



UNIVERSITY *of* MARYLAND
SCHOOL OF MEDICINE

The Complicated Nature of Urinary Tract Infection Diagnosis and Potential Role of Diagnostic Stewardship in Long-Term Care

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Acknowledgement

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Learning Objectives

Recognize

Recognize the importance of diagnostic stewardship in preventing unnecessary antibiotic use for UTI

Describe

Describe UTI diagnostic stewardship tools for use in the LTCF setting

Identify

Identify diagnostic approaches to residents with cognitive impairment and change in condition

A high
proportion of
UTI
antimicrobial
use occurs in
patients with
inappropriate
culturing

- Majority of patients with positive urine tests not meeting expert consensus clinical criteria are treated for UTI
- Among older adults seen in ED for non-infectious reasons, urine cultures positive in 14%
 - 71% of those received antibiotics
- **Positive urine culture is a powerful stimulus to treat**

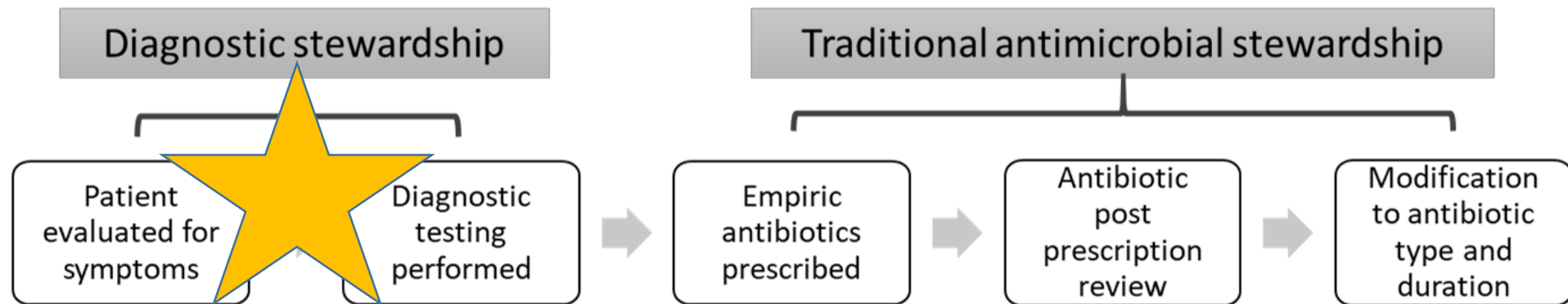
Asymptomatic Bacteriuria Is Common

	Asymptomatic bacteriuria
Women less than 60 years	3-5%
Elderly in Community	
Women	11-16%
men	15-40%
Elderly in Nursing Homes	
women	25-50%
men	15-40%
Patient with indwelling catheter	100%

Why is inappropriate culturing so common?

- High prevalence of asymptomatic bacteriuria
- High prevalence of non-specific symptoms
 - Older patients with multiple reasons for change in mental status and function
- Ordering practices
 - Reflexive “knee-jerk”
 - Misattribution of symptoms to UTI
 - Cloudy or foul-smelling urine; mental status changes alone
 - Lack of time to evaluate and fear of missing true UTI
 - Family request

Diagnostic Stewardship is Upstream of Antimicrobial Stewardship



Michigan Hospital Medicine Safety Consortium:
80% of reduction in unnecessary antibiotic use was due to decrease in inappropriate testing

Applying diagnostic stewardship for UTI in LTCF

Methods and Tools

- Culturing for appropriate symptoms
- Delayed action protocols
- SBAR communication

Practical Implementation Issues

- Cross-disciplinary approach
- Urine culture “champion”
- Education
- Data review and feedback

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General guidance to develop your facility's urine testing criteria and pathways

- **Most** patients
 - Do not test for non-specific symptoms alone
- Identify 'high-risk' patients (i.e., abnormal vital signs, systemic or complicated infection)
 - Test if urinary tract symptoms or signs
 - Test if no other localizing symptoms or signs (e.g., new or worsening cough suggesting pneumonia)
- Eliminate default urine testing for any "change in condition"
- Do not use changes in urine character alone
- No "test of cure" urine cultures if symptoms resolved

Testing pathway: Example 1

Patients without indwelling catheter

At least 1 of the following sign or symptom subcriteria

1. Acute dysuria or acute pain, swelling, or tenderness of the testes, epididymis, or prostate
2. Fever or leukocytosis and at least **1** of the following localizing urinary tract subcriteria

If no fever: **2** of the localizing urinary tract subcriteria

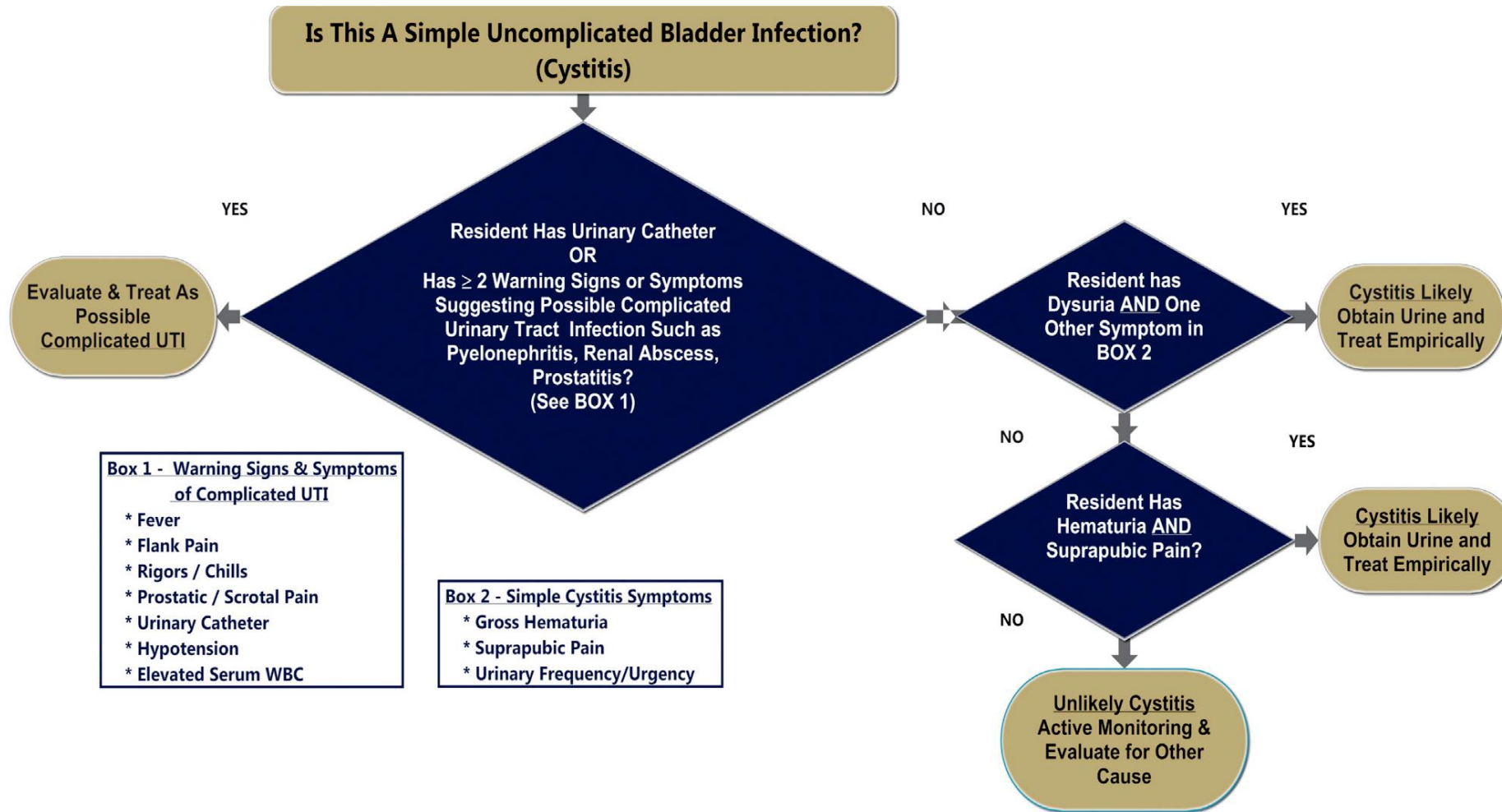
1. Acute costovertebral angle pain or tenderness
2. Suprapubic pain
3. Gross hematuria
4. New or marked increase in incontinence
5. New or marked increase in urgency
6. New or marked increase in frequency

Patients with indwelling catheter

At least 1 of the following sign or symptom subcriteria:

1. Fever, rigors, or new-onset hypotension, with **no alternate site of infection**
2. Either acute change in mental status or acute functional decline, **with no alternate diagnosis and leukocytosis**
3. New-onset suprapubic pain or costovertebral angle pain or tenderness
4. Purulent discharge from around the catheter or acute pain, swelling, or tenderness of the testes, epididymis, or prostate

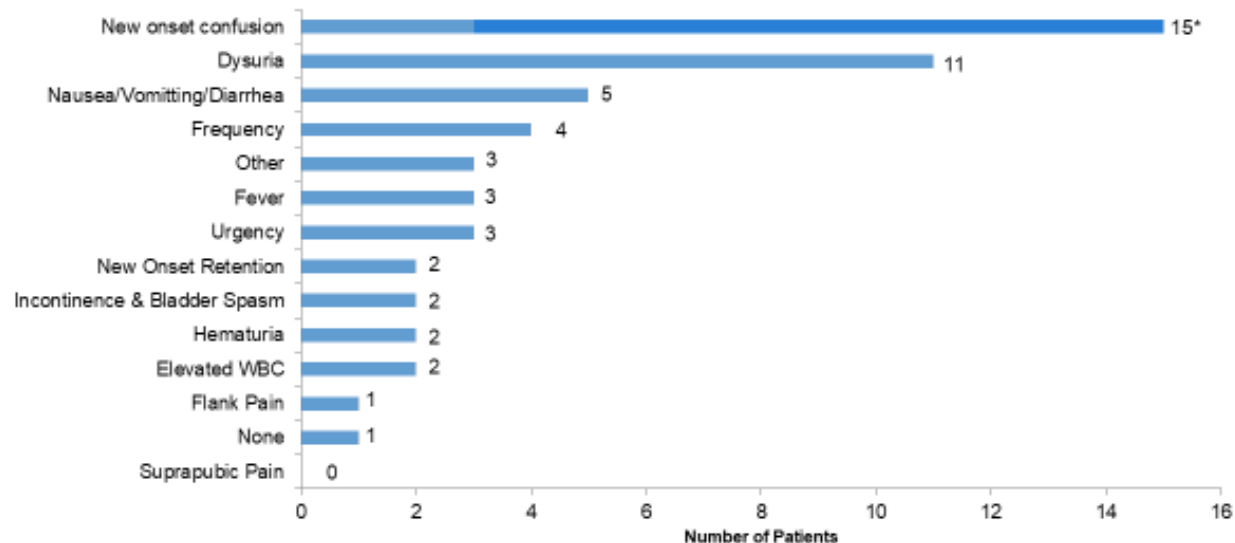
Testing Pathway: Example 2



But what about mental status changes?

- Common basis of urine culturing
- Inappropriate in most instances (applying consensus criteria)

Appropriateness of UTI Testing and Treatment:
Symptom Breakdown (n=42), Facility A



*12 patients, confusion/delirium was the only symptom that triggered a urine culture

Data courtesy Ghinwa Dumyati MD
Rochester Nursing Home Collaborative

UTI and Evaluation of Mental Status or Diffuse Changes in Condition

Myth # 1: Change in mental status or behavior or function = UTI

Reality: Patients with these symptoms are no more likely to have UTI than many other causes of those changes

Myth # 2: Residents with cognitive impairment are unable to report symptoms

Reality: Symptoms and signs of UTI can frequently be elicited despite cognitive impairment

Nace D. Improving Outcomes of UTI (IOU) Study Toolkit. Available at <https://paltc.org/content/iou-toolkit>

Clinical Practice Guideline for the Management of Asymptomatic Bacteriuria: 2019 Update by the Infectious Diseases Society of America^a

Lindsay E. Nicolle,¹ Kalpana Gupta,² Suzanne F. Bradley,³ Richard Colgan,⁴ Gregory P. DeMuri,⁵ Dimitri Drekonja,⁶ Linda O. Eckert,⁷ Suzanne E. Geerlings,⁸ Béla Köves,⁹ Thomas M. Hooton,¹⁰ Manisha Juthani-Mehta,¹¹ Shandra L. Knight,¹² Sanjay Saint,¹³ Anthony J. Schaeffer,¹⁴ Barbara Trautner,¹⁵ Bjorn Wullt,¹⁶ and Reed Siemieniuk¹⁷

In older patients with functional and/or cognitive impairment with bacteriuria and delirium (acute mental status change, confusion) and without local genitourinary symptoms or other systemic signs of infection (eg, fever or hemodynamic instability), we recommend assessment for other causes and careful observation rather than antimicrobial treatment

Approaches to UTI Diagnosis in Setting of Cognitive Impairment

- **Residents with even limited verbal skills can often still report acute bothersome symptoms**
- Dementia diagnosis should not stop from asking about symptoms
 - Take time to obtain history
 - Ask for presence of symptoms specific to urinary tract
 - Look for tenderness of flank, suprapubic, scrotal areas
 - Repeat questions for response consistency

Nace D. Improving Outcomes of UTI (IOU) Study Toolkit. Available at <https://paltc.org/content/iou-toolkit>

Evaluating LTCF Resident with Dementia for Possible UTI

- Speak to the resident directly and in a quiet setting.
- Minimize distractions by turning off the TV, loud music, and closing the door.
- Establish a calm, relaxed rapport with the resident.
- Use yes / no type questions and use visual clues.
- Give the resident time to respond to questions.
- When asking specific questions about urinary symptom, rephrase the questions using a variety of alternative descriptors. For example, when investigating whether a resident has dysuria, ask not just about burning on urination, but also ask about discomfort, pain, “hurting when you pee”.
- Weave repeated questions into your conversation.
- Suprapubic, flank, and scrotal pain are both symptoms and an exam findings. Always perform an abdominal exam when assessing for suprapubic pain.

Nace D. Improving Outcomes of UTI (IOU) Study Toolkit. Available at <https://paltc.org/content/iou-toolkit>

Choosing Wisely: Urine culturing



An initiative of the ABIM Foundation



3

Don't obtain a urine culture unless there are clear signs and symptoms that localize to the urinary tract.

Chronic asymptomatic bacteriuria is frequent in the LTC setting, with prevalence as high as 50%. A positive urine culture in the absence of localized urinary tract infection (UTI) symptoms (i.e., dysuria, frequency, urgency) is of limited value in identifying whether a patient's symptoms are caused by a UTI. Colonization (a positive bacterial culture without signs or symptoms of a localized UTI) is a common problem in LTC facilities that contributes to the over-use of antibiotic therapy in this setting, leading to an increased risk of diarrhea or other adverse drug events, resistant organisms, and infection due to *Clostridium difficile*. An additional concern is that the finding of asymptomatic bacteriuria may lead to an erroneous assumption that a UTI is the cause of an acute change of status, hence failing to detect or delaying the more timely detection of the patient's more serious underlying problem. A patient with advanced dementia may be unable to report urinary symptoms. In this situation, it is reasonable to obtain a urine culture if there are objective signs of systemic infection such as fever (increase in temperature of equal to or greater than 2°F [1.1°C] from baseline) leukocytosis, or a left shift or chills in the absence of additional symptoms (e.g., new cough) to suggest an alternative source of infection.

A patient with advanced dementia may be unable to report urinary symptoms, in this situation, it is reasonable to obtain a urine culture if there are signs of systemic infection such as

- **Fever** (increase in temperature $\geq 2^{\circ}$ F (1.1 $^{\circ}$ C) from baseline)
- **Elevated WBC**
- **Chills**

in the absence of additional symptoms (e.g. new cough) to suggest an alternative source of infection

UTI diagnosis pathways summary

Distinguish between high-risk and low-risk patients

- High-risk defined by change in vital signs/systemic symptoms → provider evaluation for possible complicated UTI

Perform urine testing in patients with symptoms localizing to urinary tract

Mental status change with baseline cognitive impairment

- Slow and careful history & exam
- Test in presence of other systemic symptoms or urinary symptoms
- Test in absence of symptoms localizing to other organs

Low-risk patients without urinary tract specific symptoms: Delayed action protocol

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Practical Implementation Issues

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Delayed Action Protocols

- **What:** Alternate pathway for low-risk patients with vague symptoms and unclear diagnosis
- **Why:**
 - Clinicians often do not have opportunity for immediate evaluation
 - Not doing something (i.e., culture +/- treat) viewed as negative
- **How:** Promote structured observation as *meaningful action*
 - In a study of educational intervention to reduce prescribing for UTI
 - observation and monitoring interventions increased
 - no increase in hospitalizations

Nace *JAMDA* 2014

Petterson *J Antimicrob Chemother* 2011

Sample monitoring tool for stable patient (no urinary symptoms and no systemic symptoms/signs)

- Obtain vital signs (BP, Pulse, Resp Rate, Temp, Pulse Ox) every ____ hours for ____ days.
- Record fluid intake each shift for ____ days.
- Notify physician if fluid intake is less than ____ cc daily.
- Offer resident ____ ounces of water / juice every ____ hours.
- Notify physician, NP, or PA if condition worsens, or if no improvement in ____ hours.
- Obtain the following blood work _____ .
- Consult pharmacist to review medication regimen.
- Contact the physician, NP, PA with an update on the resident's condition on _____.

Nace D. *JAMDA* 2014

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SBAR for Communication

- **Situation** (concerned about possible UTI: communicate high or low risk if possible)
- **Background** (resident brief history/diagnoses including baseline indwelling catheter, incontinence, dementia)
- **Assessment** (UTI symptoms/signs based on facility protocols)
- **Request**
 - Observation/monitoring parameters
 - Tests
 - Antibiotics

AHRQ Suspected UTI SBAR Toolkit. Available at:

<https://www.ahrq.gov/nhguide/toolkits/determine-whether-to-treat/toolkit1-suspected-uti-sbar.html>

Suggested SBAR for Low-Risk Change in Condition

“According to my assessment, this resident is experiencing a low-risk change-in-condition. I would like your permission to initiate our active monitoring care plane. I would not recommend testing the urine or starting antibiotics at this time”

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Cross-disciplinary approach

- “Cross” vs “Multi” disciplinary
- Ordering traditionally a provider role
- Urine culture decision pathways require other disciplines to think about urine testing
 - Nursing staff
 - Infection Prevention lead
 - Pharmacist
 - Family member
- Medical Director needs to empower and facilitate



Team-Based Activities

- Develop facility-specific ordering guidance
- Develop delayed action protocols
- Agreed upon SBAR language
- Education (including family education)

When developed by team rather than individual, more likely to be used as intended

Individual Responsibilities

- **Medical Director:** Sponsor
- **Nursing Staff:** Champion
 - Advocate, closest to patient and family
- **Infection Preventionist:** Member/Advocate
 - Track urine culture orders by indication, positive urine cultures, appropriateness of indication based on facility guideline
- **Pharmacist:** Member/Advocate
 - Track antibiotic starts for UTI, adverse events related to UTI antibiotics
 - Antibigram: resistance rates can provide impetus for appropriate culturing – risk of losing all oral antibiotics!

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Find a bedside champion!

- Role of infection prevention champion well described in healthcare epidemiology literature
- “Champions are respected individuals with strong communication skills who are knowledgeable and enthusiastic about the topic at hand. These front line personnel promote and lead healthcare-associated infection prevention initiatives by engaging and educating colleagues, solving problems, and communicating across all levels of leadership”

CDC. Infection Prevention Champion. Available at:

<https://www.cdc.gov/hai/prevent/tap/preventionchampions.html>

Infection Prevention Champions



<https://www.cdc.gov/hai/prevent/tap/preventionchampions.html>

Champions are respected individuals with strong communication skills who are knowledgeable and enthusiastic about the topic at hand. These front line personnel promote and lead healthcare-associated infection prevention initiatives by engaging and educating colleagues, solving problems, and communicating across all levels of leadership.*

For examples on how champions lead [catheter-associated urinary tract infection](#), [central line-associated blood stream infection](#) and [C. difficile infection reduction](#) efforts to improve adherence to infection prevention measures go to: www.cdc.gov/hai/prevent/tap/preventionchampions.html.

Identify

Identify Potential Champions:

- Respected
- Effective Communicators
- Enthusiastic
- Committed
- Courageous
- Team Oriented
- Open to New Ideas
- Early Adopters

Train

Provide Resources:

- Facility specific data for action
 - Results of TAP Assessments
- Evidence/Guidelines on which the initiative is based
- Contact information for support personnel
- Facility protocols for promoting initiatives

Empower

Facilitate Success:

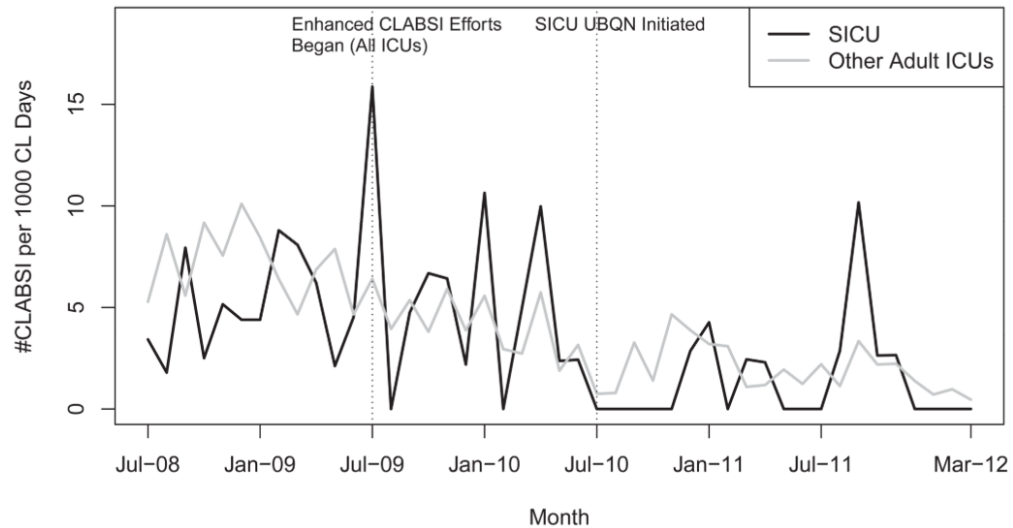
- Offer leadership support
- Make initiatives patient-centered
- Clearly define goals & timelines
- Encourage involvement from other staff
- Assist in making evidence actionable

Sustain

Continue Support:

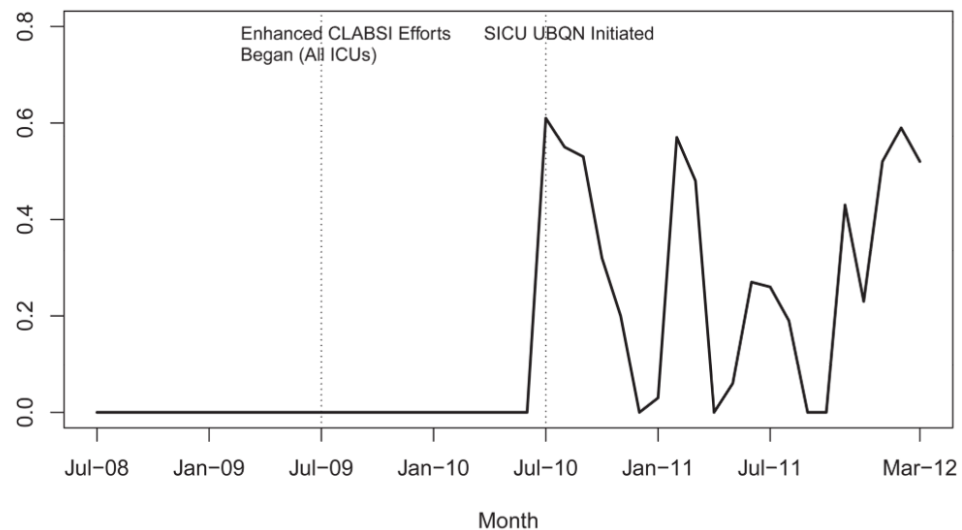
- Align goals across leadership levels
- Conduct audits and provide feedback to personnel
- Offer ongoing opportunities to discuss concerns with personnel
- Ensure hand off at the end of an initiative

Impact of SICU Unit-based Quality Nurse on CLABSI Rate



- Surgical ICU CLABSI champion “unit quality nurse”
- CLABSI rate was 5 per 1000 CL days before the intervention and 1.5 after the intervention
- Decreased by 5.1% ($p = 0.005$) for each additional 1% of days of the month that the unit quality nurse was present

Proportion of Days Unit-based Quality Nurse on Unit



Urine Culturing Champion

- **Responsibilities**
 - Gain knowledge of content
 - Disseminate protocols
 - Perform audits
 - Serve as resource: bedside education / trouble-shooting
- **Staff nurse** ideal (natural liaison between patient, provider, pharmacist, family)
 - In addition to regular duties or specific to champion role (limited time)
- **Personal attributes**
 - Empowered to speak up
 - Energetic, enthusiastic
 - Effective communicator
 - Early adopter

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Education

- Difficult but critical
 - Ongoing
 - All healthcare worker roles
 - Families!
- Utilize internal and external experts
- Outcomes of urine culture pathways
 - What did we learn from the patient's urine culture order?
 - *Positive*: Delayed action protocol leading to alternate, correct diagnosis
 - *Negative*: Inappropriate culture leading to unnecessary treatment and adverse effect



Talking Points for Staff and Families

- Nursing home residents, **including those with significant dementia**, who present without urinary symptoms no more likely to have UTI than any other acute change in condition
- Unnecessary urine culture may:
 - Delay true diagnosis
 - Lead to unnecessary antibiotics and adverse effects



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Data Review and Feedback

Facility Level

Urine cultures per month

Number (%) that did not have indication

- Breakdown by indication
- Number (%) with treatment in absence of indication

Provider Level

Total number urine cultures in time period

Number (%) ordered by provider X

- Meeting indication/not meeting indication
- Ordering practice relative to others

Medical director should review 'outlier' clinicians who order urine tests frequently, or in absence of criteria

Data Review and Feedback

Patient Level

Case reviews, root cause or apparent cause analysis of UTI cases

- **“Was urine culturing appropriate?”** should be distinct question

- Adverse effects of treatment, if any

Positive stories are powerful: Example of *appropriate* evaluation of mental status change with observation, no urine testing, provider evaluation when symptoms were persistent → alternate diagnosis of hyponatremia

- Review “outlier” residents: residents with frequent treatment for “UTI”

All Data

- Include feedback of data in regular and ongoing training: allows education to stick

Key Take-Home Points

Implement diagnostic stewardship as critical adjunct to antimicrobial stewardship to prevent unnecessary urine culturing

- Develop facility-specific protocols to
- Identify low-risk patients where delayed action protocols can be applied
 - Guide appropriate evaluation of mental status changes

Use SBAR for communication of low-risk change in resident condition → nudge away from urine testing

Identify a “urine culture champion” to facilitate urine testing stewardship

Resources

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- CDC. Infection Prevention Champion. Available at: <https://www.cdc.gov/hai/prevent/tap/preventionchampions.html>