



Inappropriate Testing and Treatment of Asymptomatic Bacteriuria: Assessment of Provider Behavior and the Effectiveness of an Audit and Feedback Intervention in the Hospital

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ABSTRACT

Background: Asymptomatic bacteriuria (ASB) is commonly treated despite recommendations against this practice. Our aim was to evaluate provider knowledge and behavior regarding unnecessary testing and treatment of ASB and assess the impact of an educational intervention.

Methods: A multiple choice, case-based survey was performed to assess internal medicine resident knowledge of ASB and indications for obtaining urine cultures. Retrospective chart review was performed to identify a one-month pre-intervention patient cohort from two medicine wards. The two-month intervention was “real-time” audit and feedback for providers who ordered urine cultures. Exclusion criteria were pregnancy, kidney transplant, nephrostomy tube, ureteral stent, and invasive urological procedures. Urinary tract infection (UTI) was defined as bacteriuria with urinary symptoms or SIRS with no other identifiable infection source in a patient who is unable to communicate. ASB was defined as bacteriuria without these conditions.

Results: The survey was completed by 50% of the internal medicine residents; 70% would send urine cultures without an appropriate indication, and 40% would treat ASB. The pre-intervention cohort included 162 cultures in April 2015. During the intervention phase in January and February 2016, there were 186 urine cultures. We observed a significant improvement in appropriate urine cultures and a decrease in detection of ASB; however rates of treatment of ASB were similar (Table 1). There was a 43% reduction in urine cultures per month during the intervention phase.

Conclusion: Compatible with the survey results, the pre-intervention cohort demonstrated frequent inappropriate urine culture testing and inappropriate antibiotic use for ASB. During our intervention, we observed an estimated 43% reduction in the number of urine cultures per month and a significant reduction in the detection of ASB. However, there was no change in the percentage of patients with ASB who were treated highlighting the importance of decreasing unnecessary urine culture testing.

INTRODUCTION

- The Choosing Wisely Campaign’s joint initiative with the Infectious Disease Society of America highlighted the inappropriate treatment of asymptomatic bacteriuria as a major contributor to antibiotic overuse.
- Our goal was to decrease the number of unnecessary urine cultures ordered, stop the treatment of asymptomatic bacteriuria, and decrease unnecessary antibiotic use at Mount Sinai Hospital.

METHODS

- Study design:** Retrospective review of urine cultures ordered and treatment provided during the pre-intervention and post-intervention time period as well as a real-time audit and feedback during the intervention period.
- Inclusion criteria:** All patients >18 years old on two medical wards during the study time period.
- Exclusion Criteria:** Pregnancy, history of kidney transplantation, or genitourinary procedure within the last month.
- Data Collection:** Presence of fever, altered mental status, urinary symptoms, Foley catheter, white blood cell count, urine culture and urinalysis results, indications for sending urine culture, length of stay, antibiotics administered and ordering provider during the pre-intervention, intervention and post-intervention time periods.

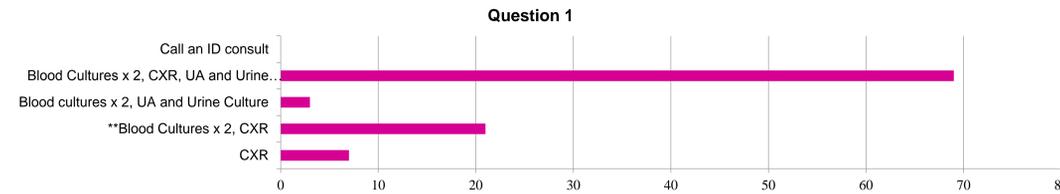


Figure 1. ASB Intervention Timeline

FIGURES

Internal Medicine Pre-Intervention Resident Survey

1. 32 year-old male with paraplegia and neurogenic bladder secondary to a gunshot wound with a chronic Foley catheter presents to the ED with 3 days of fever, chills and a productive cough. Vitals: T 38.2C, BP 100/54, P 110, RR 20, O2 97% RA. Exam with LLL rhonchi. Relevant labs include WBC count 12.5 (90% neutrophils). What would be your next step in management?



2. 76 year-old female with Alzheimer’s Dementia, HTN, DM and hypothyroidism is hospitalized with a community acquired pneumonia. On hospital day 2 she has a temperature of 38.2C while on ceftriaxone and azithromycin for her pneumonia, her other vital signs are stable. On hospital day 3, the urine culture which was sent from the ED returns with >100k ESBL E.coli. She continues to have a productive cough, is afebrile and her WBC has declined from 12 to 11. She denies abdominal pain, nausea, vomiting, diarrhea or dysuria. What would be your next step in the management of this patient?

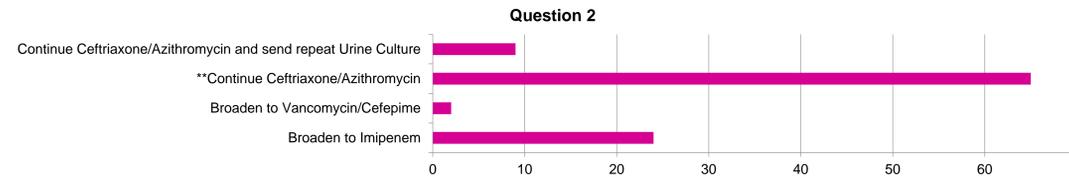


Figure 2: Medicine Resident Survey: sample questions and results

Informational Email:

Asymptomatic Bacteriuria (ASB) = positive urine culture in the absence of urinary symptoms

The treatment of asymptomatic bacteriuria is NOT recommended (except in pregnant patients and patients undergoing a urological procedure) and can lead to antibiotic resistance, complications such as c. diff and longer hospital stays. Despite compelling evidence against the treatment of ASB, up to 2/3 of hospitalized patients w ASB will receive antibacterial therapy.

One way to decrease unnecessary treatment of ASB, is to decrease the amount of unnecessary urine cultures ordered. In a recent survey of medicine housestaff, only 30% were aware of the appropriate indications for sending urine cultures. Those are:

- New onset urinary symptoms in a patient without a Foley catheter
- Fever/SIRS + (Urinary symptoms* or AMS)

*dysuria, increased urgency, increased frequency, suprapubic tenderness

Over the next eight weeks we will be providing real time feedback on the medicine floors in response to the ordering of urine cultures. Please feel free to ask us any questions!

Thank you for your help.

Figure 3. Informational email disseminated to house staff and nurse practitioners on medicine floors prior to intervention

ASB Feedback Form	
Patient MRN _____	Date/Time Feedback _____
Date ordered _____	Feedback Received by _____
Ordering Provider _____	
1. Why was the urine culture sent? <input type="checkbox"/> Fever/rigors <input type="checkbox"/> dysuria/urgency /frequency <input type="checkbox"/> Delirium <input type="checkbox"/> Leukocytosis <input type="checkbox"/> Positive U/A <input type="checkbox"/> Other	4. Does the patient have a Foley? <input type="checkbox"/> No <input type="checkbox"/> Yes, is it chronic? <input type="checkbox"/> Yes <input type="checkbox"/> No removed? <input type="checkbox"/> Yes <input type="checkbox"/> No was the urine collected from the Foley bag? <input type="checkbox"/> Yes <input type="checkbox"/> No
2. Do you think the most likely diagnosis is a UTI? <input type="checkbox"/> Yes <input type="checkbox"/> No, what is/are	5. Is the patient on antibiotics? <input type="checkbox"/> Yes, are they empiric for a UTI? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> No
3. Was a U/A Sent? <input type="checkbox"/> Yes <input type="checkbox"/> No	6. Does the patient make urine? (ESRD) <input type="checkbox"/> Yes <input type="checkbox"/> No
Results: _____	

Figure 4: Real-time feedback form for review with ordering provider

RESULTS

- 50% of internal medicine residents at MSH completed the survey
- 70% would send urine cultures without an indication.
- 40% would treat ASB.
- 162 urine cultures were sent during the one month pre-intervention period. During the two month intervention, there were 93 urine cultures sent per month.
 - 43% reduction in urine cultures sent per month during the intervention phase.
- There was a significant improvement in appropriate sending of urine cultures and a decrease in detection of ASB.
- Rate of treatment of ASB were similar (table 1).

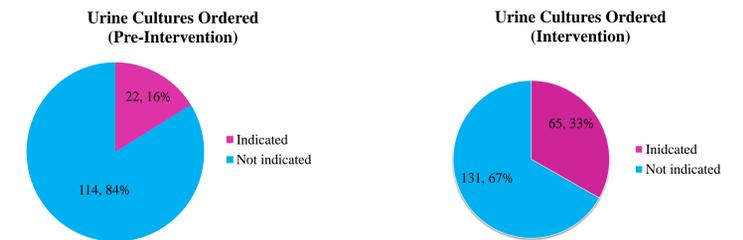


Figure 5: Urine cultures ordered during the pre-intervention and intervention periods

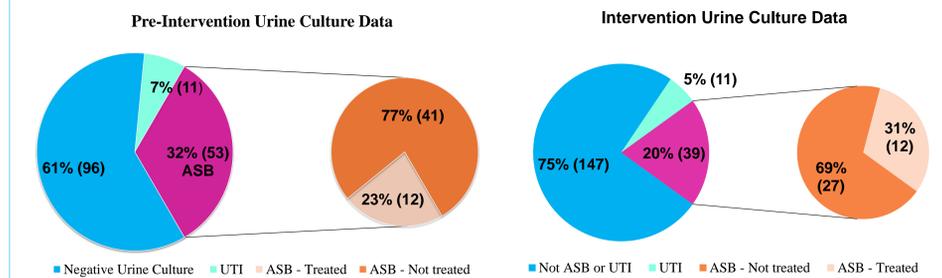


Figure 6. Pre-Intervention Urine Culture Data

Figure 7. Urine Culture Data – UTI or ASB

	Pre-intervention (n=162)	Intervention (n=186)	p-value
Appropriate clinical indication for urine culture	36 (22%)	65 (35%)	0.029
ASB detection	53 (33%)	39 (21%)	0.040
ASB treatment	12/53 (23%)	12/39 (31%)	0.91

Table 1. Results for urine cultures ordered and treatment

CONCLUSIONS

- Compatible with the survey results, the pre-intervention cohort demonstrated frequent inappropriate urine culture testing and inappropriate antibiotic use for ASB.
- Our intervention led to a significant decrease in urine cultures ordered per month and a significant reduction in the detection of ASB.
- While there was no change in the percentage of patients treated for ASB, the reduction in patients tested led to less inappropriate treatment. This highlights the importance of decreasing urine culture testing when not indicated.