Wake Forest Baptist Medical Center

Asymptomatic Bacteriuria: Myths, Magic and Management

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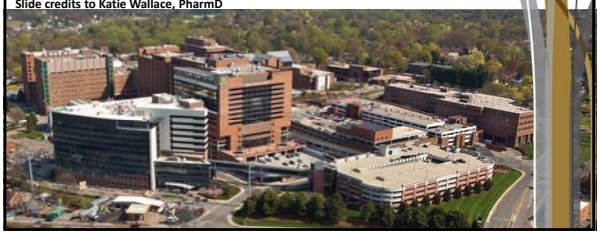
Slide credits to Katie Wallace, PharmD



Overview

- UTI Overview
- Considerations in Special Populations
- Stewardship Interventions

Significance

- UTI most common bacterial infection
  - 8 million office visits and 1 million ED visits each year
  - 100,000 hospitalizations
- Tied with pneumonia as second most common type of healthcare-associated infection
- UTI most common indication for antibiotics (ABX) so significant resistance and cost impact
- 26%-68% treated for ASB when not indicated

Weiskopf J. *JAMA Intern Med* 2015;175(3):344-345.
Mody L. *JAMA* 2014;311(8):844-854.
Bates N. *US Pharm* 2013;38(11):65-68.

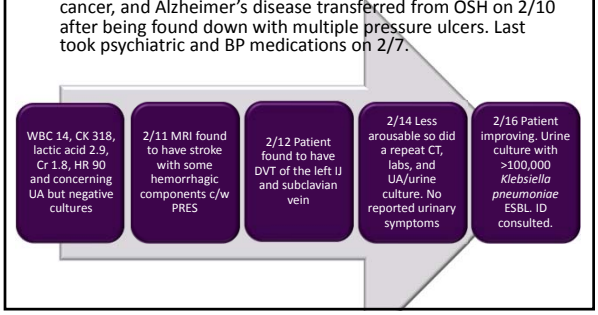
Definitions

Asymptomatic bacteriuria	• Isolation of bacteria in a urine specimen in a patient without signs or symptoms of a UTI
Acute uncomplicated UTI	• Symptomatic bladder infection in a woman with a normal genitourinary anatomy
Acute nonobstructive pyelonephritis	• Renal infection with tenderness and pain in the costovertebral angle often with fever
Complicated UTI	• Can involve bladder or kidney and occurs in patients with functional or structural abnormalities

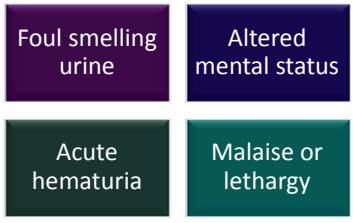
Nicolle LE, et al. *CID* 2005;40:643-54

Patient Case - AM

- 79 yo F with PMH HTN, DM, CAD, TIA, breast cancer, lung cancer, and Alzheimer's disease transferred from OSH on 2/10 after being found down with multiple pressure ulcers. Last took psychiatric and BP medications on 2/7.



Controversial Symptoms



Parasuraman P. *CID* 2010;13:327-336

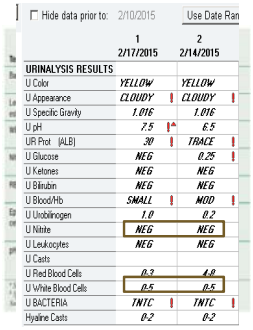
Factors Associated with Inappropriate Treatment

- Older age and frailty
- Pyuria on urinalysis
- Gram negative rods

Cope M. *CID* 2009;48:1182-8
Trautner BW. *Am J Infect Control* 2014;42:653-8

Urinalysis

- Urinalysis alone should never be used to determine treatment
- Symptomatic infection should be the only reason for obtaining urine cultures or treating infection



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	1 2/17/2015	2 2/14/2015
URINALYSIS RESULTS		
U Color	YELLOW	YELLOW
U Appearance	CLOUDY !	CLOUDY !
U Specific Gravity	1.016	1.016
U pH	7.5 ^	6.5
UR Prot (ALB)	30 !	TRACE !
U Glucose	NEG	0.25 !
U Ketones	NEG	NEG
U Bilirubin	NEG	NEG
U Blood/Hb	SMALL !	MOD !
U Urobilinogen	1.0	0.2
U Nitrite	NEG	NEG
U Leukocytes	NEG	NEG
U Casts		
U Red Blood Cells	0-2	4-8
U White Blood Cells	0-5	0-5
U BACTERIA	TNTC !	TNTC !
Hyaline Casts	0-2	0-2

Bates N. *US Pharm* 2013;38(11):65-68

Indications for Treating ASB

Urologic procedures associated with mucosal bleeding

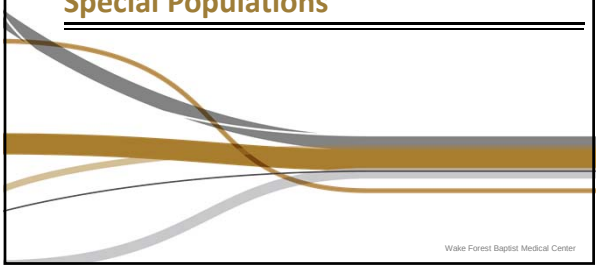
- High rate of postprocedure bacteremia and sepsis if left untreated
- Randomized clinical trials support treatment in bacteriuric men undergoing transurethral resection of the prostate
- Initiate therapy the night before or immediately before procedure

Pregnant women

- Women with ASB in early pregnancy have 20-30 fold increased risk of developing pyelonephritis
- More likely to have infants of low birth rate
- Screen in early pregnancy and treat for 3-7 days if ASB present

Nicolle LE, et al. *CID* 2005;40:643-54

Special Populations



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Common Misconceptions

- Change in mental status = UTI in elderly patients
- ASB leads to increased morbidity
- Treatment of ASB decreases SXUTI
- ASB leads to graft loss in transplant patients
- Patients with catheters or spinal cord injury should be treated for ASB

Premenopausal, Nonpregnant Women

True

More women with ASB progress to SX UTI

False

Patients with bacteriuria are more prone to CKD, genitourinary cancer, and increased mortality

Patients with ASB are more prone to future symptomatic infections if left untreated

"Association of ASB with SXUTI is likely attributable to host factors that promote both SXUTI and ASB, rather than SX infection being attributable to ASB"

Nicolle LE, et al. *CID* 2005;40:643-54

The Role of Asymptomatic Bacteriuria in Young Women With Recurrent Urinary Tract Infections: To Treat or Not to Treat?

Tommaso Cai,[1] Sandro Mazzoli,[2] Nicola Mondaini,[3] Francesco Meacci,[3] Gabriella Nesi,[4] Carolina D'Elia,[1] Gianni Malossini,[1] Vieri Boddi,[1] and Riccardo Bartoletti[3]

[1]Department of Urology, Santa Chiara Hospital, Trento; [2]Sexually Transmitted Disease Center, Santa Maria Annunziata Hospital, Florence; [3]Department of Urology, [4]Division of Pathological Anatomy, Department of Critical Care Medicine and Surgery, and [5]Department of Public Health and Epidemiology, University of Florence, Italy

Parameter	Definition
Objective	Evaluate impact of the treatment of ASB on the recurrence rate in young women with recurrent UTIs
Design	Prospectively screened women from January 2005-December 2009
Intervention	Randomized 1:1 to 2 groups: not treated (group A) or treated (group B)
Outcomes	Recurrence-free rate

Cai T et al - Results

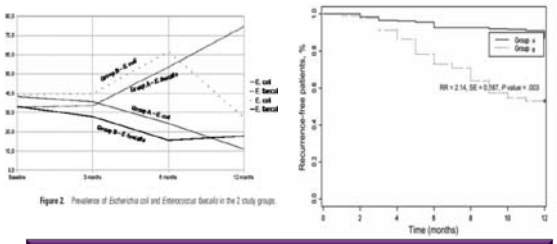


Figure 2. Prevalence of *Escherichia coli* and *Enterococcus faecalis* in the 2 study groups.

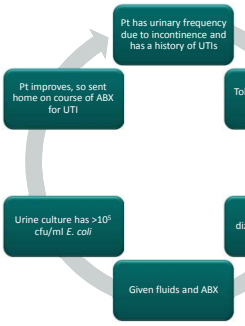
Treatment of ASB leads to higher recurrence rates of SXUTI and modification of isolated bacteria

Cai T et al - Conclusions

Strengths	Weaknesses
• Prospectively screened • Study duration • Number of included patients	• Unblinded • Patients all from same STD clinic • Resistance patterns of isolated bacteria not mentioned

Treatment of ASB leads to higher recurrence rates of SXUTI and modification of isolated bacteria

Elderly - Consider the Cause



- Prospective, randomized clinical trials show no benefits of screening or treating ASB(A-I)
- Treatment had significantly increased adverse effects and reinfection with resistant organisms

Mody L. *JAMA* 2014;311(8):844-854

Data in the elderly

Community

- Similar outcomes of treatment between post and premenopausal women
- Treatment resulted in no significant difference in the number of SXUTIs
- No adverse outcomes or decreased survival if not treated
- Routine screening and treatment of ASB is not recommended (A-II)

Institutionalized

- Prospective, randomized clinical trials show no benefits of screening or treating ASB(A-I)
- Treatment had significantly increased adverse effects and reinfection with resistant organisms

Nicolle LE, et al. *CID* 2005;40:643-54

Renal Transplant

- Frequent ASB episodes associated with UTI and pyelonephritis
- Data based primarily on retrospective studies
- Three prospective, interventional trials currently underway

Treated	Untreated
Majority have persistence of ASB	>50% clear spontaneously
Selection of resistant pathogens	3x lower risk of developing a SXUTI
	Decreased number of hospitalization days

Singh R. *Curr Opin* 2015;28:112-116
Parasuraman P. *Am J Transplant* 2013;13:327-336

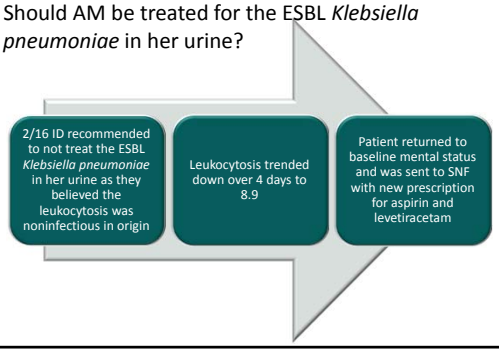
Green et al - Conclusions

Strengths	Weaknesses
• Evaluated resistance patterns • Outcomes measured	• Small sample size • Unequal groups • Did not meet power • Duration of ABX prophylaxis

There is no benefit associated with treating ASB in kidney transplant patients and there may even be a trend toward harm.

Patient Case

Should AM be treated for the ESBL *Klebsiella pneumoniae* in her urine?

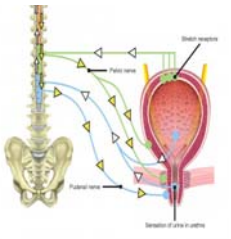


Conclusions

ASB should not be treated in the vast majority of patient populations. ASB is associated with more SXUTIs, but treatment does NOT decrease the risk of SXUTI. Treatment does increase the risk of adverse effects and ABX resistance.

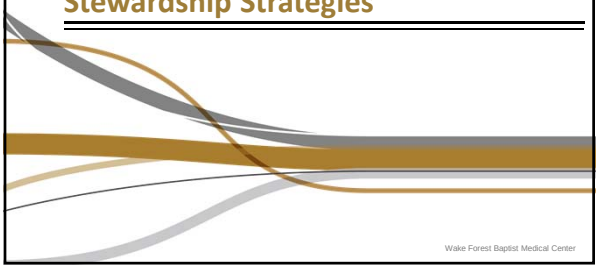
Spinal cord injury Epidemiology

- Impaired bladder emptying due to neurogenic bladder leads to increased SXUTI
- Risk of SXUTI 0.41/100 person-days with intermittent compared to 2.72/100 with chronic indwelling catheter
- ASB common – prevalence 50% for intermitten and 100% with indwelling catheters
- Treated patients often bacteriuric again within 3 days
- Consensus: only review articles, small trials, an consensus guidelines available but all uniformly recommend to not screen or treat ASB (A-II)



Nicolle LE, et al. *CID* 2005;40:643-54
Nicolle LE. *Infect Dis Clin N Am* 2014;28:91-104
www.spinalhub.com.au

Stewardship Strategies



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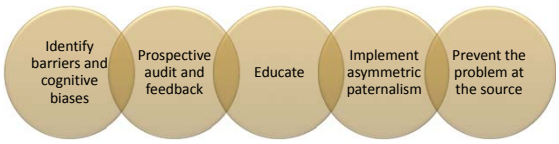
Strategies



Major article

Overtreatment of asymptomatic bacteriuria: Identifying provider barriers to evidence-based care

Barbara W. Trautner MD, PhD[a,b,*], Nancy J. Petersen PhD[b,c], Sylvia J. Hysong PhD[b,c], Deborah Horwitz MS, PA-C[b,c], P. Adam Kelly PhD, MBA[d,e], Aanand D. Naik MD[b,c,f]

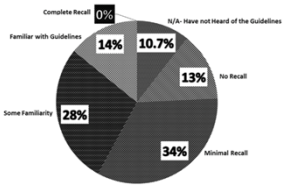


Fig 1. Self-reported familiarity with catheter-associated bacteriuria guidelines. Self-reported familiarity was assessed on a 6-point Likert-type scale. None of the respondents reported complete recall of the guidelines contents. Results reflect 168 responses.

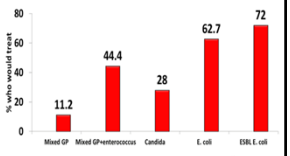


Fig 2. Organism type drives inappropriate antibiotic treatment. We offered the same case scenario 5 times, varying only the organism found in the urine culture. Although organism type is not endorsed by guidelines as a factor to consider when deciding whether to treat bacteriuria, the type of organism influenced treatment responses to this case scenario. GP, gram-positive organism.

Trautner BW. *Am J Infect Control* 2014;42:653-8

Brief report

Inappropriate use of antibiotics and *Clostridium difficile* infection

Jocelyn A. Srigley MD[a,b,c], Annie Brooks PharmD[d], Melani Sung PharmD[d], Deborah Yamamura MD[a,d,e], Shariq Haider MD[d,f], Dominik Mertz MD, MSc[d,f,g,*]

Table 2
Appropriateness of antibiotics by indication for 456 courses in 126 CDI episodes

Indication	Total courses (%)	Inappropriate courses (% within category)
Respiratory infections	128 (28.1)	52 (40.6)
Urinary tract infections	69 (15.1)	52 (75.4)
Skin and soft tissue infections	55 (12.1)	23 (41.8)
Intra-abdominal infections	50 (11.0)	22 (44.0)
Perioperative prophylaxis	33 (7.2)	7 (21.2)
Bacteremia	26 (5.7)	5 (19.2)
Sepsis	25 (5.5)	8 (32.0)
Febrile neutropenia	16 (3.5)	4 (25.0)
Bone and joint infections	13 (2.9)	4 (30.8)
Other	41 (9.0)	29 (70.7)

- 93/126 (73.8%) of patients had at least 1 inappropriate course of ABX
- UTI most common reason for inappropriate ABX use, with 44.9% of ABX prescribed for ASB
- 25.2% of inappropriate ABX attributed to UTIs

Srigley JA. *Am J Infect Control* 2013;41:1116-8

Reducing Antimicrobial Therapy for Asymptomatic Bacteriuria Among Noncatheterized Inpatients: A Proof-of-Concept Study

BRIEF REPORT

Jerome A. Leis,[1,2] Gabriel W. Rebick,[1] Nick Daneman,[1] Wayne L. Gold,[1] Susan M. Poutanen,[1,3,4] Pauline Lo,[3] Michael Larocque,[3] Kaveh G. Shojania,[2] and Allison McGeer[1,3,4]

Table 2. Outcomes Before and After Implementation of Modified Urine Culture Reporting of Noncatheterized Medical and Surgical Inpatients

Outcome				Catheterized
Outcome measures				
ASB treatment				18/44 (41)
Process measures				
Total cultures				49/49 (100)
Labeling accuracy				41/49 (84)
Unintended consequences				
Calls to laboratory	0 (0)	0 (0)	5/37 (14)	1/49 (2)
Untreated UTI	1/37 (3)	1/28 (4)	0 (0)	0 (0)
Sepsis	0 (0)	1/28 (4)	0 (0)	1/49 (2)

Data are presented as No. (%).

Abbreviations: ASB, asymptomatic bacteriuria; UTI, urinary tract infection.

Resulted in an absolute risk reduction of 36% (95% CI, 15%-57%; P=0.002) and a number needed to treat of 3

Leis JA. *CID* 2014;58(7):980-3
Naik AD. *CID* 2014;58(7):984-5

Reduction of urinary catheter use and prescription of antibiotics for asymptomatic bacteriuria in hospitalised patients in internal medicine

Martin Egger[a], Florian Balmer[a], Heidi Fricdli-Wüthrich[a], †Kathrin Mühlemann[b]

- Aimed to reduce ABX treatment days for UTIs and urinary catheter (UC) days
- Multifaceted interventional approach used to educate staff
- Decrease in UC days by 40%, from 27 to 17 per 100 patient days (IRR=0.61)

Table 2: Urinary catheter use.

	Before intervention	After intervention	p-value
Patients - n	734	771	
Admission with indwelling urinary catheter – n (%)	46 (6.3)	53 (6.9)	p = 0.635
Patients with catheters – n (%)	195 (26.6)	139 (18.0)	p <0.001
Discharge with urinary catheter – n (%)	72 (9.8)	48 (6.2)	p = 0.010
Catheter episodes – n	227	161	
Catheter type	210 (92.5)	145 (90.1)	p = 0.394
Foley cathe... suprapubic			
Duration of ca... range			
*Wilcoxon rank...			

Net decrease in ABX use from 75 to 59 treatment days per 1,000 patient days (IRR=0.79, 95% CI 0.69-0.92)

Summary

- ASB should not be treated in the vast majority of patient populations
- Essential to pause and assess patient presentation and symptoms before treating
- ASB is associated with SXUTI, but treatment does NOT prevent SXUTI
- Treatment of ASB can lead to increased rate of SXUTI, adverse effects, *Clostridium difficile* infection, and drug resistance
- A multifaceted educational and interventional stewardship approach is needed to decrease treatment of ASB

To Treat or not to treat?