01.45 Prevention of Catheter-Associated Urinary Tract Infections (CAUTI)

Audience

All employees of UTMB hospitals, clinics, Victory Lakes outpatient specialty care and surgical center, contract workers, and students.

Catheter Use

- Urinary catheters should be inserted only when necessary and left in place only for as long as necessary. They should not be used solely for the convenience of patient-care personnel.
- For selected patients, other methods of urinary drainage such as condom catheter drainage and intermittent urethral catheterization can be useful alternatives to indwelling urethral catheterization.

Champions for Appropriate Catheter Use

- Champions, including a physician, senior nurse and a hospital administrator will be appointed to oversee and support the safe use of urinary catheters as outlined in this policy.

Indications for Indwelling Bladder Catheters

- Bladder catheters must be inserted only when there is an indication to do so. (See Appendix 1). When a Foley catheter is ordered by a physician, the physician must check the indication for catheter insertion from a drop down list of indications in EPIC. If “other” is checked, the physician must enter a valid indication for insertion of the catheter.

  Indwelling catheters must be removed immediately when no longer indicated. Physicians must assess the ongoing need for an indwelling catheter every day and remove or have the catheter removed when no longer indicated. Every physician who has one or more patients with an indwelling urinary catheter in place will receive a daily reminder to evaluate each patient to determine whether or not the catheter should be removed. (See below)

- Personnel who insert urinary catheters must be trained in proper insertion technique.

Hand Hygiene

- Hand hygiene must be performed with an antimicrobial soap and water or an alcohol handrub before insertion and immediately before and after any manipulation of the catheter site or drainage system.

Catheter Insertion

- Catheters should be inserted using aseptic technique and sterile equipment.
- Sterile gloves, drape, sponges, and appropriate antiseptic solution for periurethral cleansing, and a single-use packet of sterile lubricant jelly should be used for insertion.
- As small a catheter as possible, consistent with good drainage, should be used to minimize urethral trauma.
- Indwelling catheters should be properly secured after insertion to prevent movement and urethral traction.

Documentation for Catheter Insertion

- The following information must be documented in the patient's medical record after catheter insertion
  - Indication(s) for catheter insertion
  - Date and time of catheter insertion
  - Individual who inserted the catheter
- The date and time of removal of the catheter should also be documented in the patient's medical record.
- Include documentation in the nursing flow sheet, nursing notes or physician orders.
- Documentation should be accessible in the patient's medical record and recorded in a standard format for data collection and quality improvement purposes.

Daily Reminders to Physicians to Remove Catheters from Patients When No Longer Needed

- Each physician who has one or more patients with a Foley catheter will receive a daily prompt in EPIC for each patient as to whether the catheter should be removed. Each day a physician decides to leave the catheter in place, the physician must check off the indication on the drop down list in EPIC for the catheter to remain in place. If "other" is checked, the physician must enter a valid indication for the catheter to remain indwelling.
- The physician may also indicate that the catheter be removed and replaced with intermittent catheterization for a postoperative patient or the catheter be removed from a male patient followed by placement of a condom catheter.

Closed Sterile Drainage

- A sterile, continuously closed drainage system must be maintained.
- If breaks in aseptic technique, disconnection, or leakage occur, the collecting system should be replaced using aseptic technique after disinfecting the catheter-tubing junction.

Irrigation

- Irrigation should be avoided unless obstruction is anticipated due to bleeding after prostatic or bladder surgery.
- The catheter-tubing junction must be disinfected before disconnection.
- If the catheter becomes obstructed, it should be removed. If there is a continuing need for bladder catheterization, a new catheter should be inserted using the same aseptic technique described above. The newly inserted catheter must be connected to a new sterile closed drainage system.

Specimen Collection

- If small volumes of fresh urine are needed for examination, the sampling port should be cleansed with alcohol, and urine then aspirated with a sterile needle and syringe.
- Larger volumes of urine for special analyses should be obtained aseptically from the drainage bag.

Urinary Flow and Collection Bag

- Unobstructed flow should be maintained. (Occasionally, it is necessary to temporarily obstruct the catheter for specimen collection or other medical purposes).
- To achieve free flow of urine:
  1) the catheter and collection tubing should be kept from kinking;
  2) the collection bag should be emptied regularly using a separate collection container for each patient (the draining spigot and nonsterile collection container should never come in contact);
  3) poorly functioning or obstructed catheters should be replaced;
  4) **collection bags should always be kept below the level of the bladder but should never touch the floor.**

Perineal Care

- The perineum should be cleaned daily to reduce colonization of the perineal skin by bacteria. Do not clean the periurethral area with antiseptics to prevent CAUTI while the catheter is in place. Routine hygiene (e.g., cleaning of the meatal surface during daily bathing) is appropriate.

Catheter Change Interval

- Indwelling catheters should not be changed at arbitrary fixed intervals.

Performance Measures

- Both process and outcome measures will be reported to senior hospital leadership, nursing leadership and clinicians who care for patients at risk for catheter-associated urinary tract infections.

Process Measures

- Compliance with documentation of one of the indications in Appendix 1 for catheter placement.
  - Indwelling catheters may be placed only for one of the indications listed in Appendix 1. If “other” is checked, a valid indication for continued urinary catheter use must be filled in.
  - Documentation of the indication for catheter placement must be entered into the patient’s medical record (see above).
- Documentation of the catheter insertion and removal dates must be entered into the patient’s medical record.

Surveillance of Process Measures

- Surveillance of the correct indication for catheter insertion and its documentation in the patient’s medical record.
  - Numerator: number of patients with urinary catheters on the unit in which an indication was correctly selected from the drop down check off list and documented in the patient’s medical record.
  - Denominator: number of patients on the unit with a urinary catheter in place.
  - Multiply by 100 so that the measure is expressed as a percentage.
- Surveillance of documentation of catheter insertion and removal dates in the patient’s medical record.
  - Numerator: number of patients with urinary catheters on the unit with proper documentation of insertion and removal dates.
  - Denominator: number of patients on the unit with a urinary catheter in place.
  - Multiply by 100 so that the measure is expressed as a percentage.

Outcome Measures

- Rates of symptomatic CAUTI; stratified by risk factors (age, sex, ward, indication and catheter days).
  - Use new revised CDC definitions for CAUTI. (Appendix 3)
  - Calculation of rates
    - Numerator: number of symptomatic CAUTIs in each unit monitored.
    - Denominator: total number of urinary catheter-days for all patients in each unit monitored who have an indwelling urinary catheter.
    - Multiply by 1000 so that the measure is expressed as cases per 1,000 catheter-days.
- Rates of bacteremia attributable to CAUTI
  - Use National Healthcare Safety Network (NHSN) definitions of laboratory-confirmed bloodstream infection.
  - Calculation of rates
    - Numerator: Number of episodes of bloodstream infections attributable to CAUTI.
    - Denominator: total number of urinary catheter-days for all patients in each location monitored who have an indwelling urinary catheter.
    - Multiply by 1000 so that the measure is expressed as cases per 1000 catheter-days.

References

1. Lo E, Nicolle L, Classen D, et al. Strategies to prevent catheter-associated urinary tract infections in acute care hospitals. Infect Control Hosp Epidemiol 2008: 29 (Suppl 1):S41-S50.
2. Huang W-C, Wann S-R, Lins-L, et al. Catheter-associated urinary tract infections in intensive care units can be reduced by prompting physicians to remove unnecessary catheters. Infect Control Hosp Epidemiol 2004; 25:974-978.
3. Apisarnthanarak A, Thongphubeth K, Sirinvaravong S, et al. Effectiveness of multifaceted hospitalwide quality improvement programs featuring an intervention to remove unnecessary urinary catheters at a tertiary care center in Thailand. Infect Control Hosp Epidemiol 2007; 28:791-798.
4. Saint S, Kowalski CP, Forman J, et al. A multicenter qualitative study on preventing hospital-acquired urinary tract infection in U.S. hospitals. Infect Control Hosp Epidemiol 2008; 29:333-341.
5. Reilly L, Sullivan P, Ninni S, et al. Reducing Foley catheter device days in an intensive care unit. Using the evidence to change practice. AACN Adv Crit Care. 2006; 17:272-283.

APPENDIX 1*

ICU Foley Catheter Insertion Checklist

Name: _____

Date: _____ MR#: _____

ICU room no.: _____

Prior to entering an order for insertion of a Foley catheter, the physician must check one or more of the indications for catheter insertion below and sign the form.

_____ Multiple trauma

_____ Head injury

_____ Burn injury

_____ Spinal cord injury

_____ Bladder injury

_____ Urinary incontinence in patient with skin breakdown or nearby surgical site

_____ Acute urinary retention or obstruction

_____ Chemically paralyzed and sedated patients

_____ Hemodynamically unstable patient needing accurate input and output (I&O)

_____ Renal/urologic surgery

_____ Operative patients with urinary incontinence

_____ Need for intraoperative monitoring of urinary output

_____ 24-hour urine collection

_____ Other†_____

_____
Physician Signature

*Modified from reference 5
†Must be valid indication

APPENDIX 2

Daily Physician Reminder to Assess Need for Indwelling Urinary Catheter

Name: _____ Date: ____/____/_____

Room no._____

This patient has had an indwelling urethral catheter since **____/____/_____.**

Please indicate below **EITHER** (1) that the catheter should be **removed OR** (2) that the catheter should be **retained**. If the catheter should be retained, please check ALL of the reasons that apply.

- ○ Please discontinue indwelling urethral catheter; **OR**
- ○ Please continue indwelling urethral catheter because patient requires indwelling catheritization for the following reason(s) (please check **all** that apply):

_____ Multiple trauma

_____ Head injury

_____ Burn injury

_____ Spinal cord injury

_____ Bladder injury

_____ Urinary incontinence in patient with skin breakdown or nearby surgical site

_____ Acute urinary retention or obstruction

_____ Chemically-paralyzed and sedated patients

_____ Hemodynamically unstable patient needing accurate input and output (I&O)

_____ Renal/urologic surgery*

_____ Operative patients with urinary incontinence*

_____ Need for intraoperative monitoring of urinary output*

_____ 24-hour urine collection

_____ Other†_____

*Urinary catheters inserted for surgery should be removed ≤ 48 hours after surgery unless other indications, as above, require ongoing urinary catheterization.

†Must be valid indication.

APPENDIX 3

New CDC Definitions of Catheter-Associated Urinary Tract Infections

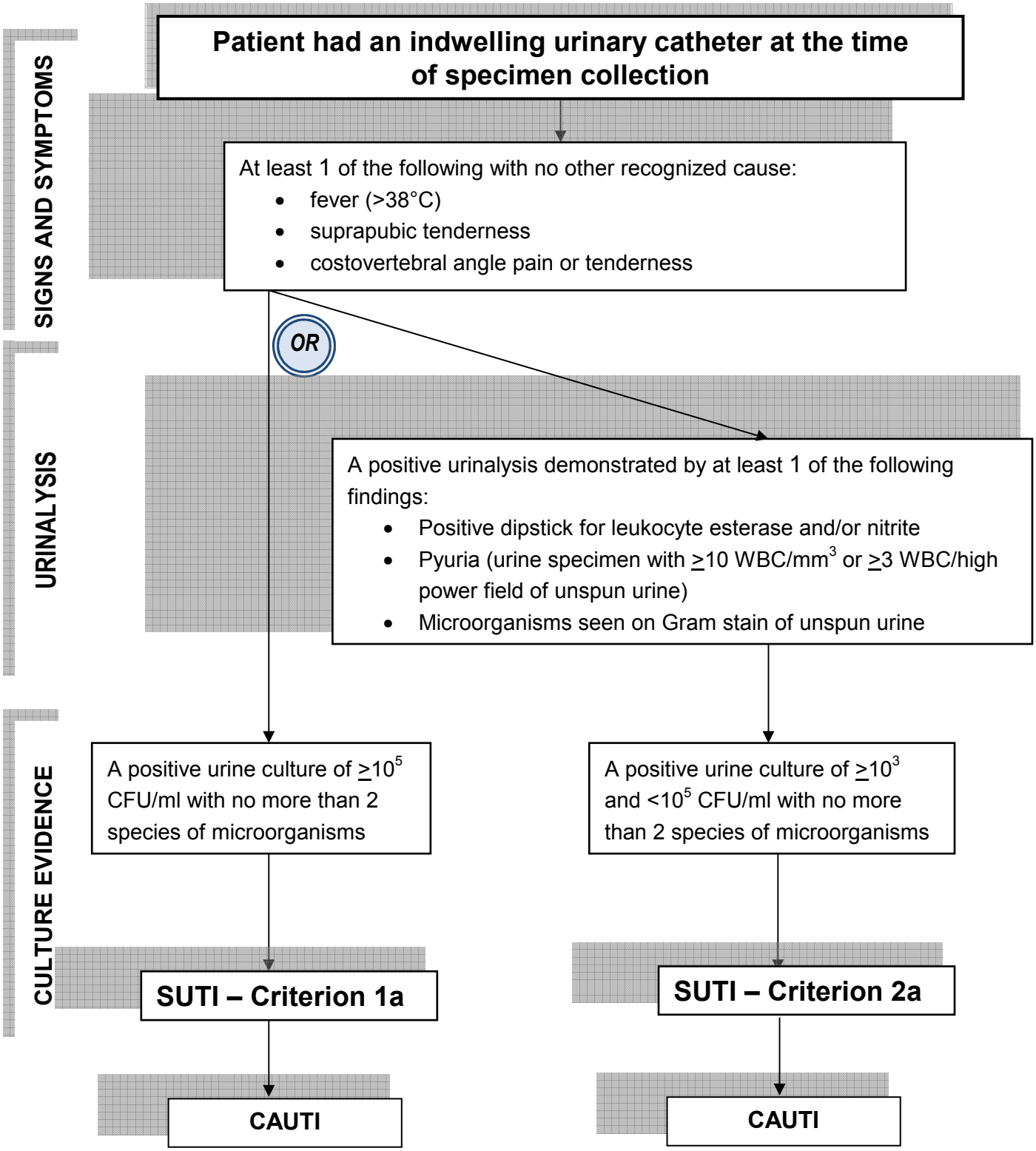
Criterion	**Symptomatic Urinary Tract Infection (SUTI)** Must meet at least 1 of the following criteria:
1a	Patient has an indwelling urinary catheter in place at the time of specimen collection *and* at least 1 of the following signs or symptoms **with no other recognized cause:** fever (>38°C), suprapubic tenderness, or costovertebral angle pain or tenderness *and* a positive urine culture of ≥10^5 colony-forming units (CFU)/ml with no more than 2 species of microorganisms. ----------OR---------- ---Patient had indwelling urinary catheter removed within the 48 hours prior to specimen collection *and* At least 1 of the following signs or symptoms with no other recognized cause: Fever (>38°C), urgency, frequency, dysuria, suprapubic tenderness, or costovertebral angle pain or tenderness *and* A positive urine culture of ≥10^5 colony-forming units (CFU)/ml with no more than 2 species of microorganisms.
1b	Patient does not have an indwelling urinary catheter in place *and* has at least 1 of the following signs or symptoms **with no other recognized cause**: fever (>38°C) in a patient that is ≤65 years of age (fever is not part of criteria for those >65 years of age), urgency, frequency, dysuria, suprapubic tenderness, or costovertebral angle pain or tenderness *and* a positive urine culture of ≥10^5 CFU/ml with no more than 2 species of microorganisms.

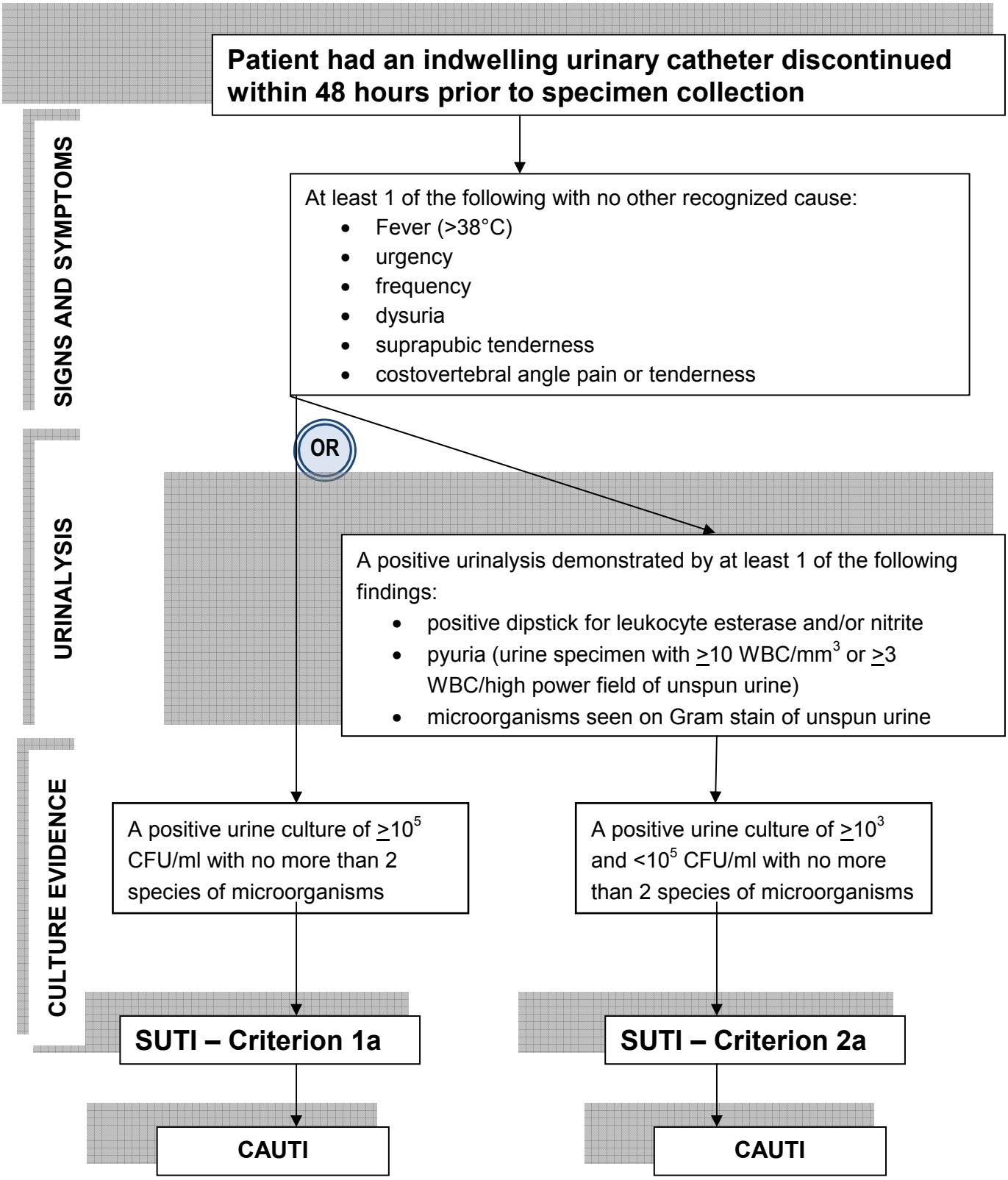
2a	Patient has an indwelling urinary catheter in place at time of specimen collection *and* has at least 1 of the following signs or symptoms **with no other recognized cause**: fever (>38°C), suprapubic tenderness, or costovertebral angle pain or tenderness *and* a positive urinalysis demonstrated by at least 1 of the following findings: a. positive dipstick for leukocyte esterase and/or nitrite b. pyuria (urine specimen with ≥10 white blood cells [WBC]/mm^3 or ≥3 WBC/high power field of unspun urine) c. microorganisms seen on Gram stain of unspun urine *and* a positive urine culture of $\geq 10^3$ and $<10^5$ CFU/ml with no more than 2 species of microorganisms. ----------OR---------- Patient had indwelling urinary catheter removed within the 48 hours prior to specimen collection *and* At least 1 of the following signs or symptoms with no other recognized cause: Fever (>38°C), urgency, frequency, dysuria, suprapubic tenderness, or costrovertebral angle pain or tenderness *and* A positive urinalysis demonstrated by at least 1 of the following findings: a) positive dipstick for leukocyte esterase and/or nitrite b) Pyuria (urine specimen with $\geq$ 10 white blood cells [WBC]/mm^3 or $\geq$3 WBC/high power field of unspun urine) c) Microorganisms seen on Gram stain of unspun urine *and* a positive urine culture of $\geq 10^3$ and $<10^5$ CFU/ml with no more than 2 species of microorganisms

2b	Patient does not have an indwelling urinary catheter in place *and* has at least 1 of the following signs or symptoms **with no other recognized cause**: fever (>38°C) in a patient that is ≤65 years of age (fever is not part of criteria for those >65 years of age), urgency, frequency, dysuria, suprapubic tenderness, or costovertebral angle pain or tenderness *and* a positive urinalysis demonstrated by at least 1 of the following findings: a. positive dipstick for leukocyte esterase and/or nitrite b. pyuria (urine specimen with ≥10 WBC/mm3 or ≥3 WBC/high power field of unspun urine) c. microorganisms seen on Gram stain of unspun urine *and* a positive urine culture of $\geq 10^3$ and $<10^5$ CFU/ml with no more than 2 species of microorganisms.
3	Patient ≤1 year of age (with or without an indwelling urinary catheter) has at least 1 of the following signs or symptoms **with no other recognized cause**: fever (>38°C core), hypothermia (<36°C core), apnea, bradycardia, dysuria, lethargy, or vomiting *and* a positive urine culture of $\geq 10^5$ CFU/ml with no more than 2 species of microorganisms.
4	Patient ≤1 year old (with or without an indwelling urinary catheter) has at least 1 of the following signs or symptoms **with no other recognized cause**: fever (>38°C core), hypothermia (<36°C core), apnea, bradycardia, dysuria, lethargy, or vomiting *and* a positive urinalysis demonstrated by at least one of the following findings: a. positive dipstick for leukocyte esterase and/or nitrite b. pyuria (urine specimen with ≥10 WBC/mm^3 or ≥3 WBC/high power field of unspun urine) c. microorganisms seen on Gram's stain of unspun urine *and* a positive urine culture of between $\geq 10^3$ and $<10^5$ CFU/ml with no more than two species of microorganisms.

Criterion	Asymptomatic Bacteremic Urinary Tract Infection (ABUTI)
	Patient with or without an indwelling urinary catheter has no signs or symptoms (i.e., for any age patient, no fever (>38°C), urgency, frequency, dysuria, suprapubic tenderness, or costovertebral angle pain or tenderness, or for a patient ≤1 year of age, no fever (>38°C core), hypothermia (<36°C core), apnea, bradycardia, dysuria, lethargy, or vomiting) *and* A positive urine culture of $\geq 10^5$ CFU/ml with no more than 2 species of uropathogen microorganisms* *and* A positive blood culture with at least 1 matching uropathogen microorganism to the urine culture. *Uropathogen microorganisms are: Gram-negative bacilli, *Staphylococcus* spp., yeasts, beta-hemolytic *Streptococcus* spp., *Enterococcus* spp., G. *vaginalis*, *Aerococcus urinae*, and *Corynebacterium* (urease positive).
Comments	• Urinary catheter tips should not be cultured and are not acceptable for the diagnosis of a urinary tract infection. • Urine cultures must be obtained using appropriate technique, such as clean catch collection or catheterization. Specimens from indwelling catheters should be aspirated through the disinfected sampling ports. • In infants, urine cultures should be obtained by bladder catheterization or suprapubic aspiration; positive urine cultures from bag specimens are unreliable and should be confirmed by specimens aseptically obtained by catheterization or suprapubicaspiration. • Urine specimens for culture should be processed as soon as possible, preferably within 1 to 2 hours. If urine specimens cannot be processed within 30 minutes of collection, they should be refrigerated, or inoculated into primary isolation medium before transport, or transported in an appropriate urine preservative. Refrigerated specimens should be cultured within 24 hours. • Urine specimen labels should indicate whether or not the patient is symptomatic. • Report secondary bloodstream infection = “yes” for all cases of Asymptomatic Bacteremic Urinary Tract Infection (ABUTI). • Report *Corynebacterium* (urease positive) as either *Corynebacterium species unspecified* (COS) or, as *C. urealyticum (CORUR) if so speciated*.

Criterion	**Other Urinary Tract Infection (OUTI) (kidney, ureter, bladder, urethra, or tissue surrounding the retroperineal or perinephric space)** Other infections of the urinary tract must meet at least 1 of the following criteria:
1	Patient has microorganisms isolated from culture of fluid (other than urine) or tissue from affected site.
2	Patient has an abscess or other evidence of infection seen on direct examination, during a surgical operation, or during a histopathologic examination.
3	Patient has at least 2 of the following signs or symptoms with no other recognized cause: fever (>38°C), localized pain, or localized tenderness at the involved site *and* at least 1 of the following: a. purulent drainage from affected site microorganisms cultured from blood that are compatible with suspected site of infection b. radiographic evidence of infection (e.g., abnormal ultrasound, CT scan, magnetic resonance imaging [MRI], or radiolabel scan [gallium, technetium]).
4	Patient ≤ 1 year of age has at least 1 of the following signs or symptoms with no other recognized cause: fever (>38°C core), hypothermia (<36°C core), apnea, bradycardia, lethargy, or vomiting *and* at least 1 of the following: a. purulent drainage from affected site b. microorganisms cultured from blood that are compatible with suspected site of infection c. radiographic evidence of infection, (e.g., abnormal ultrasound, CT scan, magnetic resonance imaging [MRI], or radiolabel scan [gallium, technetium]).
Comments	• Report infections following circumcision in newborns as SST-CIRC.


SIGNS AND SYMPTOMS
Patient had an indwelling urinary catheter at the time of specimen collection
At least 1 of the following with no other recognized cause:
• fever (>38°C)
• suprapubic tenderness
• costovertebral angle pain or tenderness
OR
URINALYSIS
A positive urinalysis demonstrated by at least 1 of the following findings:
• Positive dipstick for leukocyte esterase and/or nitrite
• Pyuria (urine specimen with ≥10 WBC/mm3 or ≥3 WBC/high power field of unspun urine)
• Microorganisms seen on Gram stain of unspun urine
CULTURE EVIDENCE
A positive urine culture of ≥10^5 CFU/ml with no more than 2 species of microorganisms
A positive urine culture of ≥10^3 and <10^5 CFU/ml with no more than 2 species of microorganisms
SUTI – Criterion 1a
SUTI – Criterion 2a
CAUTI
CAUTI


Patient had an indwelling urinary catheter discontinued within 48 hours prior to specimen collection
SIGNS AND SYMPTOMS
At least 1 of the following with no other recognized cause:
• Fever (>38°C)
• urgency
• frequency
• dysuria
• suprapubic tenderness
• costovertebral angle pain or tenderness
OR
URINALYSIS
A positive urinalysis demonstrated by at least 1 of the following findings:
• positive dipstick for leukocyte esterase and/or nitrite
• pyuria (urine specimen with ≥10 WBC/mm3 or ≥3 WBC/high power field of unspun urine)
• microorganisms seen on Gram stain of unspun urine
CULTURE EVIDENCE
A positive urine culture of ≥10^5 CFU/ml with no more than 2 species of microorganisms
A positive urine culture of ≥10^3 and <10^5 CFU/ml with no more than 2 species of microorganisms
SUTI – Criterion 1a
SUTI – Criterion 2a
CAUTI
CAUTI

Patient did not have an indwelling urinary catheter at the time of specimen collection nor within 48 hours prior to specimen collection

SIGNS AND SYMPTOMS

At least 1 of the following with no other recognized cause:

- fever (>38°C) in a patient ≤65 years of age (fever is not part of criteria for those >65 years of age
- urgency
- frequency
- dysuria
- suprapubic tenderness
- costovertebral angle pain or tenderness

OR

URINALYSIS

A positive urinalysis demonstrated by at least 1 of the following findings:

- positive dipstick for leukocyte esterase and/or nitrite
- pyuria (urine specimen with ≥10 WBC/mm^3 or ≥3 WBC/high power field of unspun urine)
- microorganisms seen on Gram stain of unspun urine

CULTURE EVIDENCE

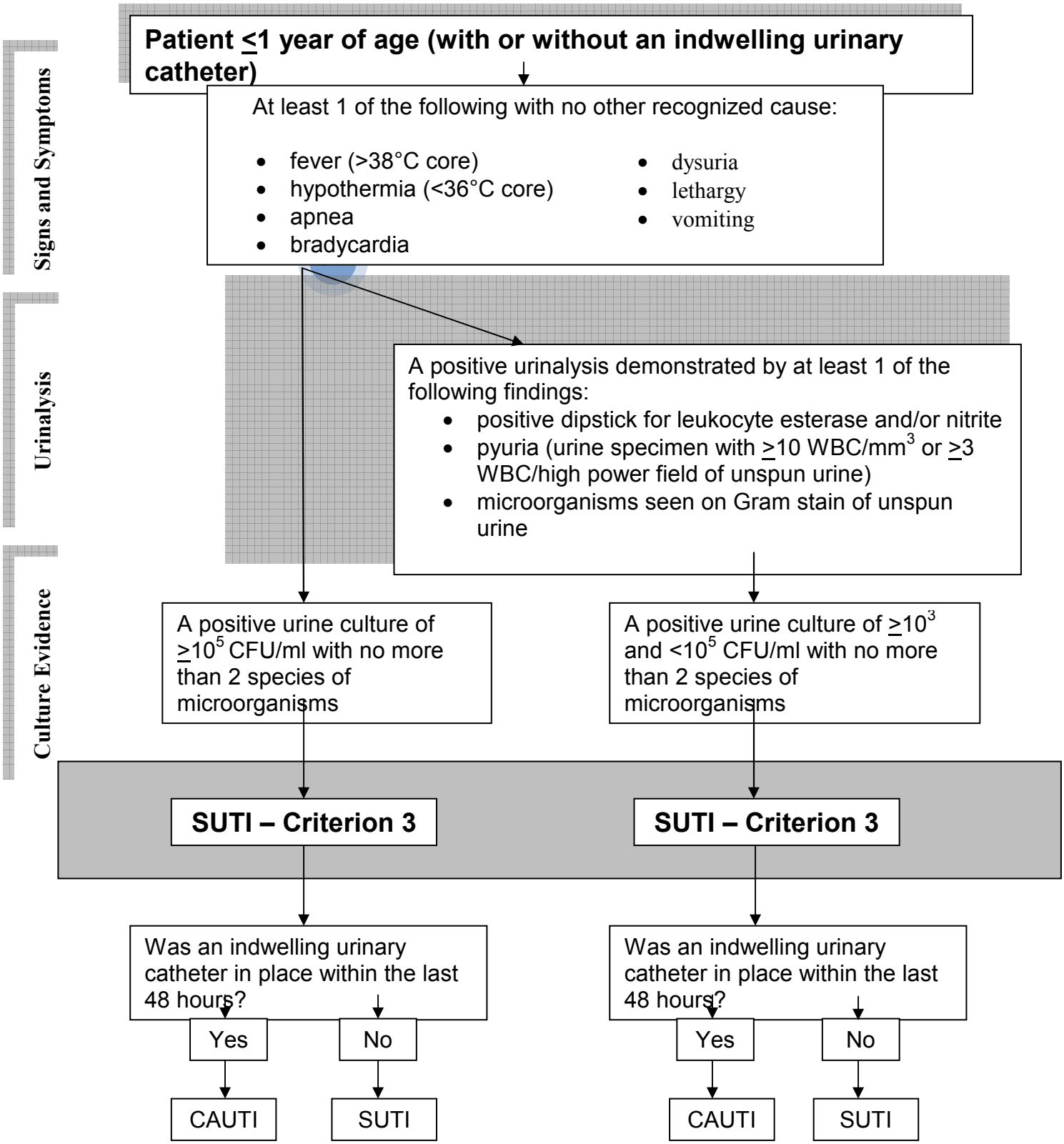
A positive urine culture of ≥10^5 CFU/ml with no more than 2 species of microorganisms

SUTI – Criterion 1b

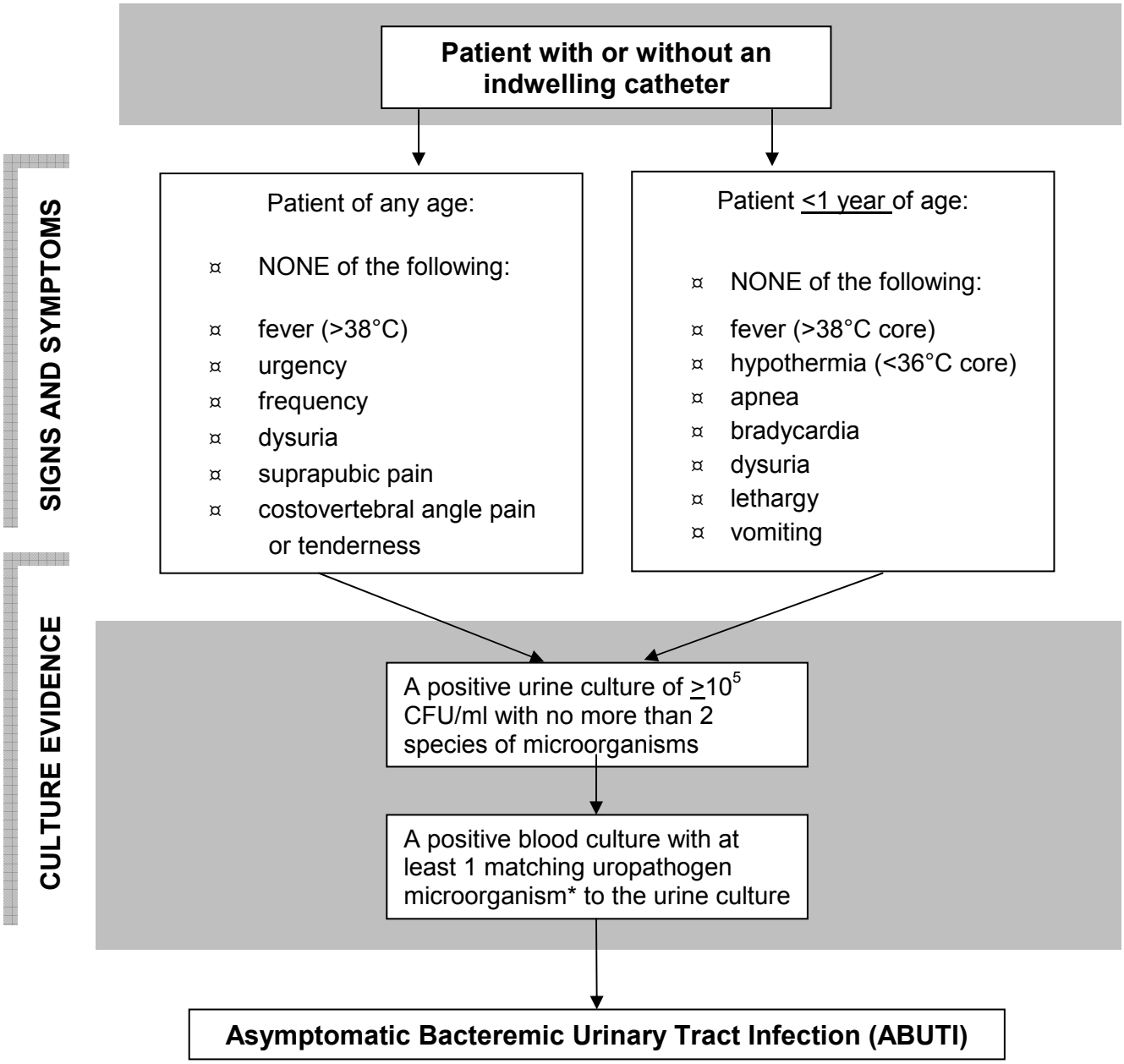
A positive urine culture of ≥10^3 and <10^5 CFU/ml with no more than 2 species of microorganisms

SUTI – Criterion 2b

Identification and Categorization of SUTI in Patient <1 Year of Age



Identification of Asymptomatic Bacteremic Urinary Tract Infection (ABUTI)



*Uropathogen microorganisms are: Gram-negative bacilli, *Staphylococcus* spp., yeasts, beta-hemolytic *Streptococcus* spp., *Enterococcus* spp., *G. vaginalis*, *Aerococcus urinae*, *Corynebacterium* (urease positive)[†]

[†]Report *Corynebacterium* (urease positive) as either *Corynebacterium species unspecified* (COS) or, as *C. urealyticum (CORUR) if so speciated*.

Comments

- Urinary catheter tips should not be cultured and are not acceptable for the diagnosis of a urinary tract infection.

- Urine cultures must be obtained using appropriate technique, such as clean catch collection or catheterization. Specimens from indwelling catheters should be aspirated through the disinfected sampling ports.

- In infants, urine cultures should be obtained by bladder catheterization or suprapubic aspiration; positive urine cultures from bag specimens are unreliable and should be confirmed by specimens aseptically obtained by catheterization or suprapubic aspiration.

- Urine specimens for culture should be processed as soon as possible, preferably within 1 to 2 hours. If urine specimens cannot be processed within 30 minutes of collection, they should be refrigerated or inoculated into primary isolation medium before transport, or transported in an appropriate urine preservative. Refrigerated specimens should be cultured within 24 hours.

- Urine specimen labels should indicate whether or not the patient is symptomatic.