Guideline for Preventing Catheter-Associated Urinary Tract Infections

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Outline

- Progress since 6/08 meeting
- In-depth guideline review
  - Layout
  - Executive summary
  - Categorization scheme
  - Organization of recommendations in summary
  - Recommendations
  - Indications table
  - Priority recommendations
  - Performance measures
  - Organization of appendices
- Review proposed updates to NHSN definitions of CAUTI
- Final questions and answers

Review of Key Questions

Q1. Who should receive urinary catheters?

A. Is urinary catheterization necessary?
B. What are the risk factors for CAUTI?
C. What populations are at highest risk of mortality from catheters?

Q2. For those who may require urinary catheters, what are the best practices?

A. What are the risks and benefits associated with different approaches to catheterization?

B. What are the risks and benefits associated with different catheters or collecting systems?

C. What are the risks and benefits associated with different catheter management techniques?

D. What are the risks and benefits associated with different systems interventions?

Q3. What are the best practices for preventing UTI associated with obstructed urinary catheters?

Progress since June 2008

- Completed evidence summaries, GRADE tables, and recommendations for Key Question 2C, 2D, and 3
- Performed multiple meta-analyses for silver alloy catheters
- Drafted and revised executive summary, background, scope and purpose, and methods
- Drafted and revised summary of recommendations, including sections on implementation and audit and further research
- Revisions based on internal and external reviews and CDC editors

Internal and External Review

- Russell Olmsted, St. Joseph Mercy Health System, HICPAC Member
- Yvette McCarter, University of Florida Health Science Center, HICPAC Member
- Barbara Soule, Joint Commission Resources, HICPAC Member
- Edward Wong, McGuire VAMC, Richmond, VA
- Walter Stamm, University of Washington, Seattle, WA
- Lindsay Nicolle, University of Manitoba, Winnepeg, MB
- Anthony Schaeffer, Northwestern University, Chicago, IL
- Harriett Pitt, Long Beach Memorial Medical Center, Long Beach, CA
- Nalini Singh, Children's National Medical Center, Washington, DC

In-depth guideline review

- Layout
- Executive summary
- Categorization scheme

Previous recommendation scheme

TABLE 1. Healthcare Infection Control Practices Advisory Committee categorization scheme for recommendations*	
Category IA	Strongly recommended for implementation and supported by well-designed experimental, clinical, or epidemiologic studies.
Category IB	Strongly recommended for implementation and supported by certain experimental, clinical, or epidemiologic studies and a strong theoretic rationale.
Category IC	Required for implementation, as mandated by federal or state regulation or standard.
Category II	Suggested for implementation and supported by suggestive clinical or epidemiologic studies or a theoretic rationale.
No recommendation	Unresolved issue; practices for which insufficient evidence or no consensus regarding efficacy exist.

*Categorized on the basis of existing scientific data, theoretic rationale, applicability, and economic impact

Current recommendation scheme

TABLE 1. Healthcare Infection Control Practices Advisory Committee Categorization Scheme for Recommendations	
Category IA	Strongly recommended for implementation and supported by well-designed experimental, clinical, or epidemiologic studies.
Category IB	Strongly recommended for implementation and supported by certain experimental, clinical, or epidemiologic studies and a strong theoretic rationale.
Category IC	Required by state or federal regulation, or representing an established association standard.
Category II	Suggested for implementation and supported by suggestive clinical or epidemiologic studies or a theoretic rationale.
No recommendation	Unresolved issue; practices for which insufficient evidence or no consensus regarding efficacy exist.

Wording of recommendations

- Strong recommendations (Category I):
  - Condom catheter drainage is preferable to indwelling urethral catheters in cooperative male patients without retention or obstruction

VS.

  - Use condom catheters rather than indwelling urethral catheters in cooperative male patients without retention or obstruction

Wording of recommendations (cont)

- **Weak recommendations (Category II):**
  - **Use clean intermittent catheterization in children with myelomeningocele and neurogenic bladder to reduce the risk of urinary tract deterioration**

    VS.
  - **Consider clean intermittent catheterization in children with myelomeningocele and neurogenic bladder to reduce the risk of urinary tract deterioration**

Consistency in wording

- Strong terms
  - use
  - do not use
  - do
  - do not
  - should
  - should not
  - must
  - We recommend for
  - We recommend against
- Weak terms
  - consider
  - may consider
  - may be used
  - could be used
  - We suggest

Preliminary Recommendations

Organization of Recommendations

I. Appropriate urinary catheter use
II. Proper techniques for urinary catheter insertion
III. Proper techniques for urinary catheter maintenance
IV. Systems interventions
V. Administrative infrastructure
VI. Surveillance

I. Appropriate urinary catheter use

A. Insert catheters only for appropriate indications and leave in place only as long as needed.

(**Category IA**) (Key Questions 1B and 2C)

- Do not use catheters in patients and nursing home residents for management of incontinence. (**Category IB**) (Key Question 1A)
- Use catheters in operative patients only as necessary, rather than routinely. (**Category IB**) (Key Question 1A)
- For operative patients who have an indication for an indwelling catheter, remove the catheter as soon as possible, preferably within 24 hours, unless there are appropriate indications for continued use. (**Category IB**) (Key Questions 2A and 2C)

Table. Appropriate indications for indwelling urethral catheter use
Acute urinary retention or obstruction
Need for accurate measurements of urinary output in critically ill patients
Perioperative use for selected surgical procedures: – Patients undergoing surgeries of the GU tract – Anticipated prolonged duration of surgery – Patients anticipated to receive large-volume infusions or diuretics during surgery – Operative patients with urinary incontinence – Need for intraoperative hemodynamic monitoring
To assist in healing of open sacral or perineal wounds in incontinent patients
Patients who require prolonged immobilization (e.g. uncleared thoracic or lumbar spine)
To improve comfort for end of life care if needed
Indwelling catheters should not be used: – As a substitute for nursing care in those with incontinence – As a means of obtaining urine for culture or other diagnostics when the patient can voluntarily void – Prolonged post-operative use without appropriate indications

I. Appropriate catheter use (cont)

B. Use alternatives to indwelling urethral catheters in selected patients when appropriate. (**Category II**)

- Condom catheter drainage is preferable to indwelling urethral catheters in cooperative male patients without retention or bladder outlet obstruction. (**Category IB**) (Key Question 2A)
- Intermittent catheterization is preferable to indwelling urethral or suprapubic catheters in those with bladder emptying dysfunction. (**Category II**) (Key Question 2A)
- An ultrasound to assess urine volume may be used for those undergoing intermittent catheterization to reduce unnecessary catheter insertions. (**Category II**) (Key Question 2C)
- Clean technique for intermittent catheterization is an acceptable alternative to sterile technique for those requiring chronic intermittent catheterization. (**Category IB**) (Key Question 2A)
- In the acute setting, use sterile technique and equipment for intermittent catheterization. (**Category II**)

II. Proper techniques for urinary catheter insertion

A. Perform hand hygiene immediately before and after insertion or any manipulation of the catheter or site. (**Category IB**) (Key Question 2D)

B. Ensure that only properly trained persons who know the correct technique of aseptic catheter insertion and maintenance are given this responsibility. (**Category IC**) (Key Question 1B)

C. Insert catheters using aseptic technique and sterile equipment. (**Category IC**)

D. Properly secure indwelling catheters after insertion to prevent movement and urethral traction. (**Category IC**)

E. Use the smallest bore catheter possible to minimize urethral trauma. (**Category II**)

III. Proper techniques for urinary catheter maintenance

A. Maintain a sterile, continuously closed drainage system. (**Category IB**) (Key Question 1B and 2B)

B. Do not disconnect the catheter and drainage system unless the catheter must be irrigated. (**Category IB**) (Key Question 1B)

C. Maintain unobstructed urine flow. (**Category IB**) (Key Questions 1B and 2D)

D. Do not use complex urinary drainage systems as a routine infection prevention measure. (**Category II**) (Key Question 2B)

E. Do not change indwelling catheters or bags at arbitrary fixed intervals. (**Category IB**) (Key Question 2C)

F. Do not use systemic antimicrobials routinely as prophylaxis for UTI in patients requiring either short or long-term catheterization. (**Category IB**) (Key Question 2C)

III. Proper techniques for urinary catheter maintenance (cont)

G. Do not clean the periurethral area with antiseptics as a routine infection prevention measure while the catheter is in place. Routine hygiene is appropriate. (**Category IB**) (Key Question 2C)

H. Avoid bladder irrigation unless obstruction is anticipated. (**Category II**) (Key Question 2C)

I. Do not irrigate the bladder with antimicrobials as a routine infection prevention measure. (**Category II**) (Key Question 2C)

J. Do not instill antiseptic solutions into urinary drainage bags as a routine infection prevention measure. (**Category II**) (Key Question 2C)

K. Clamping indwelling catheters prior to removal is unnecessary. (**Category II**) (Key Question 2C)

III. Proper techniques for urinary catheter maintenance (cont)

Catheter materials

L. Silver alloy-coated catheters should not be used routinely to prevent CAUTI; however, such catheters may be beneficial over standard latex catheters for short-term use in populations that have high rates of CAUTI despite comprehensive evidence-based infection control strategies. **(Category II)** (Key Question 2B)

M. Do not use antibiotic-coated catheters routinely to prevent CAUTI. **(Category II)** (Key Question 2B)

N. Hydrophilic catheters may be preferable to standard catheters for patients requiring intermittent catheterization. **(Category II)** (Key Question 2B)

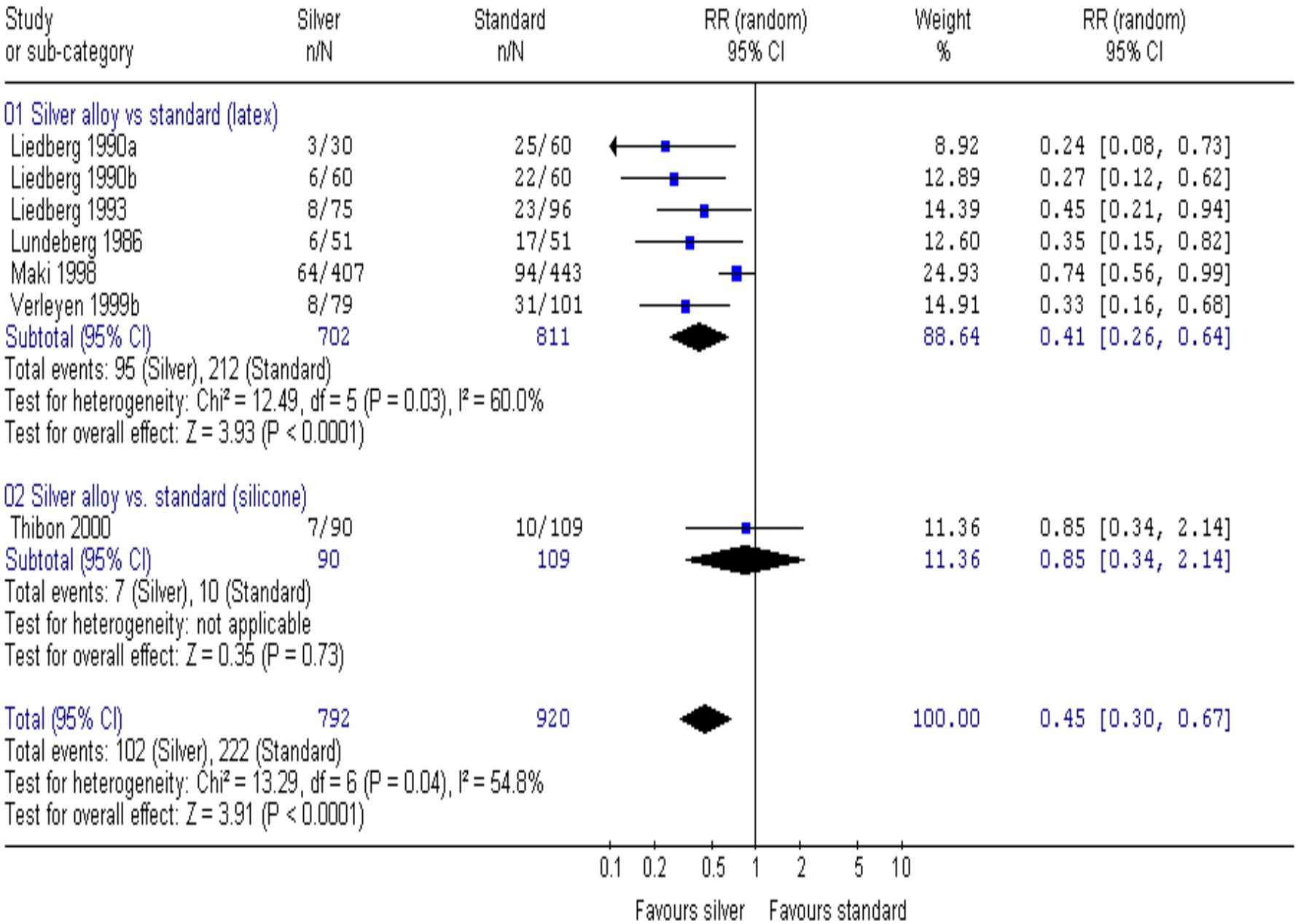
O. Silicone may be preferable to other materials to reduce the risk of encrustation in long-term catheterized patients who have frequent obstruction. **(Category II)** (Key Question 3)

Summary of Silver Alloy Meta-Analyses

Comparison	Relative Risk (95% CI)			
	Analysis 1	Analysis 2	Analysis 3	Analysis 4
Number with Asymptomatic Bacteriuria (<1 Week)				
Latex Control	0.33 (0.23-0.48)	0.33 (0.23-0.48)*	0.41 (0.26-0.64)*	0.30 (0.20-0.46)
Silicone Control	0.85 (0.34-2.14)	0.75 (0.57-0.99)*	0.85 (0.34-2.14)	0.85 (0.34-2.14)
Pre-1995	0.33 (0.21-0.51)	0.33 (0.21-0.51)	0.33 (0.21-0.51)	0.29 (0.17-0.49)
Post-1995	0.50 (0.20-1.27)*	0.61 (0.36-1.03)*	0.61 (0.36-1.03)*	0.50 (0.20-1.27)*
Overall	0.37 (0.26-0.52)	0.45 (0.30-0.67)*	0.45 (0.30-0.67)*	0.36 (0.24-0.52)
Number with Asymptomatic Bacteriuria (> 1 Week)				
Latex Control	0.60 (0.47-0.76)	0.60 (0.47-0.76)	0.60 (0.47-0.76)	0.60 (0.43-0.84)
Silicone Control	0.88 (0.50-1.55)	0.88 (0.50-1.55)	0.88 (0.50-1.55)	0.88 (0.50-1.55)
Pre-1995	0.59 (0.42-0.85)	0.59 (0.42-0.85)	0.59 (0.42-0.85)	No studies
Post-1995	0.67 (0.50-0.90)	0.67 (0.50-0.90)	0.67 (0.50-0.90)	0.67 (0.50-0.90)
Overall	0.64 (0.51-0.80)	0.64 (0.51-0.80)	0.64 (0.51-0.80)	0.67 (0.50-0.90)

Analysis 1 - all studies in Schumm without studies of silicone coated latex
Analysis 2 - all studies in Schumm including Maki under "Silicone catheters“ and abstracts
Analysis 3 - all studies in Schumm including Maki under "Latex catheters“ and abstracts
Analysis 4 - all studies in Schumm excluding abstracts

Review: Guideline for Prevention of Catheter-associated Urinary Tract Infections
Comparison: 01 Silver alloy vs standard (stratified by type of control catheter)
Outcome: 01 Number with asymptomatic bacteriuria (<1 week)



III. Proper techniques for urinary catheter maintenance (cont)

Management of obstruction

P. To relieve obstruction due to clots, mucus, or other causes, an intermittent method of irrigation may be used. **(Category II)**

Q. If obstruction is not responding to frequent irrigation, and it is likely that the catheter material is contributing to the obstruction, the catheter should be changed **(Category II)** (Key Question 3)

Specimen Collection

R. Obtain urine samples aseptically. **(Category IC)**

Spatial Separation of Catheterized Patients

S. To minimize the chances of cross-infection, avoid placing infected and uninfected patients with indwelling catheters in the same room or adjacent beds. **(Category II)** (Key Question 2D)

IV. Systems interventions

A. Implement quality improvement (QI) programs to enhance appropriate use of catheters and to reduce the risk of CAUTI. (**Category II**) (Key Question 2D)

The purposes of QI programs should be:

- to assure appropriate utilization of catheters
- to identify and remove unnecessary catheters
- to ensure hand hygiene and proper catheter care

Examples of effective programs:

- Alerts (**Category II**) (Key Question 2D)
- Guidelines and protocols for nurse-directed removal of unnecessary catheters (**Category II**) (Key Question 2D)
- Education and performance feedback (**Category II**) (Key Question 2D)
- Guidelines and algorithms for peri-op catheter management (**Category II**) (Key Question 2D)
  - Procedure-specific guidelines for catheter placement and post-op removal
  - Protocols for management of post-op urinary retention

V. Administrative infrastructure

A. Provision of guidelines
   - Provide and implement evidence-based guidelines that address catheter use, insertion, and maintenance. (**Category II**)

B. Education and Training
   - Ensure that healthcare personnel and others who take care of catheters are given periodic in-service training. (**Category IC**)
   - When feasible, provide feedback to these personnel. (**Category II**)

C. Supplies
   - Ensure that supplies necessary for aseptic technique are available. (**Category IC**)

D. System of documentation
   - Implement a system for documenting in the patient record: indications for catheter insertion, date and time of insertion, inserter, and date and time of removal. (**Category II**)

E. Surveillance resources
   - Ensure that there are sufficient trained personnel and technology to support surveillance for catheter use and outcomes. (**Category II**)

VI. Surveillance

- Use standard methods for CAUTI surveillance. (**Category II**)
  - Identify the patient groups or units on which to conduct surveillance based on frequency of catheter use and risk of CAUTI.
  - The following CDC/NHSN metrics should be used:
    - Number of *symptomatic* CAUTI per 1000 catheter-days
    - Number of bloodstream infections secondary to CAUTI per 1000 catheter-days
    - Catheter utilization ratio

- Do not screen for asymptomatic bacteriuria in catheterized patients as a routine infection prevention measure. (**Category II**) (Key Question 2D)

- When performing surveillance for CAUTI, provide regular feedback of unit-specific rates to appropriate staff. (**Category II**) (Key Question 2D)

Priority Recommendations

1. Appropriate Urinary Catheter Use
   - Insert catheters only for appropriate indications, and leave in place only as long as needed. (**Category IA**)
   - Do not use catheters in patients and nursing home residents for management of incontinence. (**Category IB**)
   - For operative patients who have an indication for an indwelling catheter, remove the catheter as soon as possible, preferably within 24 hours, unless there are appropriate indications for continued use. (**Category IB**)

2. Aseptic Insertion of Urinary Catheters
   - Ensure that only properly trained persons who know the correct technique of aseptic catheter insertion and maintenance are given this responsibility. (**Category IC**)
   - Insert catheters using aseptic technique and sterile equipment. (**Category IC**)

3. Proper Urinary Catheter Maintenance
   - Maintain a sterile, continuously closed drainage system. (**Category IB**)

Performance Measures

Internal Reporting

Process measures

A. Compliance with educational program
B. Compliance with documentation of catheter insertion and removal dates
C. Compliance with documentation of indication for catheter placement

Internal Reporting (cont)

Outcome measures

A. Rates of catheter-associated *symptomatic* UTI
B. Rates of bloodstream infections secondary to CAUTI

External Reporting

A. State requirements
   - Collect and report required data
   - In some cases, reporting may also be required for certification or accreditation

B. External quality initiatives
   - Hospitals that participate in external quality initiatives, such as Premier or IHI, must collect and report required data

In-depth guideline review

- Organization of appendices
  - Search strategies
  - Summary of primary literature
    - Explicit links to the recommendations
    - Organized by 3 key questions
      - Evidence table
      - Grade table
      - Quality assessment table

Proposed updates to NHSN CAUTI definitions

CAUTI Infection Data

- CAUTI can be:
  - Symptomatic UTI (SUTI)
  - Asymptomatic Bacteriuria (ASB)

Symptomatic UTI

Patient has at least one of the following signs or symptoms with no other recognized cause: fever, urgency, frequency, dysuria, or suprapubic tenderness

AND

Patient has a positive urine culture, that is ≥10^5 colonies/ml with no more than 2 species of microorganisms

OR

Patient has at least two of the following signs or symptoms with no other recognized cause: fever, urgency, frequency, dysuria, or suprapubic tenderness

AND

At least one of the following:

a. Positive dipstick for leukocyte esterase and/or nitrate
b. Pyuria (urine specimen with ≥10 wbc/mm^3 or ≥3 wbc/high power field of unspun urine)
c. Organisms seen on Gram stain of unspun urine
d. At least two urine cultures with repeated isolation of the same uropathogen with ≥10^2 colonies/ml in nonvoided specimens
e. ≥10^5 colonies/ml of a single uropathogen in a patient being treated with an effective antimicrobial agent for a UTI
f. Physician diagnosis of a UTI
g. Physician institutes appropriate therapy for a UTI

Symptomatic UTI - Proposal

Patient has at least one of the following signs or symptoms with no other recognized cause: fever, urgency, frequency, dysuria, or suprapubic tenderness

AND

Patient has a positive urine culture, that is ≥10^5 colonies/ml with no more than 2 species of microorganisms

OR

Patient has at least one of the following signs or symptoms with no other recognized cause: fever, urgency, frequency, dysuria, or suprapubic tenderness

AND

Positive urinalysis demonstrated by at least one of the following:

- **positive dipstick for leukocyte esterase and/or nitrate**
- **pyuria (urine specimen with ≥10 white blood cells[WBC]/mm3 or ≥3 WBC/high power field of unspun urine)**
- **organisms seen on Gram stain of unspun urine**

AND

Positive urine culture of between ≥ 10^2 and < 10^5 colonies/ml with no more than 2 species of microorganisms

Asymptomatic Bacteriuria (ASB)*

Patient has had an indwelling urinary catheter within 7 days before the culture

AND

Patient has a positive urine culture, that is ≥10^5 colonies/ml with no more than 2 species of microorganisms

AND

Patient has no fever, urgency, frequency, dysuria, or suprapubic tenderness

* Proposal is to eliminate ASB criteria