Diagnostic Stewardship

Creating Value, Improving Quality, and Reducing Cost

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Consulting Team

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Objectives

- Review current advances in antibiotic stewardship, diagnostic stewardship, and microbiome science.
- Identify practical strategies in diagnostic stewardship that support the value proposition of improved outcomes and reduced costs.
- Provide specific diagnostic stewardship examples related to C. difficile, urinary tract infections, and respiratory infections.
- Explore opportunities to reduce costs while enhancing patient safety and quality of care across the continuum.

Antibiotic Stewardship includes Diagnostic Stewardship

- Test Result leads to action or treatment
  - Inclined to use Order Sets or Protocols
  - Clinical Assessment/Critical Thinking Opportunity

- Clinical examples

Diagnostic Stewardship for HAI Prevention

- Decreased CAUTI by 37%
  Decreased antibiotic use 40-60%

- Decreased C. Difficile by 31-58%
  Decreased antibiotic use 15-27%

- Decreased CLABSI by 36%
  Decreased antibiotic use 8-13%

Asymptomatic Bacteriuria (ASB)

ASB is **COMMON**.

Population	Prevalence
Healthy premenopausal women	1–5%
Women 65–90 years old	11–16%
Female long-term care residents	25–50%
Male long-term care residents	15–50%
Women with diabetes	9–27%
Men with diabetes	1–11%
People receiving hemodialysis	25%
People with indwelling urinary catheters	> 90%

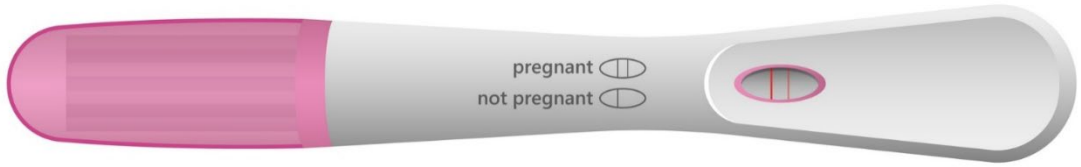
Treatment of ASB Is Not Beneficial And May Cause *Harm*

- **ASB does not require treatment**
- Randomized controlled trials have not shown that antibiotic treatment of ASB reduces subsequent risk of UTI
- Treatment of ASB is associated with:
  - Avoidable antibiotic-associated adverse events
  - An increased risk of subsequent UTIs that may be increasingly difficult to treat due to the development of antibiotic resistance

When is Screening/Treating for ASB indicated?

Guidelines recommend screening and treating for ASB in two situations:

- Early in pregnancy
  - May prevent pyelonephritis, preterm labor, and low birth-weight infants
- Impending urologic procedure in which mucosal bleeding is expected
  - May prevent urosepsis



Asymptomatic Pyuria

- Pyuria is also **COMMON**.

Population	Prevalence
Young women	32%
Pregnant women	30-70%
Diabetic Women	70%
Elderly institutionalized patients	90%
Dialysis Patients	90%
Patients with short term catheters	1–11%
Patients with long term catheters	25%

- Pyuria in patients with Asymptomatic Bacteriuria is not an indication for antibiotic therapy
- Other cause of pyuria to consider: sexually transmitted infections and interstitial nephritis

Pertinent Recent Literature

Clinical Infectious Diseases

MAJOR ARTICLE

How Testing Drives Treatment in Asymptomatic Patients: Level of Pyuria Directly Predicts Probability of Antimicrobial Prescribing

Kalpana Gupta,[1,2,3] William O'Brien,[3] Jaime Gallegos-Salazar,[2] Judith Strymish,[1,4] and Westyn Branch-Elliman[1,3,4]

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Pertinent Recent Literature

Clinical Infectious Diseases

MAJOR ARTICLE

IDSA Infectious Diseases Society of America

hivma hiv medicine association

OXFORD

Optimal Urine Culture Diagnostic Stewardship Practice—Results from an Expert Modified-Delphi Procedure

Pertinent Recent Literature

Antimicrobial Stewardship & Healthcare Epidemiology (2025), **5**, e213, 1–2
doi:10.1017/ash.2025.10130

SHEA

Research Brief

A urinalysis to urine culture reflex protocol results in high rates of asymptomatic bacteriuria treatment

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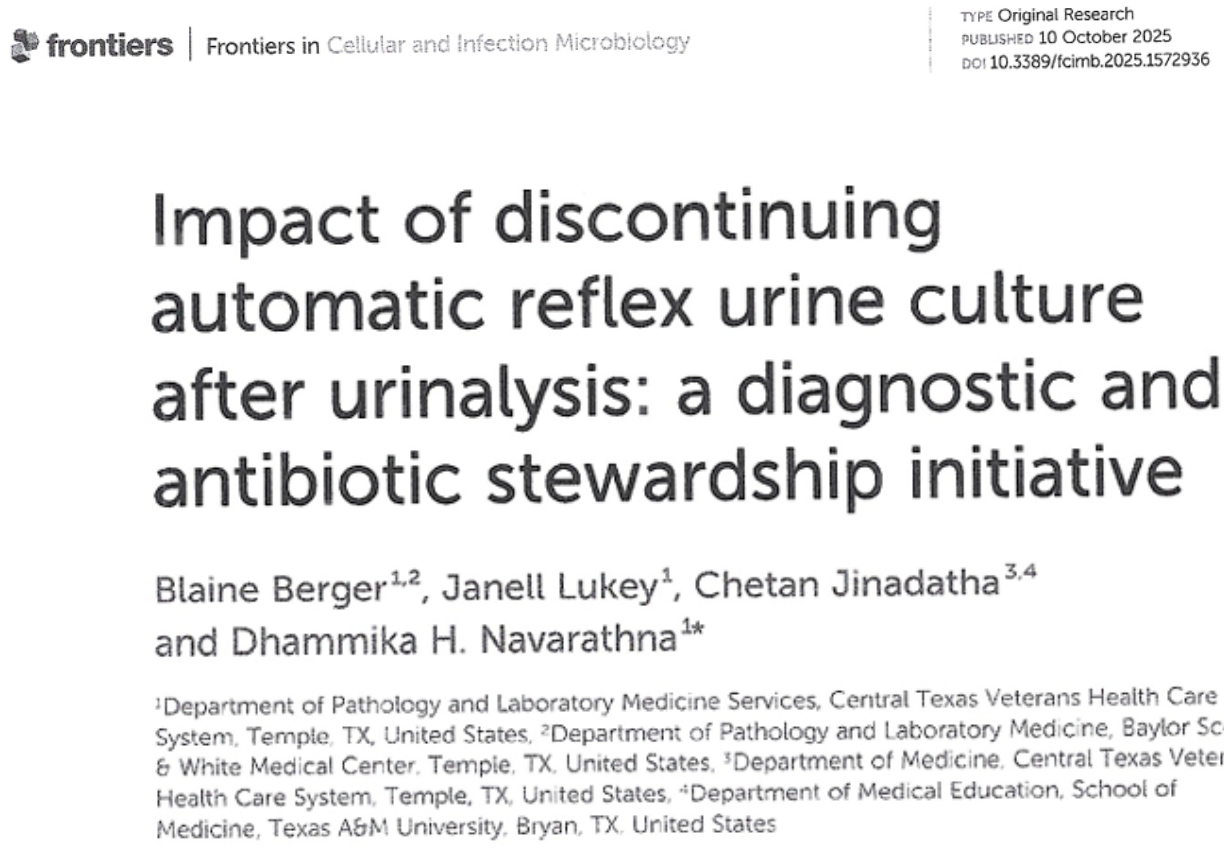
(Received 19 May 2025; accepted 31 July 2025)

Pertinent Recent Literature



frontiers | Frontiers in Cellular and Infection Microbiology

TYPE Original Research
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DOI 10.3389/fcimb.2025.1572936

Impact of discontinuing automatic reflex urine culture after urinalysis: a diagnostic and antibiotic stewardship initiative

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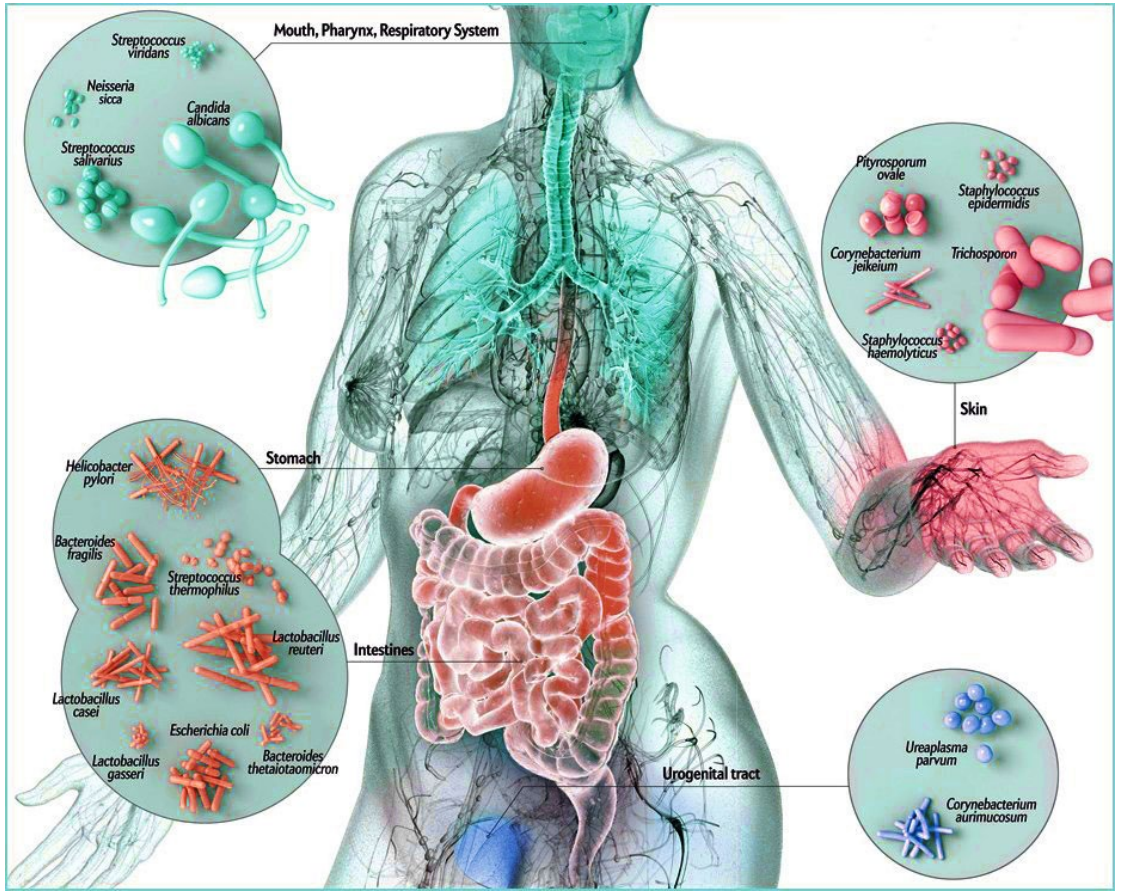
Microbiome Considerations

- Normal genitourinary flora
- Normal vaginal flora
- Atrophic vaginitis flora

Treatment increases risk of UTI’s



Urinalysis and Urine Cultures

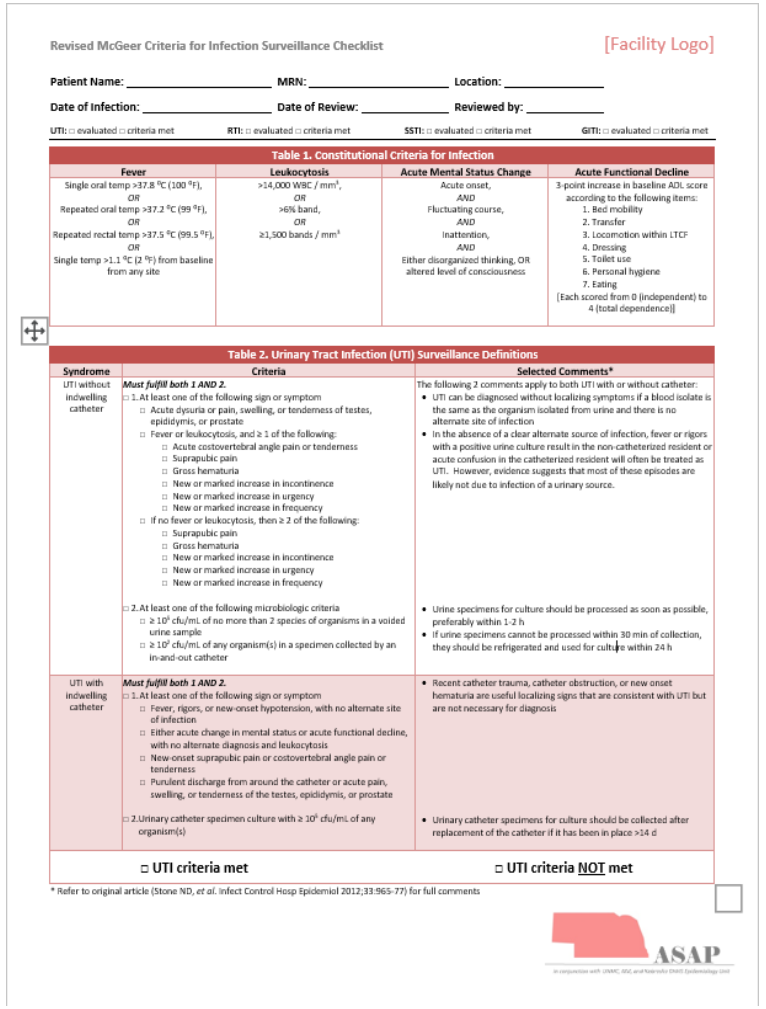
- Send urinalysis (UA) (optional) and urine culture when patient has symptoms of UTI
- How urine cultures are collected matters
- Do not send urine cultures for
  - Cloudy or foul-smelling urine
  - Routinely on admission or preop
  - Routinely before or after a catheter change
  - As part of a fever work up if there are no signs or symptoms localizing to the urinary tract
  - As a test of cure

Mental Status Changes and Asymptomatic Bacteriuria

- Bacteriuria and delirium are each independently common in the elderly.
- Although patients with a symptomatic UTI may present with delirium, falls, or confusion, these symptoms are unlikely to be the result of a UTI in the absence of urinary symptoms.
- If a patient has signs of systemic infection and delirium, empiric antibiotic therapy is likely warranted.

Important Considerations

- Atrophic Vaginitis
- LTC McGeer Criteria
- #1 use of antibiotics in LTC is suspected UTI
- Do not check a U/A or urine culture for cure
- Indwelling catheter colonization



Revised McGeer Criteria for Infection Surveillance Checklist [Facility Logo]

Patient Name: _____ MRN: _____ Location: _____

Date of Infection: _____ Date of Review: _____ Reviewed by: _____

UTI: □ evaluated □ criteria met RTI: □ evaluated □ criteria met SSTI: □ evaluated □ criteria met GITI: □ evaluated □ criteria met

Table 1. Constitutional Criteria for Infection

Fever	Leukocytosis	Acute Mental Status Change	Acute Functional Decline
Single oral temp >37.8 °C (100 °F), *OR* Repeated oral temp >37.2 °C (99 °F), *OR* Repeated rectal temp >37.5 °C (99.5 °F), *OR* Single temp >1.1 °C (2 °F) from baseline from any site	>14,000 WBC / mm^3, *OR* >6% band, *OR* ≥1,500 bands / mm^3	Acute onset, *AND* Fluctuating course, *AND* Inattention, *AND* Either disorganized thinking, OR altered level of consciousness	3-point increase in baseline ADL score according to the following items: 1. Bed mobility 2. Transfer 3. Locomotion within LTCF 4. Dressing 5. Toilet use 6. Personal hygiene 7. Eating (Each scored from 0 (independent) to 4 (total dependence))

Table 2. Urinary Tract Infection (UTI) Surveillance Definitions

Syndrome	Criteria	Selected Comments*
UTI without indwelling catheter	***Must fulfill both 1 AND 2.*** □ 1. At least one of the following sign or symptom □ Acute dysuria or pain, swelling, or tenderness of testes, epididymis, or prostate □ Fever or leukocytosis, and ≥ 1 of the following: □ Acute costovertebral angle pain or tenderness □ Suprapubic pain □ Gross hematuria □ New or marked increase in incontinence □ New or marked increase in urgency □ New or marked increase in frequency □ If no fever or leukocytosis, then ≥ 2 of the following: □ Suprapubic pain □ Gross hematuria □ New or marked increase in incontinence □ New or marked increase in urgency □ New or marked increase in frequency □ 2. At least one of the following microbiologic criteria □ ≥ 10^5 cfu/mL of no more than 2 species of organisms in a voided urine sample □ ≥ 10^5 cfu/mL of any organism(s) in a specimen collected by an in-and-out catheter	The following 2 comments apply to both UTI with or without catheter: • UTI can be diagnosed without localizing symptoms if a blood isolate is the same as the organism isolated from urine and there is no alternate site of infection • In the absence of a clear alternate source of infection, fever or rigors with a positive urine culture result in the non-catheterized resident or acute confusion in the catheterized resident will often be treated as UTI. However, evidence suggests that most of these episodes are likely not due to infection of a urinary source. • Urine specimens for culture should be processed as soon as possible, preferably within 1-2 h • If urine specimens cannot be processed within 30 min of collection, they should be refrigerated and used for culture within 24 h
UTI with indwelling catheter	***Must fulfill both 1 AND 2.*** □ 1. At least one of the following sign or symptom □ Fever, rigors, or new-onset hypotension, with no alternate site of infection □ Either acute change in mental status or acute functional decline, with no alternate diagnosis and leukocytosis □ New-onset suprapubic pain or costovertebral angle pain or tenderness □ Purulent discharge from around the catheter or acute pain, swelling, or tenderness of the testes, epididymis, or prostate □ 2. Urinary catheter specimen culture with ≥ 10^5 cfu/mL of any organism(s)	• Recent catheter trauma, catheter obstruction, or new onset hematuria are useful localizing signs that are consistent with UTI but are not necessary for diagnosis • Urinary catheter specimens for culture should be collected after replacement of the catheter if it has been in place >14 d
□ UTI criteria met		□ UTI criteria NOT met

* Refer to original article (Stone ND, *et al.* Infect Control Hosp Epidemiol 2012;33:965-77) for full comments

ASAP

Recurrent UTI's

- Consider catheter acquired urine culture
- Adequate fluid intake
- Assess and treat for atrophic vaginitis
- Cranberry juice
- Lactobacillus containing probiotic

Urine Culture Results and Sensitivities in Rural Areas

- 90% of positive urine cultures are E. coli
- Sensitivities
  - Nitrofurantoin 98%
  - Keflex 95%
  - TMP/SMP 95%

Uncomplicated Cystitis Treatment

Drug	Duration Studied
Nitrofurantoin	**5 days**
TMP/SMX	**3 days**
Cephalexin	7 days
Cefpodoxime	3 days
Cefdinir	5 days

Most patients can be treated for 3–5 days.

- Back up treatment options: Ciprofloxacin and Fosfomycin

Take Home Messages

- Send urine cultures only when you suspect UTIs based on clinical symptoms.
- Asymptomatic bacteriuria is common and should not be treated in the vast majority of patients.
- Select appropriate durations of therapy for cystitis, pyelonephritis, and complicated urinary tract infections.
  - For uncomplicated cystitis this is generally 3–5 days.

Pertinent Recent Literature

INFECTION CONTROL & HOSPITAL EPIDEMIOLOGY JUNE 2018, VOL. 39, NO. 6

CONCISE COMMUNICATION

Reducing *Clostridium difficile* Colitis Rates Via Cost-Saving Diagnostic Stewardship

Christina Yen, MD;[1,2] Paul Holtom, MD;[1,2]
Susan M. Butler-Wu, PhD;[1,3] Noah Wald-Dickler, MD;[1,2]
Ira Shulman, MD;[1,3] Brad Spellberg, MD[1,2]

We conducted a quality improvement project at a large public tertiary-care academic hospital to reduce reported hospital-acquired *Clostridium difficile* infection (CDI) rates. We introduced diagnostic stewardship and provider education, resulting in a 2-fold reduction in *C. difficile* nucleic acid amplification test (NAAT) orders and markedly lower hospital CDI rate.

Infect Control Hosp Epidemiol 2018;39:734–736

Pertinent Recent Literature

INFECTION CONTROL & HOSPITAL EPIDEMIOLOGY DECEMBER 2016, VOL. 37, NO. 12

ORIGINAL ARTICLE

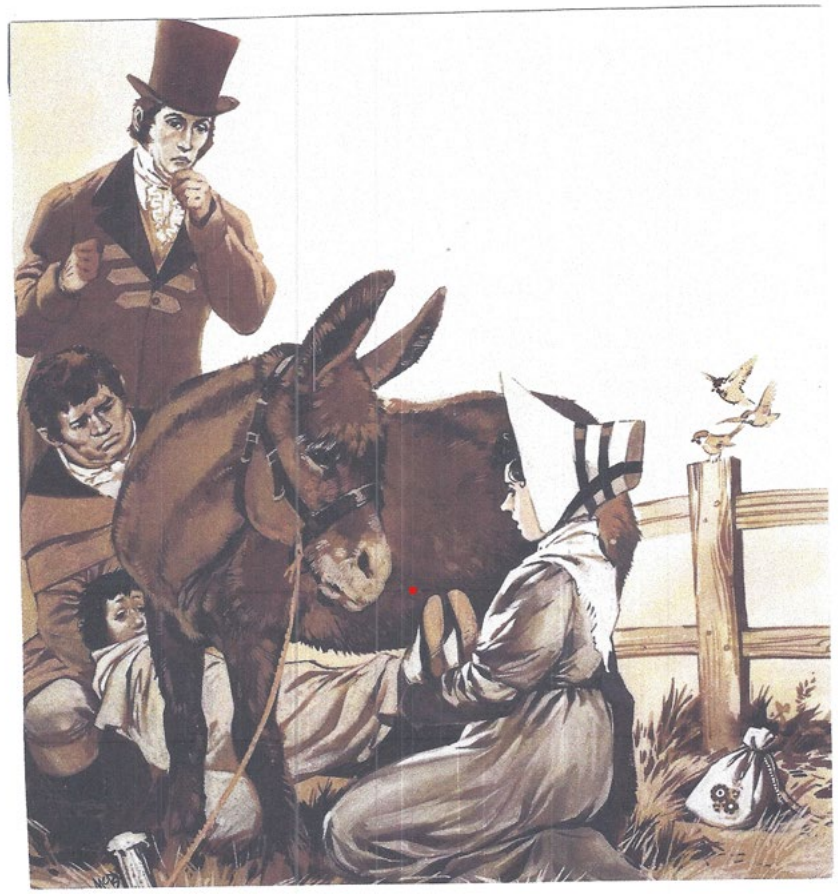
Inappropriate *Clostridium difficile* Testing and Consequent Overtreatment and Inaccurate Publicly Reported Metrics

Sean G. Kelly, MD;[1] Michael Yarrington, MD;[2] Teresa R. Zembower, MD;[1,3] Sarah H. Sutton, MD;[1,3] Christina Silkaitis, MT;[3] Michael Postelnick, RPh;[4] Anessa Mikolajczak, BSN;[5] Maureen K. Bolon, MD[1,3]

Testing to diagnosis Clostridioides difficile

- **Diagnostic Stewardship recommendations**
  - Only test if greater than 3 stools in less than 24 hours with patient not receiving laxatives.
  - Do not test if patient receiving laxatives.
  - Do not test formed or soft stool
  - Do not recheck test within 7 days
  - Do not test for cure
  - Do not test asymptomatic patients.

Whooping Cough/Pertussis treatment in the 1700's



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Questions and Discussion

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