

Developing an Antimicrobial Stewardship around Asymptomatic Bacteriuria

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The Scapegoat by William Holman Hunt (1827-1910)



Urine in a catheterized patient is the scapegoat for myriad symptoms.

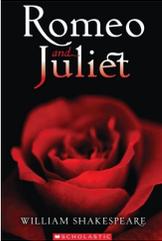
Workshop outline

- ~ Overview of asymptomatic bacteriuria (ASB) and UTI
- ~ Review cases submitted by participants
- ~ Group activity: developing an antimicrobial stewardship program
 - . Chartering the project (2 teams)
 - . Data, measurement, and reporting (2 teams)
- ~ Report out from group activities

Nomenclature

What's in a name? That which we call a rose by any other name would smell as sweet

William Shakespeare, *Romeo and Juliet*, Act II



Multiple definitions of CAUTI, UTI, and ASB exist

Different purposes, different audiences
Impact antimicrobial stewardship programs

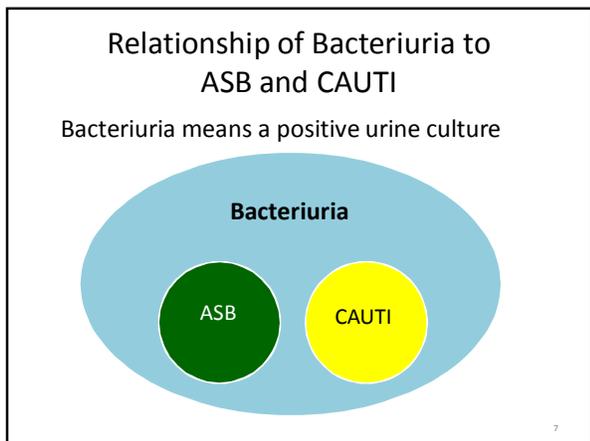
What is a scapegoat?

- ~ 1. A person or group made to bear the blame for others or to suffer in their place.
- ~ 2. Chiefly Biblical: a goat let loose in the wilderness on Yom Kippur after the high priest symbolically laid the sins of the people on its head. Lev. 16:8,10,26
- ~ 3. Urine in a catheterized inpatient
 - . Easy to collect
 - . Nearly always "dirty" in long-term catheter use

Definitions of CAUTI

Definition Source	Use	Advantages	Limitations
National Healthcare Safety Network (NHSN)	CAUTI surveillance for reporting and metrics	Objective criteria	Does not correlate with clinical CAUTI or clinician practice
Clinical Practice Guideline: Infectious Diseases Society of America (IDSA)	Define CAUTI for clinical diagnostic purposes	Diagnosis by exclusion minimizes overdiagnosis	Not easy for a clinician to apply to a specific patient
Claims-based (ICD-9-CM)	Used for billing	Identified by diagnosis codes	Low sensitivity to capture clinical CAUTIs
Clinician Diagnosis	Decide whether to treat and explain clinical symptoms	Based on clinician evaluation	Subjective, non-standardized, potential for inappropriate antimicrobial use

Fakih et al, *Infection Control Hosp Epidemiology* 2015



IDSA Guidelines for Asymptomatic Bacteriuria

Screening and treatment of bacteriuria recommended for:

1. Pregnancy
2. Before transurethral resection of the prostate
3. Urologic procedures for which mucosal bleeding is anticipated

IDSA Guidelines, Nicolle et al, Clin Infect Dis 2005
http://www.idsociety.org/Organ_System/

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Bacteriuria and Antimicrobial Use

“ So we have a positive urine culture: When should we use antibiotics?

“ Asymptomatic bacteriuria is a clinical definition

- . No tests to guide you
- . Even worse, the test results can mislead you
 - “ Pyuria, positive urine cultures

Trautner and Grigoryan, ID Clinics North America 2014

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IDSA Guidelines for Asymptomatic Bacteriuria

Screening and treatment of **asymptomatic** bacteriuria not recommended for:

1. Non-pregnant women
2. Diabetic women
3. Elderly in the community or institutionalized
4. Persons with spinal cord injury
5. Patients with indwelling catheter

IDSA Guidelines, Nicolle et al, Clin Infect Dis 2005
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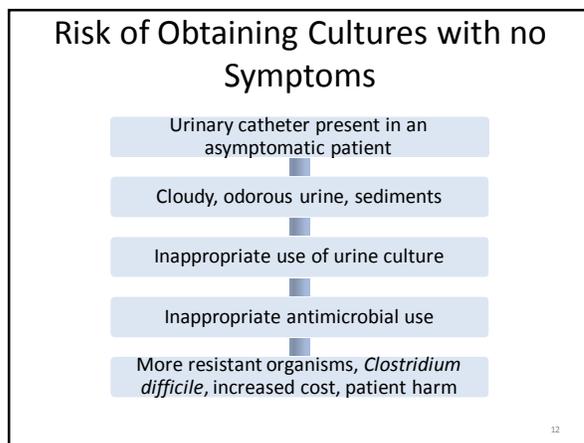
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Table 2. Prevalence of asymptomatic bacteriuria in selected populations.

Population	Prevalence, %	Reference
Healthy, premenopausal women	1.0–5.0	[31]
Pregnant women	1.9–9.5	[31]
Postmenopausal women aged 50–70 years	2.8–8.6	[31]
Diabetic patients		
Women	9.0–27	[32]
Men	0.7–11	[32]
Elderly persons in the community ^a		
Women	10.8–16	[31]
Men	3.6–19	[31]
Elderly persons in a long-term care facility		
Women	25–50	[27]
Men	15–40	[27]
Patients with spinal cord injuries		
Intermittent catheter use	23–89	[33]
Sphincterotomy and condom catheter in place	57	[34]
Patients undergoing hemodialysis	28	[28]
Patients with indwelling catheter use		
Short-term	9–23	[35]
Long-term	100	[22]

^a Age, ≥70 years. Nicolle et al, Clin Infect Dis 2005; 40:643. 54

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What are the TRUE signs and symptoms of CAUTI?

<ul style="list-style-type: none"> ~ Fever ~ Rigors ~ Malaise/lethargy ~ Flank pain or CVA tenderness ~ Foul-smelling urine ~ Acute hematuria ~ Pelvic discomfort ~ Change in urine color ~ Cloudy urine 	<ul style="list-style-type: none"> ~ Urinary sediment ~ Delirium ~ Dysuria, urgency, frequency <p style="margin-top: 20px;">Why? Chronically-catheterized patients have bacteriuria 98% of the time.</p>
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The Kicking CAUTI Intervention: Key Components

1. Algorithm: make the guidelines "actionable"
 - . Applicable to specific patients
 - . Provide step-by-step instructions
2. Audit and feedback: interactive educational component
3. Targeted personnel
 - . Providers who order urine cultures and antibiotics
4. Outcomes
 - . Urine cultures ordered (primary)
 - . Treatment of ASB with antibiotics (secondary)

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Guidelines Should be Actionable



recipe: favorite chocolate cake

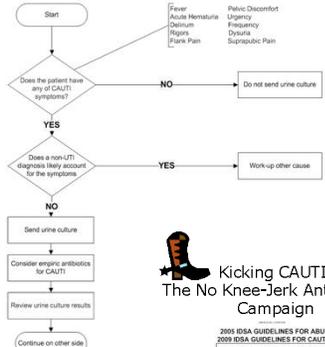
ingredients
 1 egg, 200g fresh cream, 100g C, warm water
 1kg whole chocolate pudding, 175g C, oil
 200g sugar, 175g C, low-sugar chocolate chips
 1 C, sour cream

instructions
 Grease a fluted tube pan and preheat oven to 350 degrees.
 Mix ingredients together except chocolate chips, using a mixer. Fold in chocolate chips.
 Bake for 45 -50 minutes, or until inserted toothpick comes out clean.
 Cool for 20 minutes and then invert and remove from pan.
 Dust with powdered sugar and serve with fresh whipped cream and strawberries or raspberries.

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Catheter-Associated UTI (CAUTI) vs Asymptomatic Bacteriuria

(Patient with urinary catheter or catheter use within 48 hours)





Kicking CAUTI
The No Knee-Jerk Antibiotics Campaign

2009 IDSA GUIDELINES FOR ABU
2015 IDSA GUIDELINES FOR CAUTI
Copyright ©

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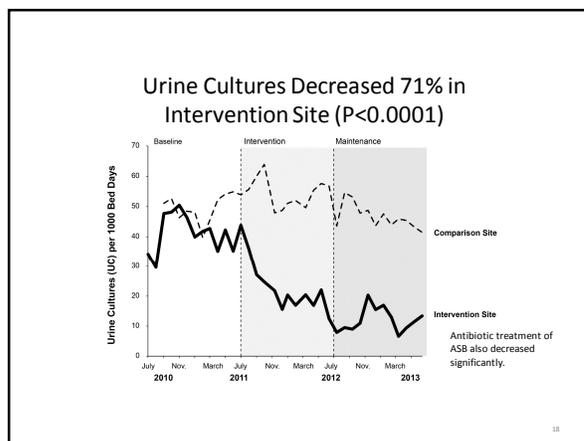


Kicking CAUTI

The No Knee-Jerk Antibiotics Campaign

A Guidelines-Based Approach to Kicking CAUTI

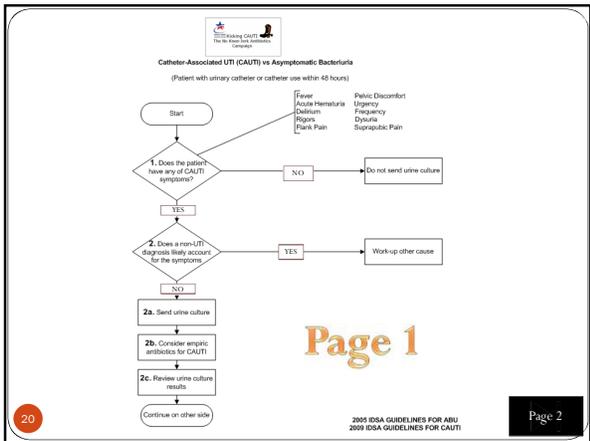
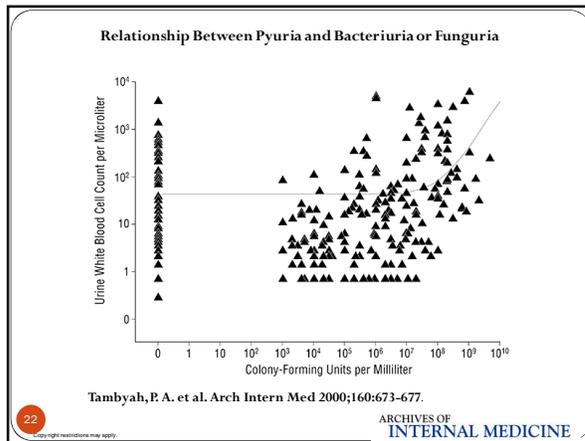
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Which of these catheterized persons has a CAUTI?

- Mr. J, an 86 year old resident of a LTCF, has a chronic indwelling Foley. He refuses to eat for 2 days. His urine has clumps of material in the drainage tube and smells bad.
- Urinalysis shows 50 wbc/hpf and many bacteria.

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What do we do with Mr. J?

- Mr. J, an 86 yo resident of a LTCF, has a chronic indwelling Foley. He refuses to eat for 2 days. His urine has clumps of material in the drainage tube and smells bad. Urinalysis shows 50 wbc/hpf and many bacteria.
- Suggestions:
 - Change the Foley to ensure no obstruction
 - Look for another cause of anorexia
 - Withhold antibiotics

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Pyuria in a catheterized patient

- Nearly universal
- Cannot be used to distinguish CAUTI from CA-ABU
- The presence of pyuria is not an indication to treat CA-ABU
- The absence of pyuria in a symptomatic patient suggests diagnosis other than CAUTI
- Cloudy or malodorous urine also not useful to distinguish CAUTI from CA-ABU

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Which of these catheterized persons has a CAUTI?

- Mrs. Y, who is still catheterized 48 hours after a difficult vaginal childbirth, now has a fever of 102. Her urine has 10 WBC/hpf.
- How do you determine if she has a CAUTI?
- Would you treat her with antibiotics?

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What do we do with Mrs. Y?

- Mrs. Y, who is still catheterized 48 hours after a difficult vaginal childbirth, now has a fever of 102. Her urine has 10 WBC/hpf.
- Fever is consistent with pyelonephritis
 - Pregnant women are at higher risk for pyelonephritis
- Fever also consistent with infected hematoma, endometritis, cholecystitis.
- Imaging studies, blood cultures, antibiotics clearly indicated.

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What do we do with Mr. H?

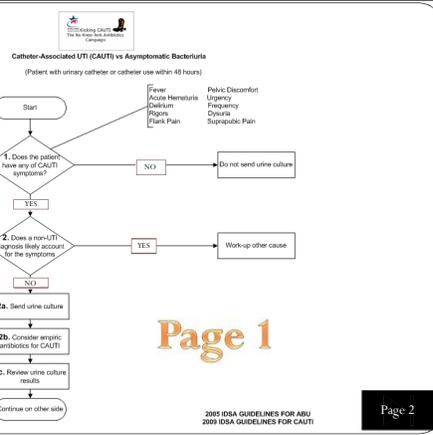
- Mr. H, a 22 yo male hospitalized for fracture of the femur, has had a Foley catheter for 6 days. He is complaining of irritation from the catheter—specifically the tape on his leg is bothering him. His urine has 20WBC/hpf and $10^2 E. coli$.
- Suggestions:
 - Tape irritation is not the same as dysuria
 - Remove the catheter
 - A foreign body is a nidus for infection
 - Normal voiding may clear the bacteriuria
 - Re-assess his symptoms

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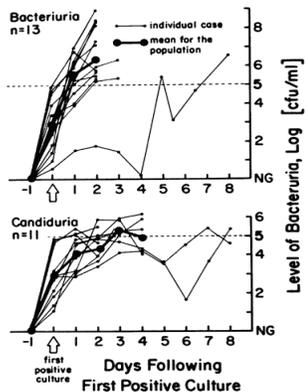
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- What is the significance of 10^2 organisms?

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Stark and Maki, NEJM 1984; 311.

Which of these catheterized persons has a CAUTI?

- Mr. W, an 82 yo male with nephrolithiasis, a left nephrostomy tube, and 2 episodes of recurrent *Pseudomonas* urosepsis in the past 2 years is admitted for nausea and malaise. His urine has visible clumps and grows *Pseudomonas* resistant to all antibiotics except amikacin (per computer report).
- How do we manage this patient?

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What do we do with Mr. W? Think first, antibiotics later

- Does he have symptoms consistent with CAUTI?
 - Check the guidelines
 - “Malaise or lethargy with no other identified cause”
- In prior episodes of urosepsis, he had fever and back pain
- Does he have another explanation for his current symptoms?
 - Admission labs revealed a sodium of 112
 - Treat the hyponatremia, withhold antibiotics



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NSHN surveillance criteria

- “ CAUTI and UTI in acute care
 - . Symptomatic UTI: CAUTI and non-CAUTI
 - “ CAUTI: catheter, fever, positive culture
 - “ UTI: fever (or symptoms), positive culture
 - . Asymptomatic bacteremic UTI
 - “ No urinary symptoms (but fever), positive urine and blood cultures
- “ CAUTI and UTI in LTC
 - . Modified McGeer criteria for surveillance
 - . Loeb minimum criteria for antibiotic use

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Case Review

CAUTI Criteria for older adults- NSHN

Catheter-associated Urinary Tract Infection (CAUTI)
Criteria for defining CAUTI in long-term care residents:

One or more of the following:

- Fever*
- Rigors (shaking chills)
- New onset hypotension
- New onset confusion/functional decline AND increased white blood cell count*
- New costovertebral angle pain or tenderness
- New or increased suprapubic pain or tenderness
- Acute pain, tenderness, or swelling of the testes, epididymis, or prostate
- Pus around the catheter site

AND

Any of the following:

- If catheter removed in last 2 calendar days:*
 - Voided urine culture positive for $\geq 100,000$ colony forming units (CFU)/ml of no more than 2 species of microorganisms
 - In/Out catheter urine culture positive for ≥ 100 colony forming units (CFU)/ml of any number of microorganisms
- If catheter in place:*
 - Inflowing catheter urine culture positive for $\geq 100,000$ colony forming units (CFU)/ml of any number of microorganisms

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Case review: Symptoms Identified

- “ Discuss symptoms identified
 - . Guideline concordant symptoms
 - . Guideline discordant
- “ Diagnostic challenges
 - . Concomitant infections

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CAUTI Criteria for older adults – Pocket Card (Back)

***Constitutional Criteria for Long-term Care Residents**

Fever
Must have one of the following:
 Single oral temperature $>100^{\circ}\text{F}$ (37.8°C)
 Repeated oral temperature $>99^{\circ}\text{F}$ (37.2°C) **OR**
 rectal temperature $>99.5^{\circ}\text{F}$ (37.5°C)
 Single temperature $>2^{\circ}\text{F}$ (1.1°C) over baseline from any site (oral, tympanic, axillary)

Increased White Blood Cell Count (Leukocytosis)
Must have one of the following:
 $>14,000$ white blood cells (leukocytes)/mm³
 Increase in immature white blood cells (left shift) with $>6\%$ bands or $>1,500$ bands/mm³

Acute Change in Mental Status
All components must be present:
 Acute onset (a new change)
 Fluctuating course (behavior change coming and going, or changing in severity)
 Inattention (difficulty focusing attention)
 Disorganized thinking (thinking is incoherent or hard to follow) **OR**
 Altered level of consciousness (change is different from baseline, may be sleepy, lethargic, difficult to arouse)

Acute Functional Decline
 New 3 point increase in Total activities of daily living (ADL) score from baseline (range: 0-28)
 Each ADL scored from 0 (independent) to 4 (totally dependent), including: bed mobility, transfer, locomotion within facility, dressing, toilet use, personal hygiene, and eating

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Group Activity: Designing an antimicrobial stewardship program

- ~ Two activities, two groups each
 - . Chartering the project
 - . Data and measurement
- ~ 30 minutes to brainstorm and plan
- ~ 10 minutes for report out

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Report out and next steps

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Group Activity: Designing an antimicrobial stewardship program

- ~ Chartering the project
 - ~ Identify a champion
 - ~ Define team membership
 - ~ Choose a target population
 - ~ Address buy in
 - . Leadership
 - . Participants
 - . Patients
 - ~ Draft a charter

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Group Activity: Designing an antimicrobial stewardship program

- ~ Data and measurement
 - . Define outcomes
 - . Determine how you will measure outcomes
 - . Determine how to record the data
 - ~ Who, when, how
 - . Decide who will receive the data
 - ~ When (frequency)
 - ~ How (mode of delivery)

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