → Avoids unnecessary antibiotics, which cause side effects and breed resistant bacteria. Bacteria living quietly in catheter urine are not the problem — symptoms of tissue invasion are.

Your top priorities at the bedside

1. Remove the urinary catheter immediately if it is no longer medically necessary, or replace it with a new sterile catheter if retention or other valid indication exists. — why: The catheter surface is covered with biofilm (a sticky layer where bacteria hide and multiply). Removing the source stops ongoing bacterial entry into the bladder. If a new catheter is placed, it provides a clean surface and allows accurate urine culture collection.

2. Collect a urine specimen for culture and sensitivity testing from the new catheter port (or by straight catheterization if catheter removed) before any antibiotics are given. — why: Culture identifies the exact bacteria causing infection, and sensitivity testing shows which antibiotics will kill it. Collecting before antibiotics prevents false-negative results. Never collect from the drainage bag because that urine is old and contaminated.
3. Obtain two sets of blood cultures from separate sites if the patient has fever over 100.4°F, chills, confusion, or any sign of sepsis. — why: Bacteria from the bladder can enter the bloodstream through inflamed tissue. Blood cultures detect bacteremia (bacteria in blood) or sepsis, which requires different antibiotic dosing and longer treatment than bladder infection alone.