

Catheter Associated Urinary Tract Infections (CAUTI): Monitoring and Prevention.

Rabee Adwan MD.

Outlines

- **Background**
 - **Impact**
 - **Pathogenesis**
 - **Epidemiology**
- **Prevention Strategies**
 - **Core & Supplemental**
- **Measurement**
- **Tools for Implementation**

Issues Associated with Urinary Catheters – Clinical Mandate

- ✦ **Discomfort to the patient**
- ✦ **Limit mobility**
- ✦ **Prolonged hospital stay**
- ✦ **Increased cost and mortality**

Background: Urinary Catheter Use

- **15-25% of hospitalized patients**
- **Often placed for inappropriate indications**
- **Physicians frequently unaware**
- **In a recent survey of U.S. hospitals:**
 - **> 50% did not monitor which patients catheterized**
 - **75% did not monitor duration and/or discontinuation**

Background: Impact of CAUTI

- **Most common type of healthcare-associated infection**
 - > 30% of HAIs reported to NHSN
 - Estimated > 560,000 nosocomial UTIs annually
- **Increased morbidity & mortality**
 - Estimated 13,000 attributable deaths annually
 - Leading cause of secondary BSI with ~10% mortality
- **Excess length of stay —> 2-4 days?**
- **Increased cost —> \$0.4-0.5 billion per year nationally**
- **Unnecessary antimicrobial use**

Hidron AI et al. ICHE 2008;29:996-1011

Givens CD, Wenzel RP. J Urol 1980;124:646-8

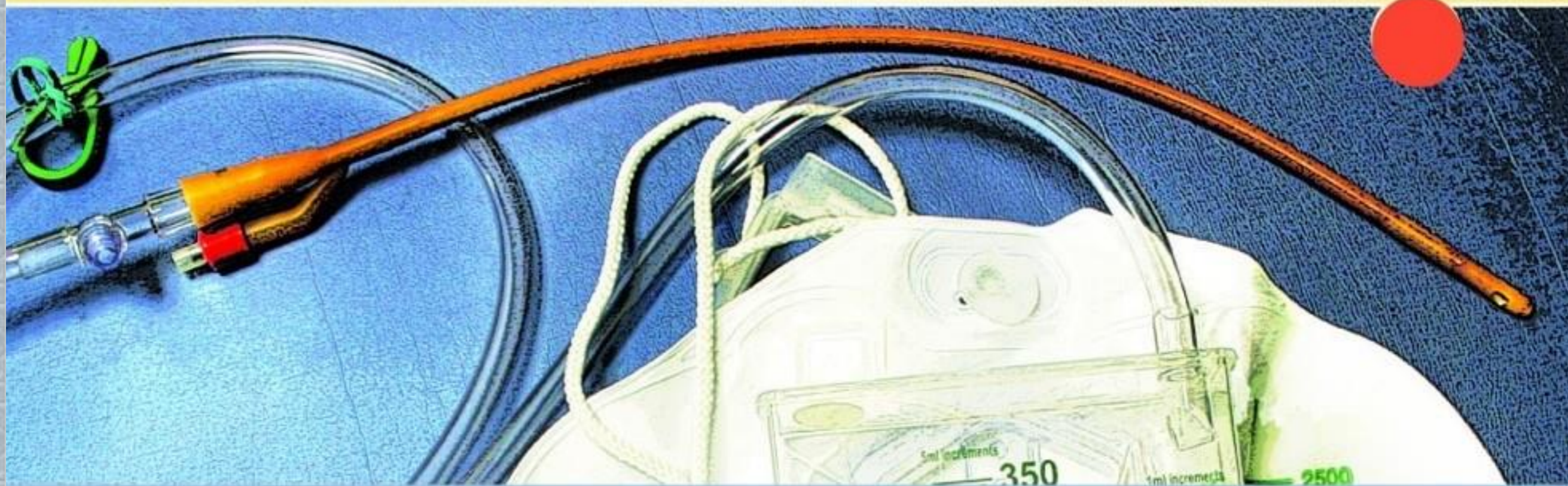
Klevens RM et al. Pub Health Rep 2007;122:160-6 Green MS et al. J Infect Dis 1982;145:667-72

Weinstein MP et al. Clin Infect Dis 1997;24:584-602 Foxman B. Am J Med 2002;113:5S-13S

Cope M et al. Clin Infect Dis 2009;48:1182-8

Saint S. Am J Infect Control 2000;28:68-75

Why does your patient need that catheter?



Prevent Catheter-Associated Urinary Tract Infections.



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Indications for Catheter

Table 2. A. Examples of Appropriate Indications for Indwelling Urethral Catheter Use ¹⁻⁴

Patient has acute urinary retention or bladder outlet obstruction

Need for accurate measurements of urinary output in critically ill patients

Perioperative use for selected surgical procedures:

- Patients undergoing urologic surgery or other surgery on contiguous structures of the genitourinary tract
- Anticipated prolonged duration of surgery (catheters inserted for this reason should be removed in PACU)
- Patients anticipated to receive large-volume infusions or diuretics during surgery
- Need for intraoperative monitoring of urinary output

To assist in healing of open sacral or perineal wounds in incontinent patients

Patient requires prolonged immobilization (e.g., potentially unstable thoracic or lumbar spine, multiple traumatic injuries such as pelvic fractures)

To improve comfort for end of life care if needed

NOT

Indications for Urinary Catheter

- **Incontinence**
- **Immobility**
- **Nurse Convenience**
- **Obtaining Periodic Urine Specimens**

Pathogenesis of CAUTI

- Source of microorganisms may be endogenous (meatal, rectal, or vaginal colonization) or
- Exogenous, usually via contaminated hands of healthcare personnel during catheter insertion or manipulation of the collecting system

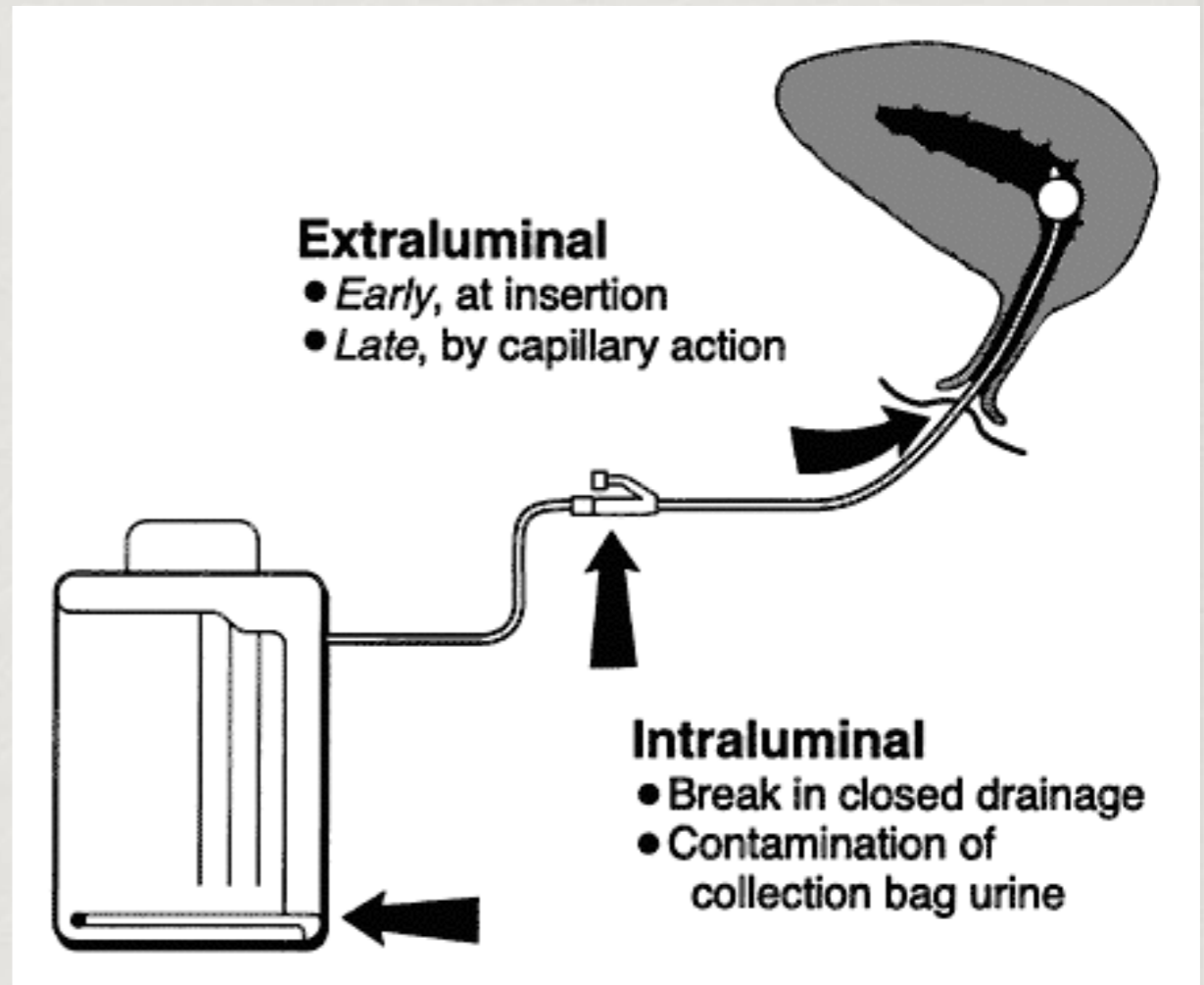


Figure from: Maki DG, Tambyah PA. *Emerg Infect Dis* 2001;7:1-6

*Source Healthcare Associated
Urinary Tract Infections*



The Burden of CAUTI

- **Virtually all healthcare associated urinary tract infection are caused by instrumentation of the urinary tract.**
- **CAUTI can lead to complications**



Complications of CAUTI

- **Cystitis**
- **Pyelonephritis**
- **Gram-negative bacteremia**
- **Prostatitis**
- **Epididymitis**
- **Orchitis**

Endocarditis

Vertebral osteomyelitis

Septic arthritis

Endophthalmitis

Meningitis

CAUTI Definitions

Catheter-associated UTI (CAUTI):

A UTI where:-

- 1. an indwelling urinary catheter was in place for >2 calendar days on the date of event, with day of device placement being Day 1,**

&
 - 2. An indwelling urinary catheter was in place on the date of event or the daybefore.**
- If an indwelling urinary catheter was in place for > 2 calendar days and then removed, the date of event for the UTI must be the day of discontinuation or the next day for the UTI to be catheter-associated.**

Indwelling catheter:

- A drainage tube that is inserted into the urinary bladder **through the urethra**, is left in place, and is connected to a drainage bag. These devices are also called Foley catheters.
- Condom or straight in-and-out catheters are not included nor are nephrostomy tubes, ileoconduits, or suprapubic catheters **unless a Foley catheter is also present.**
- **Indwelling urethral catheters that are used for intermittent or continuous irrigation are included in CAUTI surveillance.**

Sample collection

- **Urine for culture should be collected from the sampling port using aseptic technique.**
- **Specimens should not be obtained from the urinary drainage bag nor should the specimen be obtained by disconnecting the catheter from the drainage tubing.**
- **Urinary catheter tips should not be cultured and are not acceptable for the diagnosis of a UTI.**
UTI.

Example of Associating Catheter Use to UTI:

- A patient in an inpatient unit has a Foley catheter inserted and the following day is the date of event for a UTI.
- Because the catheter has not been in place ≥2 calendar days on the date of event, **this is not a CAUTI.**
- However, depending on the date of admission, this may be a healthcare-associated UTI.

Notes

- **Indwelling urinary catheters that are removed and reinserted: If, after indwelling urinary catheter removal, the patient is without an indwelling urinary catheter for at least one full calendar day (NOT to be read as 24 hours), then the urinary catheter day count will start anew.**
- **If instead, a new indwelling urinary catheter is inserted before a full calendar day has passed without an indwelling urinary catheter being present, the urinary catheter day count will continue.**

	March 31 (Hospital day 3)	April 1	April 2	April 3	April 4	April 5	April 6
Patient A	Foley Day 3	Foley Day 4	Foley removed (Foley Day 5)	Foley replaced (Foley Day 6)	Foley Day 7	Foley removed Day 8	No Foley
Patient B	Foley Day 3	Foley Day 4	Foley removed (Foley Day 5)	No Foley	Foley replaced (Foley Day 1)	Foley Day 2	Foley Day 3

. Location of attribution:

- **The inpatient location where the patient was assigned on the date of the UTI event.**
- **Transfer Rule: If the date of event for a UTI is on the date of transfer or discharge, or the next day, the infection is attributed to the transferring/discharging location.**

Examples of the Transfer Rule:

- Patient is transferred in the morning to the medical ward from the MSICU after having the Foley catheter removed, **which had been in place for 6 days.**
 - The day of transfer is the date of event for the CAUTI. This is reported as a CAUTI for the MSICU.
- **On Monday**, patient with a Foley catheter in place is transferred from the medical ward to the (CCU). **Wednesday** in the CCU, patient has a fever and urine culture collected that day is positive for 100,000 CFU/ml of E. coli.
 - This is reported as a CAUTI for the CCU, because the UTI date of event is **LATER THAN** the day after transfer.

Cont...

- A patient has a Foley catheter removed **on catheter day 5** and is discharged the same day from hospital A's urology ward. The next day, the IP from Hospital B calls to report that this patient has been admitted to Hospital B meeting UTI criteria.
 - **This CAUTI should be reported for Hospital A and attributed to the urology ward because the date of event is the next day after transfer.**
- Patient in the MICU with a Foley catheter, which has been in place for 4 days, is transferred to the medical ward. The day after transfer is determined to be the date of event for a catheter-associated ABUTI.
 - **This is reported as an ABUTI for the MICU because the date of event was the next day after transfer.**

. Multiple Transfers

- **If patient has been transferred to more than one location on the date of a UTI, or the day before, attribute the UTI to the first location in which the patient was housed the day before the UTI's date of event.**

	3/22	3/23	3/24
Locations in which patient was housed	Unit A	Unit A Unit B Unit C	Unit C Unit D This is also the date of event for a CAUTI. CAUTI is attributed to Unit A since Unit A was the first location in which the patient was housed the day before the date of event.

Criterion	Urinary Tract Infection (UTI)
	<p>Symptomatic UTI (SUTI) Must meet at least <u>one</u> of the following criteria:</p>
<p>SUTI 1a</p> <p>Catheter-associated Urinary Tract Infection (CAUTI)</p>	<p>Patient must meet 1, 2, <u>and</u> 3 below:</p> <ol style="list-style-type: none"> 1. Patient had an indwelling urinary catheter that had been in place for > 2 days on the date of event (day of device placement = Day 1) AND was either: <ul style="list-style-type: none"> • Present for any portion of the calendar day on the date of event[†], OR • Removed the day before the date of event[‡] 2. Patient has at least <u>one</u> of the following signs or symptoms: <ul style="list-style-type: none"> • fever (>38.0°C) • suprapubic tenderness* • costovertebral angle pain or tenderness* • urinary urgency ^ • urinary frequency ^ • dysuria ^ 3. Patient has a urine culture with no more than two species of organisms identified, at least one of which is a bacterium of $\geq 10^5$ CFU/ml (See Comment Section on page 7-8). All elements of the UTI criterion must occur during the Infection Window Period (See Definition Chapter 2 Identifying HAIs in NHSN).

**SUTI 1b
Non-
Catheter-
associated
Urinary
Tract
Infection
(Non-
CAUTI)**

Patient must meet 1, 2, and 3 below:

1. One of the following is true:
 - Patient has/had an indwelling urinary catheter but it has/had not been in place >2 calendar days on the date of event[†]
OR
 - Patient did not have a urinary catheter in place on the date of event nor the day before the date of event[†]

2. Patient has at least **one** of the following signs or symptoms:
 - fever (>38°C) in a patient that is ≤ 65 years of age
 - suprapubic tenderness*
 - costovertebral angle pain or tenderness*
 - urinary frequency ^
 - urinary urgency ^
 - dysuria ^

3. Patient has a urine culture with no more than two species of organisms identified, at least one of which is a bacterium of ≥10⁵ CFU/ml. (See comment section on page 7-8) All elements of the SUTI criterion must occur during the Infection Window Period (See Definition [Chapter 2 Identifying HAIs in NHSN](#)).

SUTI 2

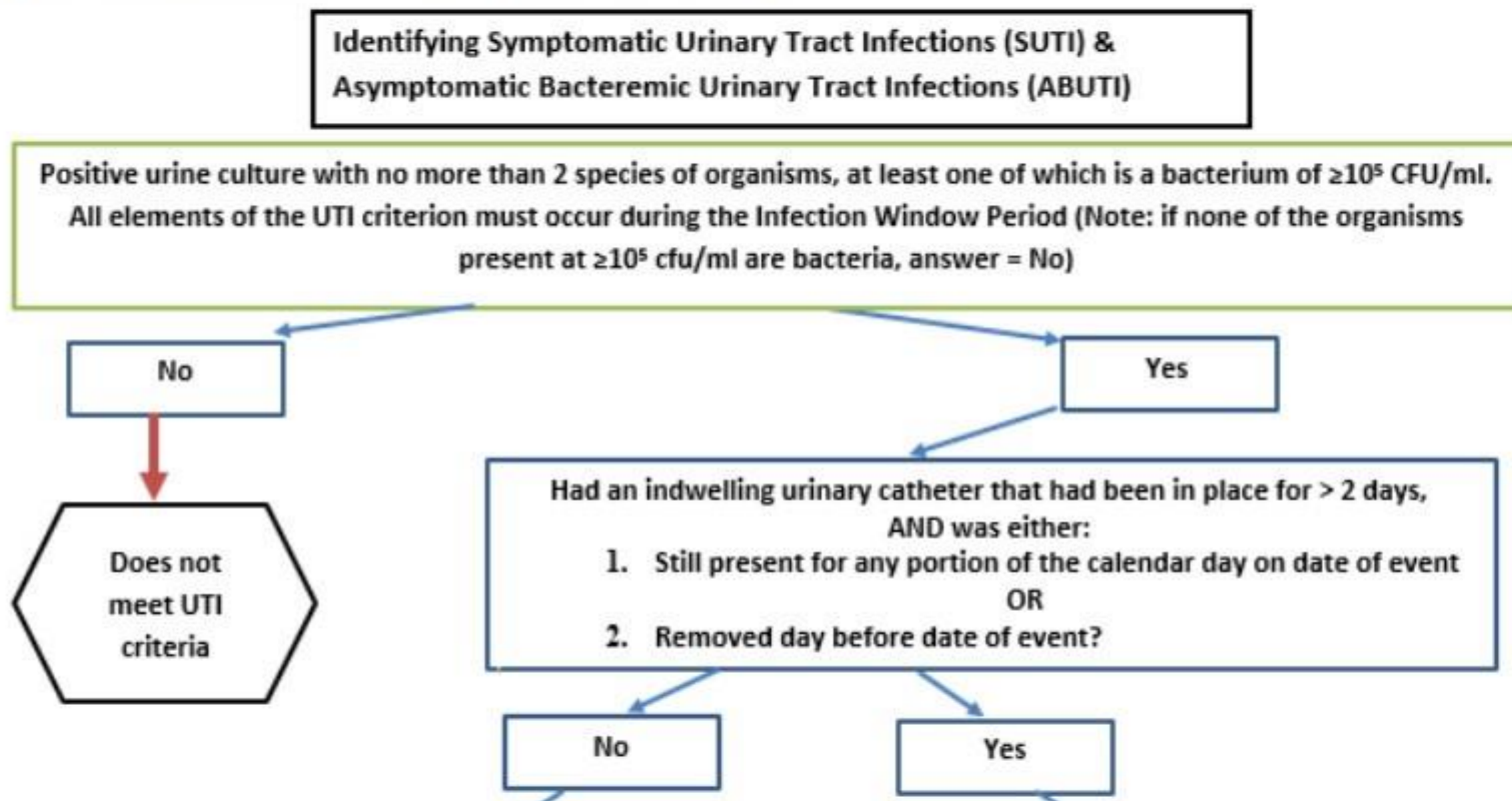
CAUTI or Non-CAUTI in patients 1 year of age or less

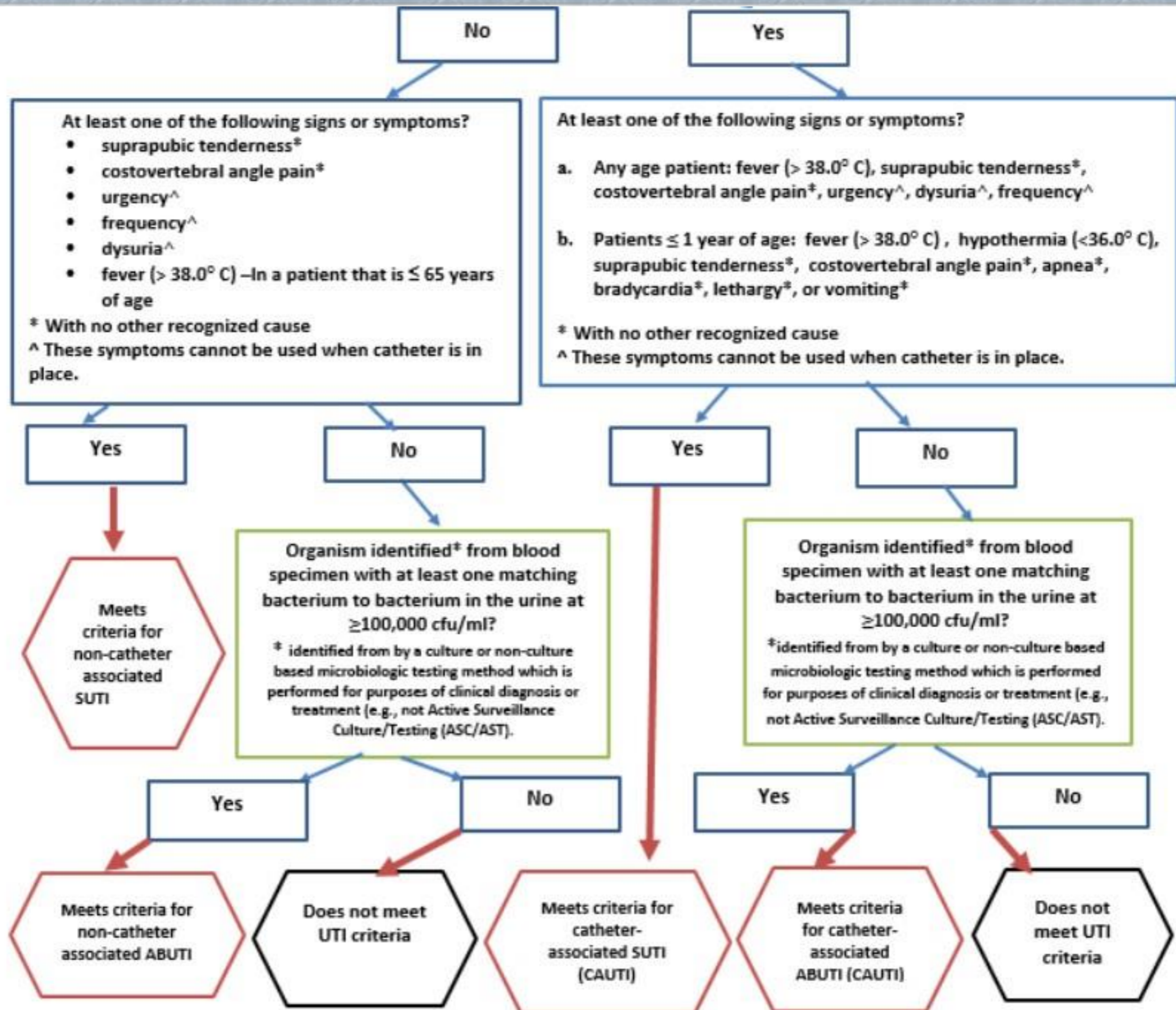
Patient must meet 1, 2, and 3 below:

1. Patient is ≤ 1 year of age (with[‡] or without an indwelling urinary catheter)
2. Patient has at least ***one*** of the following signs or symptoms:
 - fever ($>38.0^{\circ}\text{C}$)
 - hypothermia ($<36.0^{\circ}\text{C}$)
 - apnea*
 - bradycardia*
 - lethargy*
 - vomiting*
 - suprapubic tenderness*
3. Patient has a urine culture with no more than two species of organisms identified, at least one of which is a bacterium of $\geq 10^5$ CFU/ml. (See comment section on page 7-8) All elements of the SUTI criterion must occur during the Infection Window Period (See Definition [Chapter 2 Identifying HAIs in NHSN](#)).

[‡] If patient had an indwelling urinary catheter in place for >2 calendar days, and catheter was in place on the date of event or the previous day the CAUTI criterion is met. If no such indwelling urinary catheter was in place, UTI (non-catheter associated) criterion is met.

Figure 3: Identifying SUTI and ABUTI Flowchart





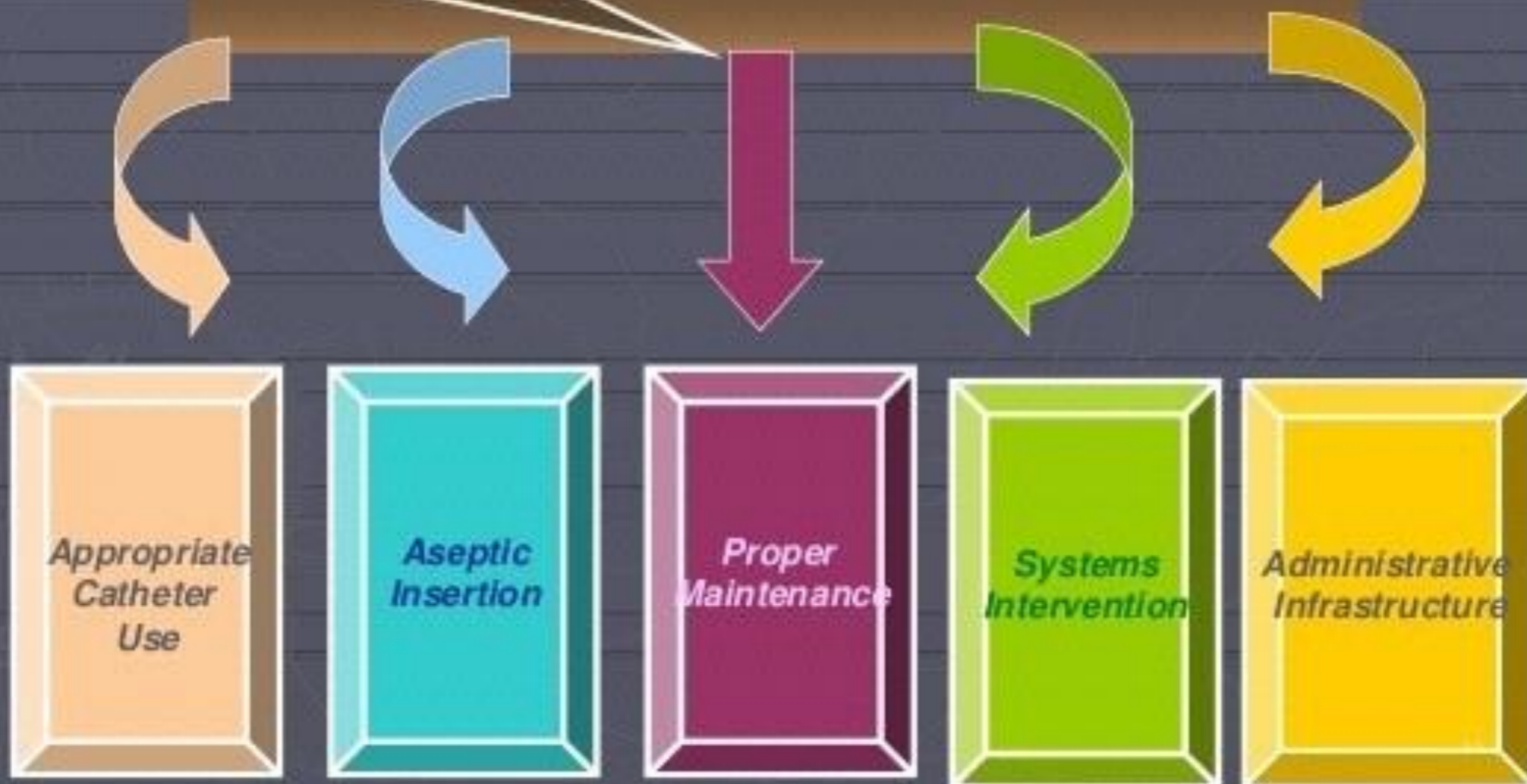
Evidence-based Risk Factors for CAUTI

Symptomatic UTI	Bacteriuria
Prolonged catheterization*	Disconnection of drainage system*
Female sex†	Lower professional training of inserter*
Older age†	Placement of catheter outside of OR†
Impaired immunity†	Incontinence†
	Diabetes
	Meatal colonization
	Renal dysfunction
	Orthopaedic/neurology services
* Main modifiable risk factors † Also inform recommendations	

**DON'T BE NAUGHTY!
PREVENT CAUTI!**



Preliminary Recommendations For Prevention Of CAUTI



Administrative Infrastructure

*Provision of
Guidelines*

*Education &
Training*

Supplies

*System of
Documentation*

*Surveillance
Resources*

*Performance
Measures*

Compliance

