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Downstream Impact of Urine Cultures Ordered without Indication at Two Acute Care Teaching Hospitals

Author(s): Jerome A. Leis, MD; Wayne L. Gold, MD; Nick Daneman, MD, MSc; Kaveh Shojania, MD; Allison McGeer, MD

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## RESEARCH BRIEFS

## Downstream Impact of Urine Cultures Ordered without Indication at Two Acute Care Teaching Hospitals

Antimicrobial therapy for asymptomatic bacteriuria (ASB) is recommended for pregnant patients and those undergoing genitourinary procedures.<sup>1</sup> In other populations, treatment has not been demonstrated to confer benefit and is associated with adverse drug reactions, selection for infection with increasingly drug-resistant bacteria, and *Clostridium difficile* infection.<sup>2-5</sup> We undertook a prospective audit of urine culture ordering practices among medical and surgical inpatients at 2 acute care teaching hospitals to identify the proportion of urine cultures ordered without clinical indication that lead to antimicrobial therapy for ASB.

During August and September 2012, consecutive urine cultures from nonpregnant ward patients were identified within 24 hours of culture ordering. Each patient was interviewed by the study team to determine the presence of urinary tract infection (UTI) using standard surveillance criteria.<sup>6</sup> Noncatheterized patients met clinical indications for UTI if they had fever (temperature  $>38^{\circ}\text{C}$ ) without another explanation or at least 1 urinary symptom (dysuria, urgency, frequency, costovertebral angle tenderness, or suprapubic pain or tenderness). Catheterized patients met clinical indications for UTI if they had fever, suprapubic pain, or costovertebral angle tenderness. Other reasons for ordering cultures were documented on the basis of care provider interviews before culture results were known. Culture results and antimicrobial prescriptions were documented 72 hours later. The study was approved by the research ethics boards of Mount Sinai Hospital (472 beds) and University Health Network (408 beds; Toronto General Hospital site).

Seventy-six of 112 urine cultures audited (0.68 [95% confidence interval (CI), 0.59–0.76]) were ordered without clinical indication. Reasons included confusion (23%), unexplained leukocytosis (21%), previous history of UTI (11%), abnormal smell or color of urine (9%), recent catheterization (8%), urinary retention (8%), weakness or dizziness (7%), and dysglycemia (4%). No reason was provided for 8 cultures (11%). Of cultures ordered without indication, 42% (32 of 76) were from noncatheterized inpatients, 30% (23 of 76) were from noncatheterized patients at hospital admission, 21% (16 of 76) were from catheterized inpatients, and 7% (5 of 76) were from catheterized patients at hospital admission. Among these patients, 4% (3 of 76) received empirical therapy for UTI at the time of test ordering, compared with 36% of patients (13 of 36) who met clinical criteria ( $P < .0001$ ). Urine cultures were positive for 21 patients who did not meet criteria for UTI, and antimicrobial therapy was

prescribed for 12 of these patients with ASB (0.57 [95% CI, 0.37–0.76]). When the culture results were classified according to Centers for Disease Control and Prevention criteria, UTI was present in 38% of catheterized (3 of 8) and 12% of noncatheterized (4 of 34) patients cultured at hospital admission and 5% of catheterized (1 of 21) and 2% of noncatheterized (1 of 49) inpatients (Figure 1).

Urine cultures ordered without clinical indication are common among medical and surgical inpatients in our hospitals, and detection of ASB led to unnecessary therapy in more than 50% of patients. These results agree with previous retrospective studies involving hospitalized patients and residents of long-term care facilities that have found that 32.8%–41.0% of patients with ASB receive antimicrobial therapy.<sup>4,5</sup>

Previous efforts to reduce antimicrobial therapy for ASB have had very limited success. Providing education to clinicians through infectious diseases consultation or written communications in charts decreased treatment duration for ASB without having a significant impact on the initiation of antimicrobial therapy.<sup>7,8</sup> A cluster-randomized trial of a diagnostic algorithm for suspected UTI did not significantly decrease urine culture ordering in long-term care facilities.<sup>9</sup> A novel approach would be to no longer routinely report urine culture results for select patients at low risk for UTI unless a special request was made. In our prospective audit, we observed that inpatients without an indwelling urinary catheter represented nearly half of urine cultures ordered without clinical indication, despite having the lowest risk for UTI (2%). For this population, reporting results of urine cultures might do more harm than good.

Our study is limited by its small sample size, with data from only 2 teaching hospitals. The use of standardized surveillance definitions for UTI may have overestimated the pro-

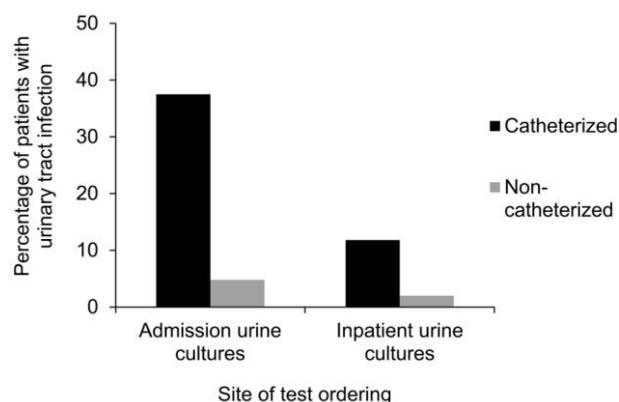


FIGURE 1. Proportion (%) of urine cultures associated with confirmed urinary tract infection based on prospectively applied Centers for Disease Control and Prevention criteria, according to site of test ordering ( $n = 112$ ).

portion of patients with ASB among patients who could not reliably communicate their symptoms. However, the small fraction of patients who met criteria for ASB who received empirical antimicrobial therapy at the time that tests were ordered suggests that clinicians had a relatively low pretest probability of UTI in these cases.

Urine cultures without indication lead to significant unnecessary use of antimicrobials among hospitalized patients. No longer routinely reporting positive urine culture results for noncatheterized inpatients should be evaluated as a quality improvement strategy.

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**Jerome A. Leis, MD;<sup>1</sup> Wayne L. Gold, MD;<sup>1</sup>  
Nick Daneman, MD, MSc;<sup>2</sup> Kaveh Shojania, MD;<sup>3</sup>  
Allison McGeer, MD<sup>1,4</sup>**

Affiliations: 1. Division of Infectious Diseases, Department of Medicine, University Health Network, Toronto, Ontario, Canada; 2. Division of Infectious Diseases, Department of Medicine, Sunnybrook Health Sciences Centre, Toronto, Ontario, Canada; 3. Department of Medicine, Sunnybrook Health Sciences Centre, and University of Toronto Centre for Patient Safety Toronto, Ontario, Canada; 4. Department of Microbiology, University Health Network/Mount Sinai Hospital, Toronto, Ontario, Canada.

Address correspondence to Jerome A. Leis, MD, 200 Elizabeth Street, 13EN-213, University Health Network, Toronto, Ontario M5G 2C4, Canada (jerome.leis@mail.utoronto.ca).

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## Healthcare Epidemiology Practicum Rotation for Postgraduate Physician Trainees in Medicine–Infectious Diseases

Practicum education in healthcare epidemiology and infection control (HEIC) for postgraduate physician trainees in infectious diseases is necessary to prepare them to be future participants and leaders in patient safety. Voss et al<sup>1</sup> suggested that training in HEIC should be offered as a “common trunk” for physicians being trained in clinical microbiology or infectious diseases. A 1-month rotation has been recommended previously.<sup>2</sup> A survey by Joiner et al<sup>3</sup> indicated that only 50% of infectious diseases fellows found the infection control training adequate. The objective of this article is to report our 2-year experience with a 1-month practicum rotation we designed and implemented at our institution.

The setting is the Adult Infectious Diseases fellowship program at the University of Texas Southwestern Medical Center (UTSW), Dallas, Texas. The fellows have clinical rotations at the Parkland Health and Hospital System, UTSW University hospitals, North Texas Veterans Affairs Health Care System, and Children’s Medical Center Dallas. The 2-year program recruits 7 fellows every 2 years. The 1-month core rotation was established in July 2011 and is ongoing. Fellows who completed the rotation during the period July 2011 to April 2013 are included in this study.

The components of the semistructured rotation include the following: (1) complete 25 learning assignments with multiple professionals in infection prevention, antimicrobial stewardship, occupational health, microbiology, patient safety, and public health; (2) participate in infection control and quality committees; (3) read a set of required articles, with a list of references to look up; and (4) make an end-of-the-rotation presentation at an infectious diseases case conference on a quality improvement project, critique of a policy, written research proposal, or review of literature. Topics reviewed in-