

**VA**



**U.S. Department of Veterans Affairs**

Veterans Health Administration

*Geriatric Research, Education, and Clinical Centers*

# It's OK to Have A Dirty Urine

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# Speaker Disclosures

Dr. Jump has no direct conflicts of interest related to this presentation.

Dr. Jump has research support from the VA, AHRQ, Pfizer, Merck and Abacus. She serves on advisory board for Pfizer.

The opinions presented herein are my own and do not represent those of the Veterans Affairs system or the federal government.

**VA**



# Learning Objectives

- Recognize signs and symptoms of acute cystitis as well as other reasons for those symptoms
- Interpret and respond to results from urinalyses and urine cultures
- Discuss management of individuals with acute cystitis



# Mr. N

73 year-old male admitted to the nursing home on 1/5/2024 for rehabilitation following surgical repair of a broken femur.

## PMHx:

chronic pain on opioids since 2007

lower urinary tract syndrome (LUTS)

diabetes mellitus (Hgb A1C 6.2%)

chronic kidney disease (Cr 1.5)

coronary artery disease, s/p CABG 2014





# Mr. N

Date	Events
01/10/2024	Nurse notes dysuria; Night coverage orders UA & Culture UA w/ SG 1.023, TNTC WBC, 3-10 RBC
01/12/2024	Culture with >100K Klebsiella Covering provider orders 8 days cefuroxime



# Loeb Minimum Criteria for Initiating Antibiotics

➤ Dysuria

OR

- 2 or more of the following:
  - Fever and/or shaking chills
  - Urgency
  - Flank pain or suprapubic pain
  - New or worsening incontinence
  - Gross hematuria

Loeb *et al.* BMJ 2005;331:669

A vertical strip on the left side of the slide shows a microscopic view of a petri dish with a dark green agar surface. Several small, circular, yellowish-white bacterial colonies are visible, some with a more pronounced central dot.

# Signs and Symptoms of...

## Acute Cystitis

Dysuria

Urgency

Flank pain or  
suprapubic pain

New/worsening  
incontinence

Gross hematuria

Fever and/or  
shaking chills

# Signs and Symptoms of...

## Something Else

Occasional tingling or funny feeling

Urinary retention

Change in mental status, behavior, or functional status

Dark or funny smelling urine

Falls

Family or resident request





# Typical Signs & Symptoms of Infection

Fever

Cough, sputum production, chest pain

Dysuria, frequency, urgency, hematuria

Nausea, vomiting, abdominal pain, diarrhea

Erythema, swelling, pain



# Typical Signs & Symptoms of Infection

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Erythema, Swelling, Pain



# Atypical Signs & Symptoms of Infection



Poor appetite (anorexia)

Functional decline

Falls

Incontinence

Change in mental status

Delirium

# Atypical Signs & Symptoms of Infection



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Delirium

# Change in Mental Status



Depression  
chronic

Dementia  
chronic

Delirium  
acute\*

Coma  
acute

## Change in Behavior

- (bothersome)
- Should **not** prompt evaluation for infection

## Change in Level of Consciousness

- (alarming)
- Infection is a common cause of delirium

\*may last for days to weeks

# Confusion Assessment Method (CAM)



Acute change in mental  
status with a fluctuating  
course

AND

Inattention

WITH  
EITHER

Disorganized thinking

OR

Altered level of  
consciousness



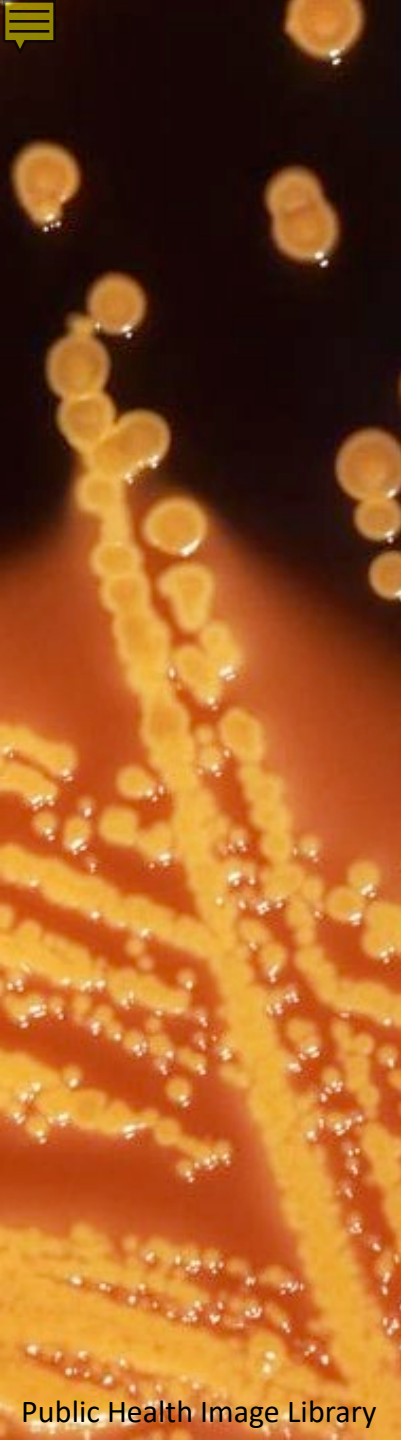
**PennState**

- **UB-CAM app** on Apple and Google Play



# Clean Catch?

- Sit down
- Cleanse
- Cleanse again
- Hold labia apart
- Start to pee
- Stop peeing
- Position container
- Start to pee again and collect urine
- Put lid onto container without touching sides or lid



A vertical strip on the left side of the slide shows a microscopic view of bacteria, likely E. coli, appearing as orange, rod-shaped structures against a dark background.

# Recommendations for Urine Collection

- Suggest shower or bath before attempting clean catch
- For men, short-term condom catheter. Check bag every 30 minutes
- For women, in/out catheterization, unfortunately....
- If urinary catheter, then must change entire collection system *before* collecting sample
- Samples must be stored in the refrigerator until transported to the lab



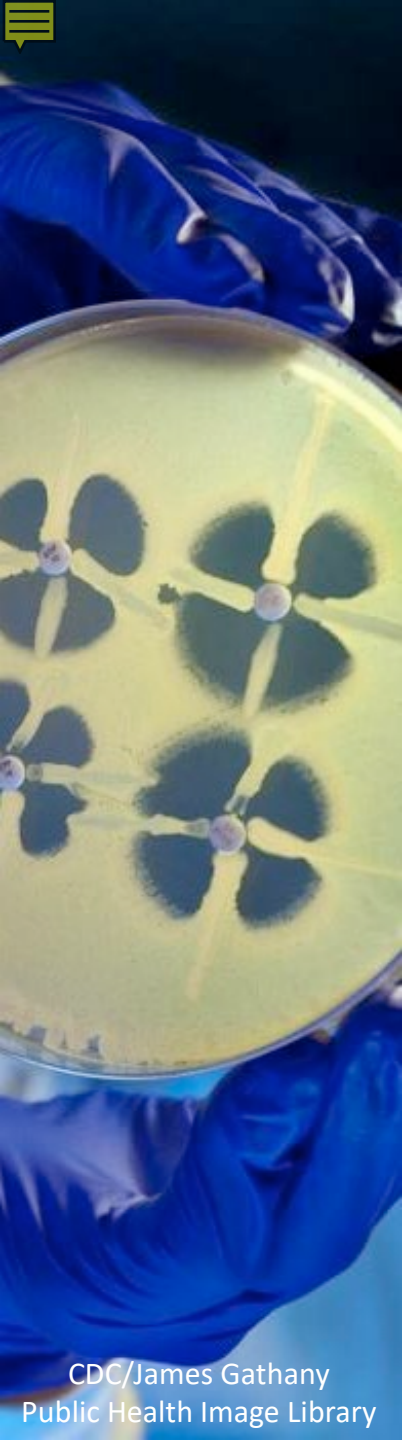
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**We need to tell families, it's  
not just “check a urine.”**

# Interpreting Diagnostic Tests





Diagnoses	Urine Culture	Clinical Symptoms
Acute, uncomplicated urinary tract infection	>100,000 bacteria, No more than 2 species of bacteria	<ul style="list-style-type: none"><li>• Dysuria</li></ul> OR <ul style="list-style-type: none"><li>• Fever AND 1 of the following:<ul style="list-style-type: none"><li>-Frequency</li><li>-Urgency</li><li>-Suprapubic pain</li><li>-Incontinence*</li><li>-Gross Hematuria**</li></ul></li></ul>
Asymptomatic Bacteriuria	>100,000 bacteria, No more than 2 species of bacteria	<ul style="list-style-type: none"><li>• No signs or symptoms referable to the urinary tract</li></ul>

Stone *et al.* Infec Control Hosp Epi 2012;

\*New or worsening of baseline incontinence

\*\*I have never known hematuria to a sign of infection in an older adult. Rather, it seems to indicate trauma to the mucosa, which can lead to urinary tract infection or urosepsis.

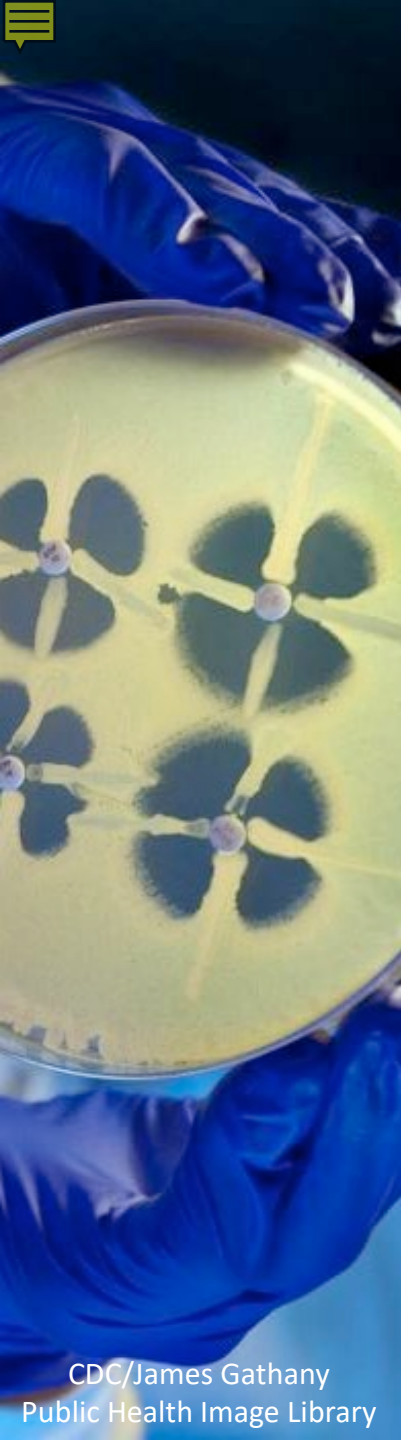
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# Urinalysis

- Leukocyte esterase → white blood cells
- Nitrites → *Enterobacteriaceae* in urine

**This tells us nothing about acute cystitis  
So why do we check UAs?**

Dipstick Results	Laboratory Evidence for UTI (>100K CFU/mL and >10 WBC/mL)		
	Positive	Negative	Total
Positive for leukocytes esterase OR nitrites	40	49	89
Negative for both	0	12	12
Total	40	61	101

# Urinalysis

- Leukocyte esterase → white blood cells
- Nitrites → *Enterobacteriaceae* in urine

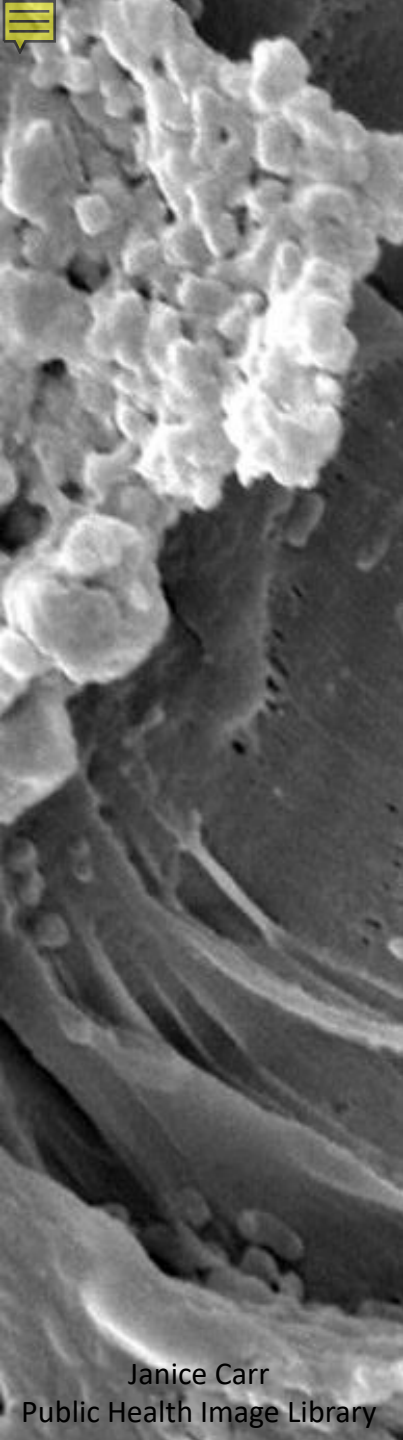
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Sensitivity 100%; Specificity 20%

PPV 45%; NPV 100%





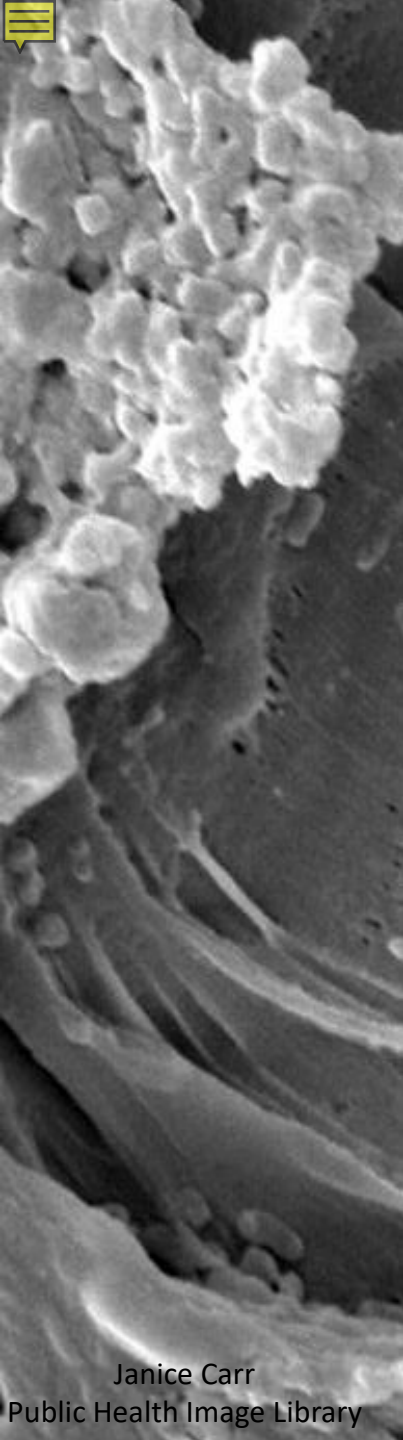
# Catheter-Associated UTIs (CAUTIs)

$\geq 10^3$  cfu/mL of  $\geq 1$  bacterial species & a symptom:

Clinical Symptoms	Context for Interpretation
Fever Rigors Change in mental status Malaise Lethargy	With no other identified cause
Flank pain Costovertebral angle tenderness *Acute hematuria Pelvic Discomfort	Signs or symptoms referable to the urinary tract
Dysuria Urgency or Frequency Suprapubic pain or tenderness	Within 48 hours of catheter removal

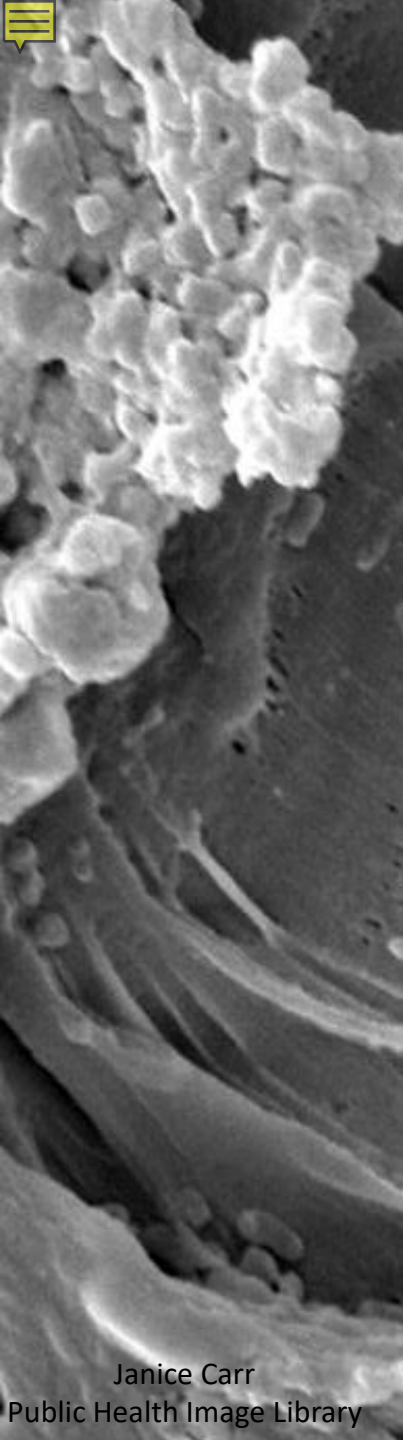
Hooton *et al.* CID 2010;50 625 ([www.IDSociety.org](http://www.IDSociety.org))

\*I have never known hematuria to be a sign of infection in an older adult. Rather, it seems to indicate trauma to the mucosa, which can lead to urinary tract infection or urosepsis.



# 2009 NHSN criteria for CAUTI

Laboratory	Symptoms
Urine culture with $\geq 10^5$ cfu/mL of 1-2 bacterial species	Fever ( $>38^{\circ}\text{C}$ ), suprapubic tenderness or CVA tenderness
OR	
Urine culture with $\geq 10^3$ and $<10^5$ cfu/mL, pyuria ( $\geq 10$ ) and positive leukocyte esterase or positive nitrite	If catheter removed with 48 hours urgency, frequency, dysuria



# Clinical CAUTI vs. NHSN CAUTI

- 85 patients in hospital met 2009 NHSN surveillance definition.
- All had a fever
- 42 (49%) with “clinical CAUTI”—the patient was given a diagnosis and treated for UTI
- 46 (54%) with alternate source of fever (*e.g.*, other infection, DVT)

Leekha *et al.* ICHE Oct 2015 v36(10) 1236.

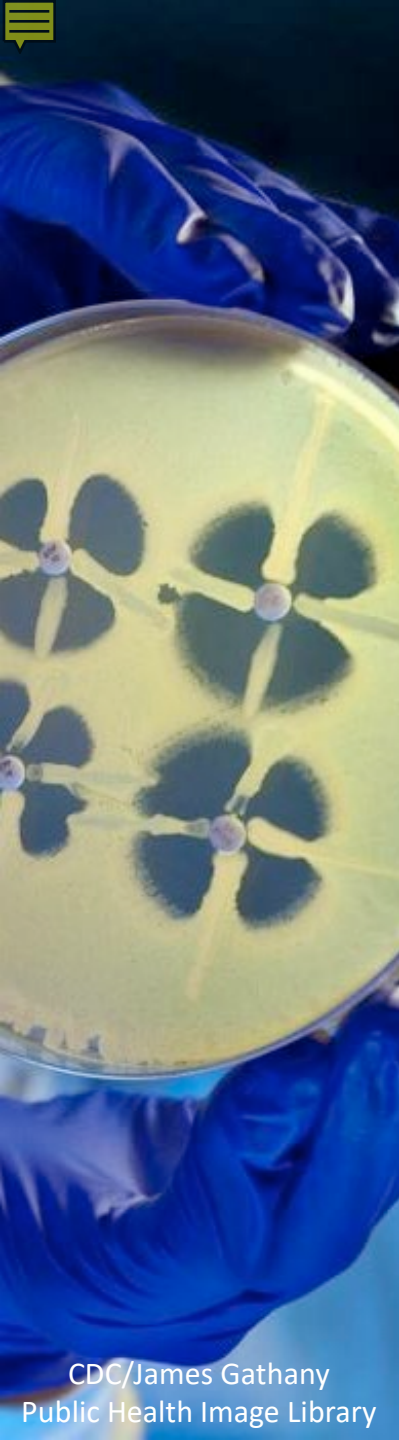
\*NHSN = National Healthcare Safety Network



# Interpreting Urine Culture Results

>100,000 CFU/ML ESCHERICHIA COLI

		INTP	
AMPICILLIN	4	S	MCG/ML
CEFAZOLIN	$\leq 4$	S	MCG/ML
CIPROFLOXACIN	$\leq 0.25$	S	MCG/ML
TRIMETH/SULFA	$\leq 20$	S	MCG/M
NITROFURANTOIN	$\leq 16$	S	MCG/ML
AMPICILLIN/SULB	$\leq 2$	S	MCG/ML



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**Infectious Disease physicians don't  
do math. Neither should you.**

# Selecting Antibiotics

Antibiotic	Length of Therapy	Other Comments
Nitrofurantoin	5 days	CrCl > 30; not for pyelo
Trimethoprim/ Sulfamethoxazole	3 days	↑ in K (real); ↑ in Cr (cosmetic)
Beta-lactam agents	3 to 7 days	Narrow options: amoxicillin, cefalexin
Fosfomycin	1 – 2 doses	Agent of last resort for MDROs
Fluoroquinolones	3 days	Black box warning

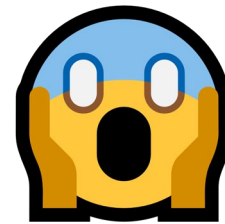
# Other Thoughts

Intravenous Antibiotic	Oral Equivalent
Ampicillin	Amoxicillin
Cefazolin	Cefalexin or Cefuroxime
Ampicillin/Sulbactam	Amoxicillin/Clavulanate

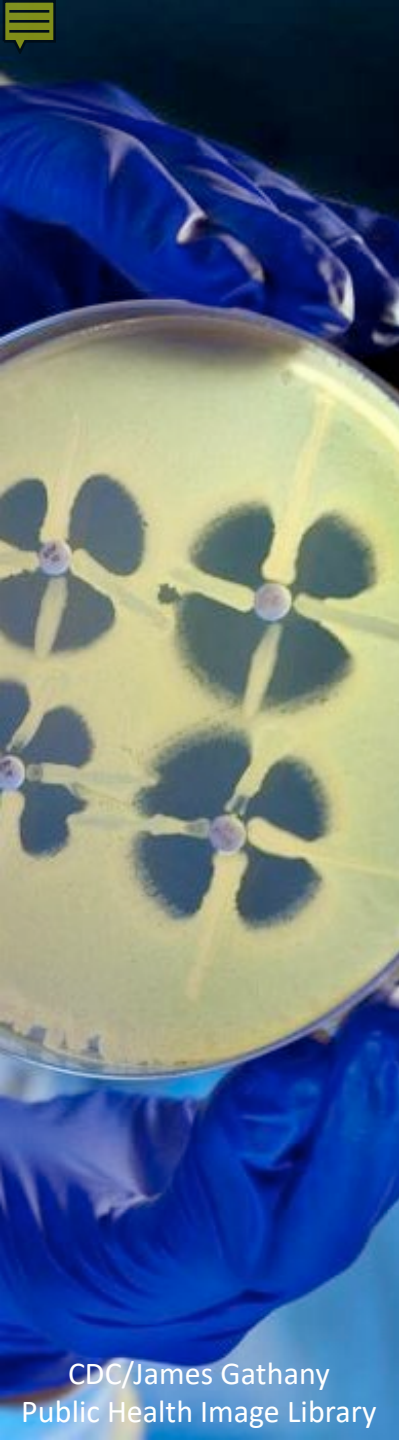
Tetracyclines = doxycycline & minocycline



Enterococcus spp.



*Staphylococcus aureus*





# Antimicrobials for UTI in Residents with Severe Dementia

- 196 episodes of suspected UTI in 110 residents
  - Over 80% female and white
  - Extremely impaired cognitive & functional status
- 55 (28%) episodes with fever
- 118 (80%) “positive UA & culture”
- 31 (16%) met minimum criteria to start antimicrobials

Dufour *et al.*, JAGS Dec 2015 v63(12) 2472.

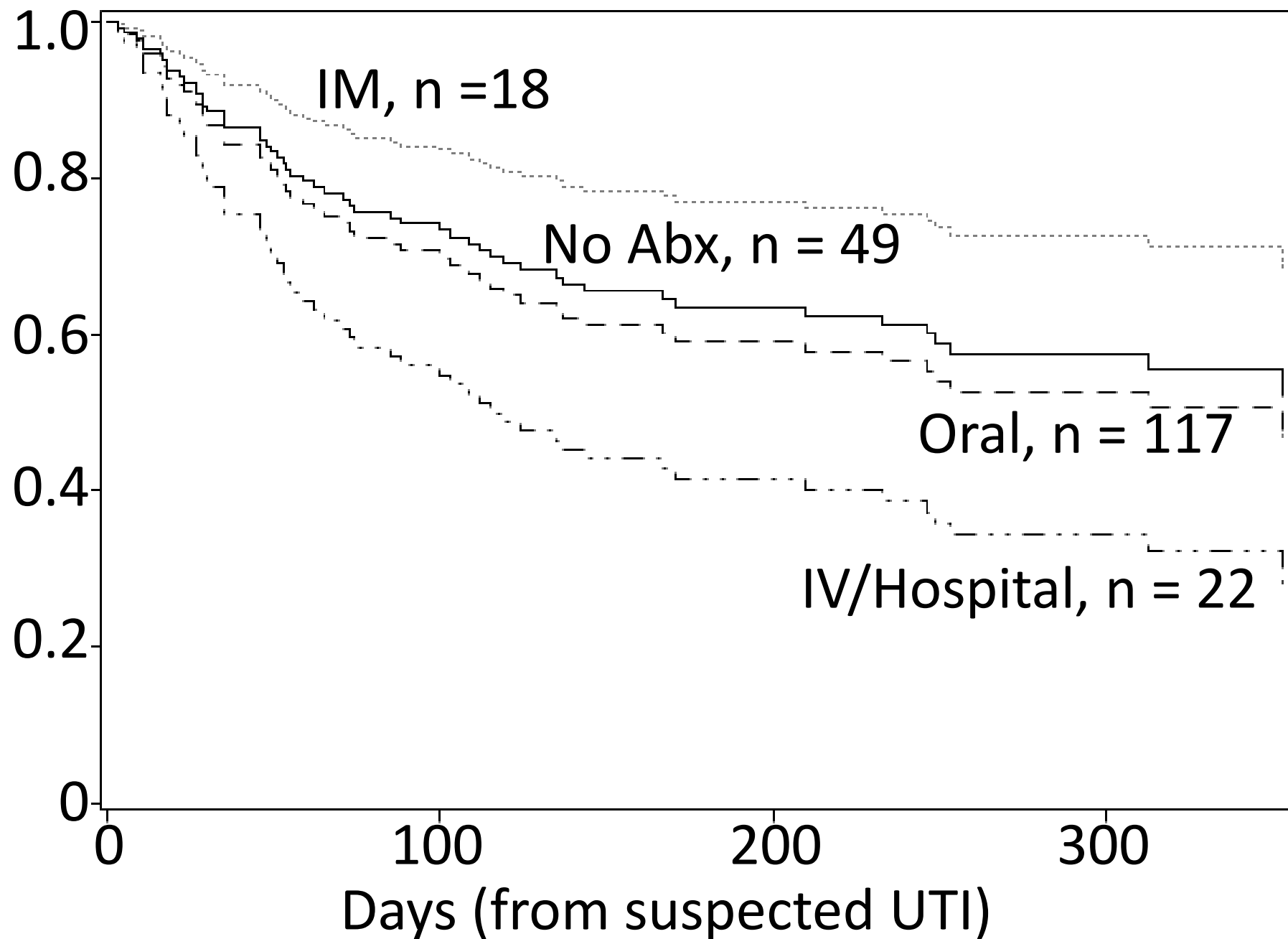
WD Exp  
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Janice Haney Carr

Public Health Image Library



Probability of Survival



# Active monitoring ~~Watchful Waiting~~

- This is an active process
- More frequent vital signs
- Oral hydration
- Assess for pain, changes in medicine, other reasons like a bad night's sleep, constipation





# Active Monitoring Order Set

- ☐ 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 \_\_\_\_\_.





# Mr. N

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What is missing here?



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01/12/2024	<b>Culture with &gt;100K Klebsiella</b> Covering provider orders 8 days cefuroxime
01/15/2024 & 01/16/2024	Noted to have <b>urinary retention</b> Intermittent straight caths → indwelling foley Behavioral issues around pain Night coverage note: “ <b>Large volumes of urine</b> may exacerbate CKD and UTI”
01/18/2024	Last day of cefuroxime
01/19/2024	Provider attributes <b>urinary retention</b> to UTI Stops oxybutynin Starts to address pain, narcotics, constipation issues
01/24/2024	Foley catheter removed
01/26/2024	Tamsulosin 0.4mg started

A vertical strip on the left side of the slide shows a microscopic view of a petri dish with a dark green agar surface. Several circular bacterial colonies are visible, appearing as lighter green or yellowish spots with some internal structure.

# Signs and Symptoms of...

## Acute Cystitis

Dysuria

Urgency

Flank pain or  
suprapubic pain

New/worsening  
incontinence

Gross hematuria

Fever and/or  
shaking chills

A vertical strip on the left side of the slide shows a microscopic view of several green, spherical bacteria, likely E. coli, on a dark background.

# Signs and Symptoms of...

## Acute Cystitis

Dysuria

Urgency

Flank pain or  
suprapubic pain

New/worsening  
incontinence

Gross  
hematuria

Fever and/or  
shaking chills

## May Have Causes that are NOT Acute Cystitis

Yeast infection, enlarged prostate,  
LUTS, urethral stricture...

Instrumentation, urge incontinence

Spinal issues, muscle spasm, shingles,  
GI issues, renal stones...

Mobility, stones, neurogenic bladder,  
pelvic floor weakness...

Prostate issues, stones, renal/bladder  
cancer, medications...

A systemic infection...



## Take Home Messages

- It's ok to have a dirty urine
- It's ok to have a positive urine culture
- It's ok to **STOP** antibiotics
- No tests of cure
  - Don't borrow trouble!
- Try active monitoring before antibiotics
- 7 days of antibiotics is a long course





# A Nursing Home Haiku

Kind care for elders  
Rehabilitation place  
Many roles, one home.

**Thank you !**

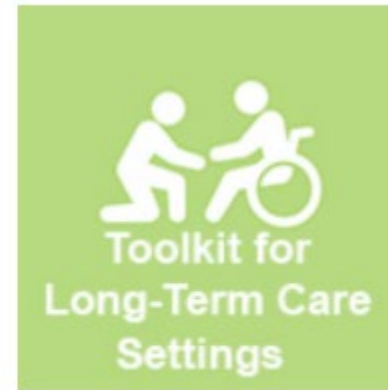
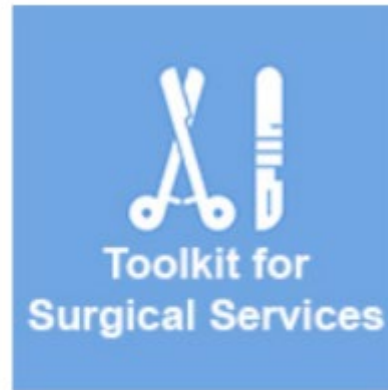
[robinjump@gmail.com](mailto:robinjump@gmail.com) or  
[Robin.Jump@va.gov](mailto:Robin.Jump@va.gov)

# Patient Safety Program for Antibiotic Stewardship



Agency for Healthcare  
Research and Quality

## Toolkits for MRSA Prevention



**Note:** the Toolkit for Long-Term Care Settings will be available in late 2025.



# Patient Safety Program for Antibiotic Stewardship



Agency for Healthcare  
Research and Quality

## Toolkits To Improve Antibiotic Use

Select your clinical setting below:



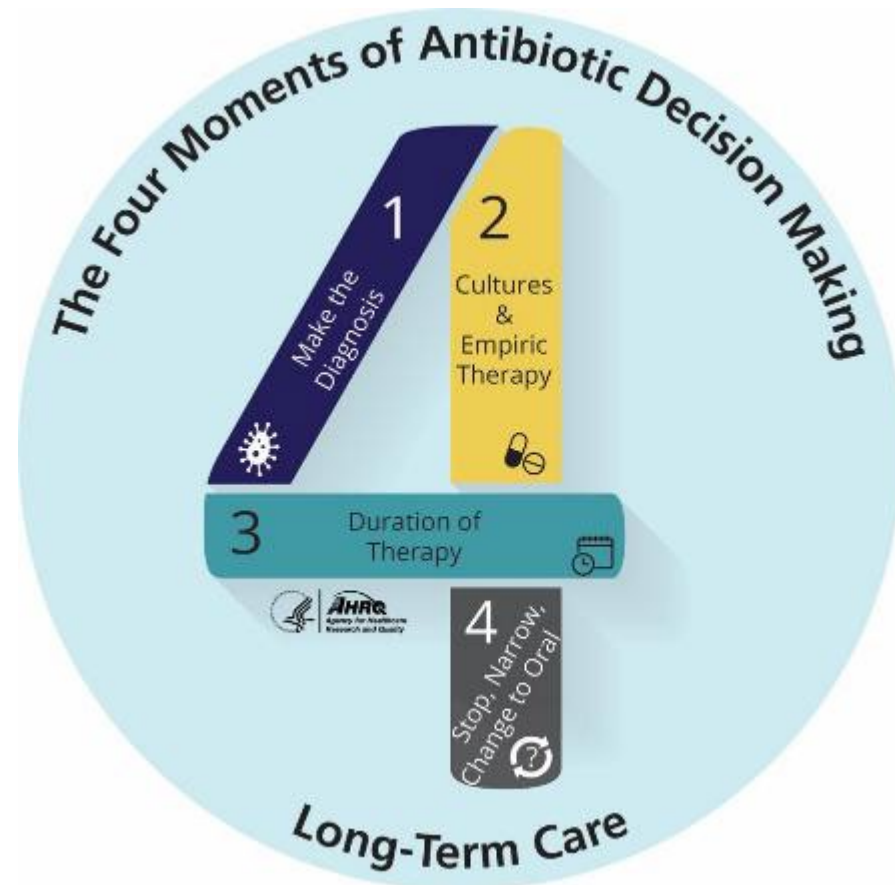
Acute Care Hospital Toolkit



Long-Term Care Toolkit



Ambulatory Care Toolkit





# Antibiotic Use Protocols for Long-Term Care

 [Assessment and Management of the Resident With a Suspected Urinary Tract Infection](#)

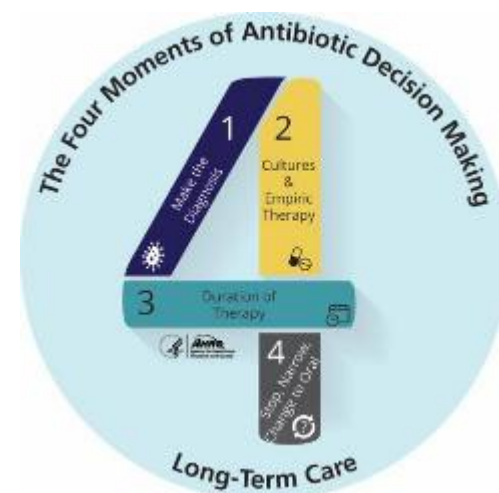
 [Assessment and Management of the Resident With a Suspected Respiratory Tract Infection](#)

 [Assessment and Management of the Resident With a Suspected Skin or Soft Tissue Infection](#)

 [Penicillin Allergies and Other Side Effects of Antibiotic Use](#)

The One-Page Document below is primarily intended for health care practitioners.

 [One-Page Document – Management of \*Clostridioides difficile\* Infection](#) (PDF, 212 KB)



# Resources

## Toolkit To Improve Antibiotic Use in Long-Term Care

<https://www.ahrq.gov/antibiotic-use/long-term-care/index.html>

### Urinary Tract Infection

<https://www.ahrq.gov/antibiotic-use/long-term-care/best-practices/uti-assess.html>

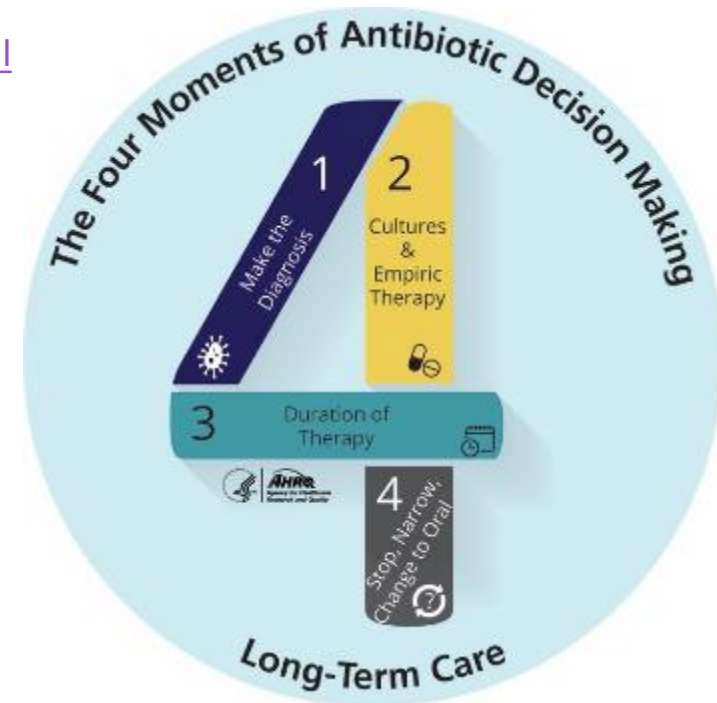
### Respiratory Tract Infection

<https://www.ahrq.gov/antibiotic-use/long-term-care/best-practices/respiratory-assess.html>

### Skin/Soft Tissue Infection

<https://www.ahrq.gov/antibiotic-use/long-term-care/best-practices/cellulitis.html>

<https://paltc.org/content/iou-toolkit>



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