

Recognizing & Treating Infections in Nursing Home Residents

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U.S. Department of Veterans Affairs

Veterans Health Administration

Geriatric Research, Education, and Clinical Centers



University of
Pittsburgh

School of
Medicine

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Speaker Disclosures

- Dr. Jump has no direct conflicts of interest related to this presentation.
- Dr. Jump has current/recent research support from Merck, Pfizer, Dept of Veterans Affairs, CDC, and AHRQ.


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

VA



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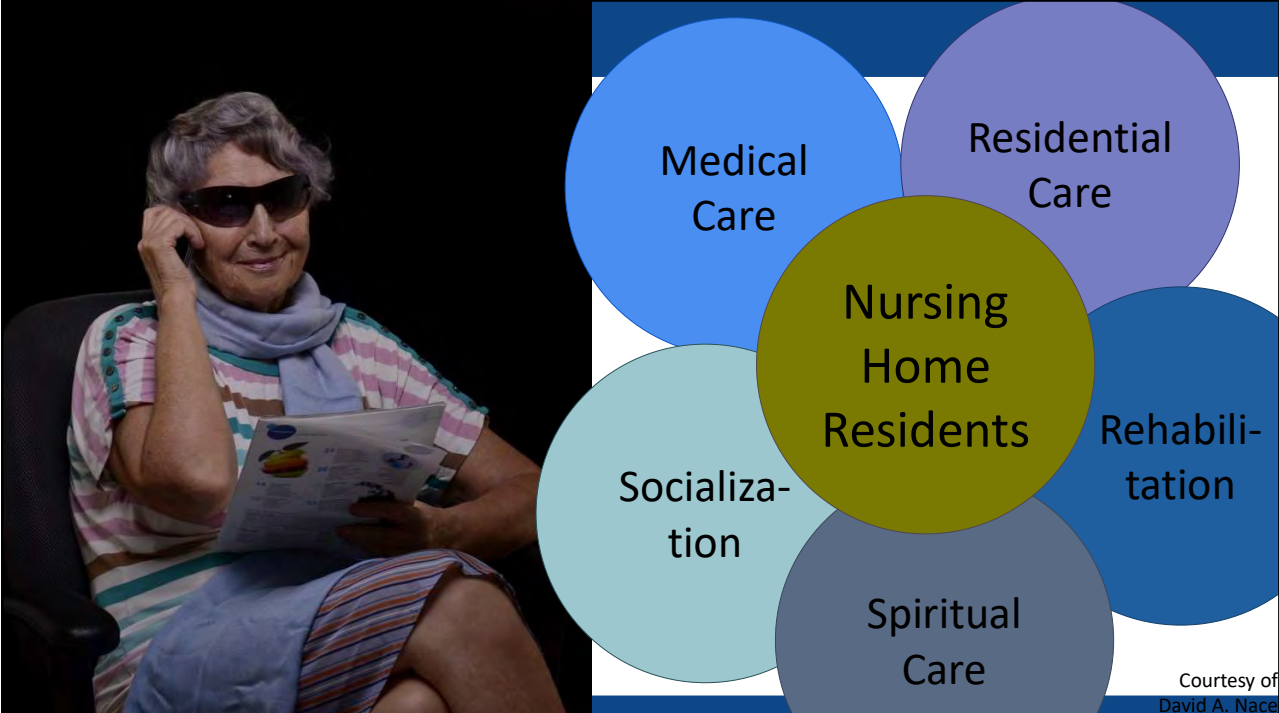


Learning Objectives

- Describe non-localizing signs and symptoms that **may** indicate infection in long-term care residents
- Differentiate signs and symptoms of acute cystitis from other reasons for those symptoms
- Introduce antibiotic use protocols for infections common to older adults

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Medical Care

Residential Care

Nursing Home Residents

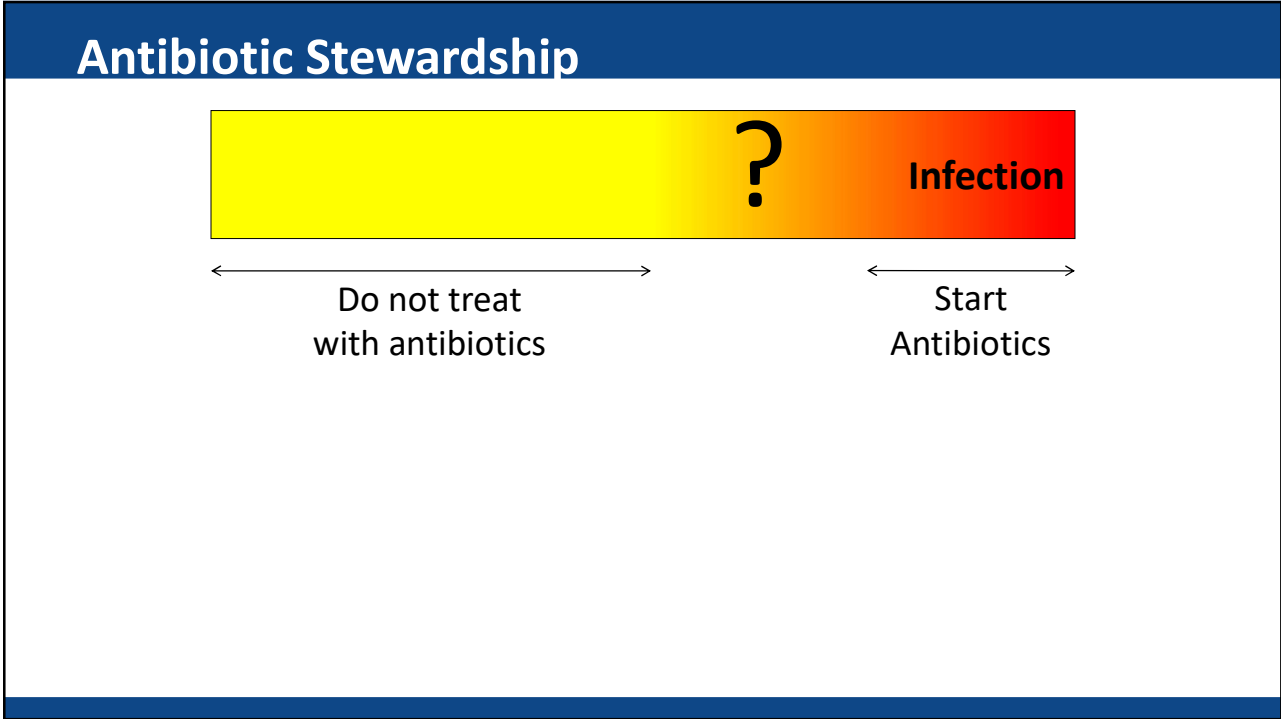
Socialization

Rehabilitation

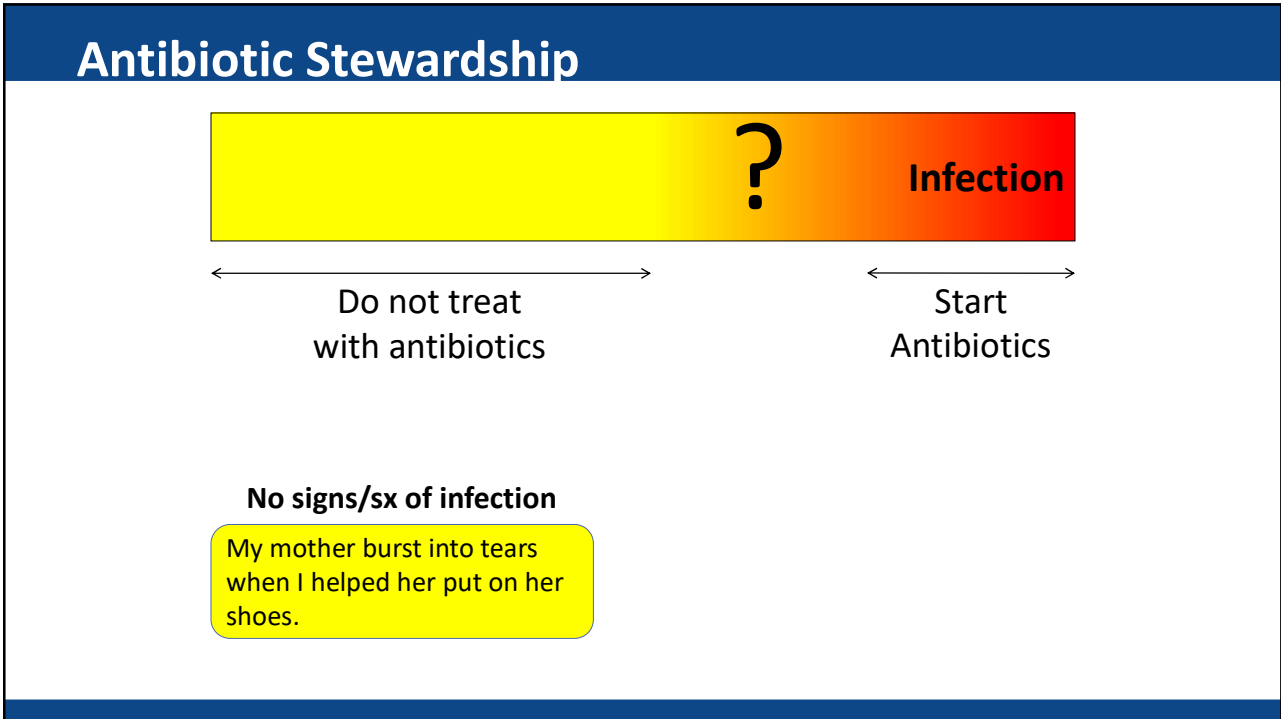
Spiritual Care

Courtesy of David A. Nace

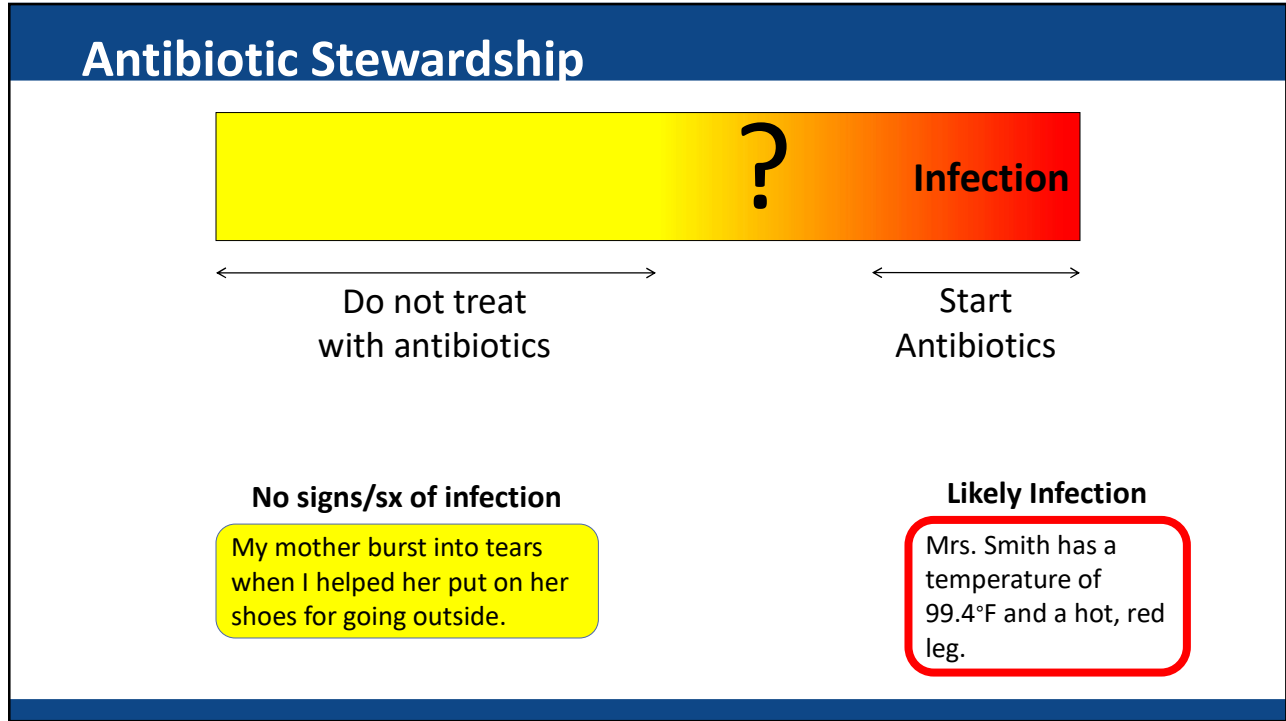
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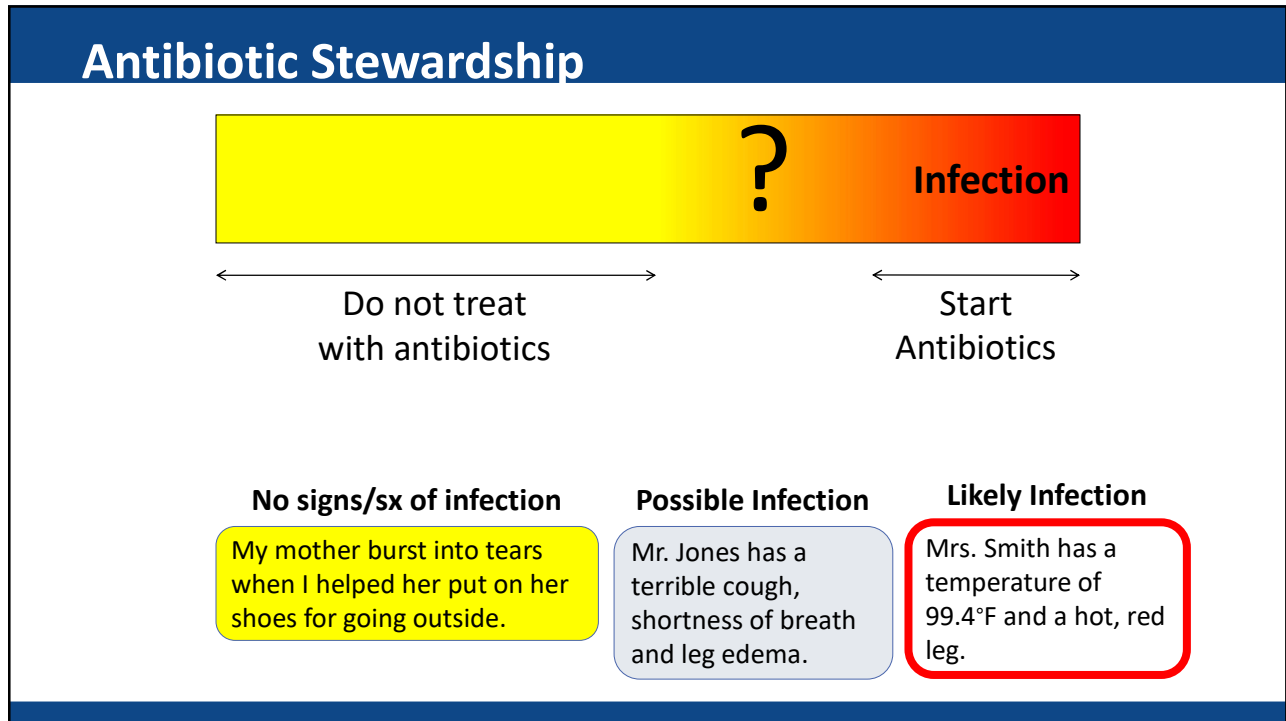
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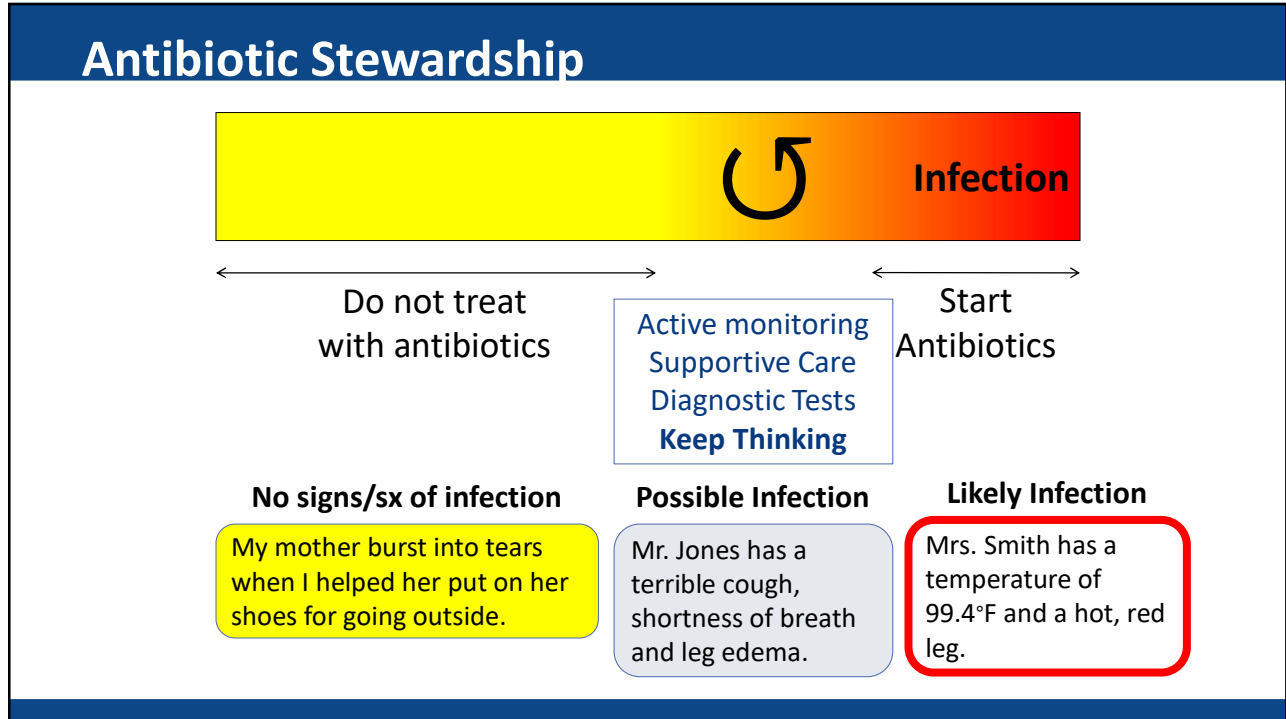
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Guidance Document

Infection Control & Hospital Epidemiology (2022), **43**, 417–426
doi:10.1017/ice.2020.1282


SHEA

SHEA Document

Reliability of nonlocalizing signs and symptoms as indicators of the presence of infection in nursing-home residents

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Signs & Symptoms of Infection

- Fever
- Cough, sputum production, chest pain
- Dysuria, frequency, urgency, hematuria
- Nausea, vomiting, abdominal pain, diarrhea
- Erythema, Swelling, Pain


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Signs & Symptoms of Infection



Younger Adults	Older Adults
Fever	Poor appetite (anorexia)
Cough, sputum production, chest pain	Functional decline
Dysuria, frequency, urgency, hematuria	Falls
Nausea, vomiting, abdominal pain, diarrhea	Incontinence
Erythema, Swelling, Pain	Change in mental status



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Signs & Symptoms of Infection

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Dysuria, frequency, urgency, hematuria	Falls
Nausea, vomiting, abdominal pain, diarrhea	Incontinence
Erythema, Swelling, Pain	Change in mental status


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Unlikely Signs & Symptoms of Infection

Poor appetite (anorexia)	<ul style="list-style-type: none"> Changes in hunger/satiety Changes in GI motility Decreased smell & taste Medication side effects Dry mouth/poor dentition 	
Functional decline	<ul style="list-style-type: none"> Association, not causation Both risk factor and outcome of infection Not specific; not timely 	
Falls	<ul style="list-style-type: none"> Weak muscles Poor balance Orthostatic hypotension Foot problems – pain and/or deformities Vision and hearing problems Medication side effects 	

10.3390/nu8020069, PMID: 26828516.
<https://www.nhsinform.scot/healthy-living/preventing-falls/causes-of-falls>; 10.1017/ice.2020.1282

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Change in Mental Status


<p>Depression chronic</p> <p>Dementia chronic</p> <p>Delirium acute*</p> <p>Coma acute</p>	<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <p>Change in Behavior</p> <ul style="list-style-type: none"> (bothersome) Should not prompt evaluation for infection </div> <div style="border: 1px solid black; padding: 5px;"> <p>Change in Level of Consciousness</p> <ul style="list-style-type: none"> (alarming) Infection is a common cause of delirium </div>
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*may last for days to weeks


Patti L, Gupta M. Change In Mental Status. [Updated 2022 Aug 8]. In: StatPearls

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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

Fick et al. Journal of Hospital Medicine. 2015)

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Photo: Ulrich Joho

Causes & Contributors to Delirium

- Infection
- Electrolyte imbalances
- Medications
 - anticholinergics
 - benzodiazepines
 - narcotics
- Withdrawal
 - benzodiazepines
 - SSRIs
 - EtOH
- Dehydration
- Pain
- Constipation
- Urinary retention
- Immobility (catheters, lines)
- Sleep interruptions, noise
- Impaired vision, hearing

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Fever

A single temperature of $>100^{\circ}\text{F}$ ($>37.8^{\circ}\text{C}$)

Repeated temperatures of $>99^{\circ}\text{F}$ ($>37.2^{\circ}\text{C}$)

An increase in temperature of $>2^{\circ}\text{F}$ ($>1.1^{\circ}\text{C}$)
over the resident's baseline non-illness
temperature

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Does this resident have a fever?

- 82-year-old resident with dementia
- Congestive heart failure
- On aspiration precautions
- Nurse aid noticed a new cough

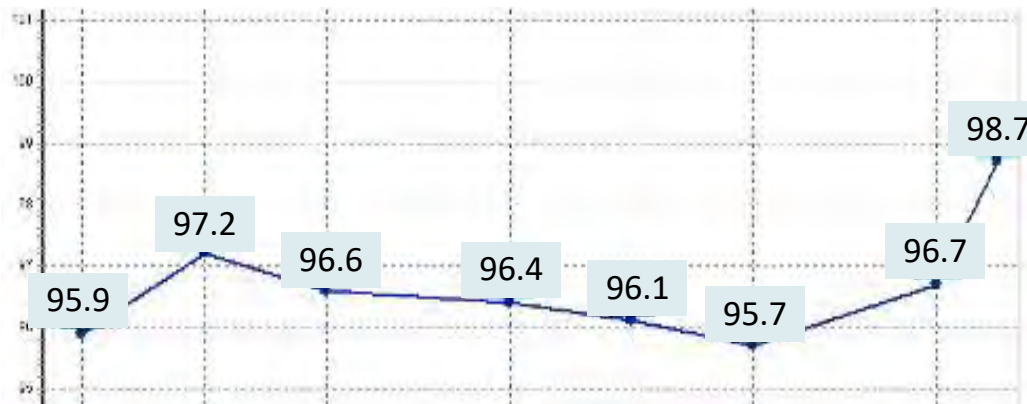
98.7°F
 97 bpm
 132/78 mmHg
 93% on room air

10.1017/ice.2020.1282

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Does this resident have a fever?



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Hypothermia

Two or more temperature $\leq 95.9^{\circ}\text{F}$
($\leq 36.0^{\circ}\text{C}$)

Two or more temperatures of $> 2^{\circ}\text{F}$
($> 1.1^{\circ}\text{C}$) under the resident's baseline
non-illness temperature

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Hypotension

Systolic < 90 mmHg

Systolic < 100 mmHg

Decrease in systolic of 40 mmHg or $\geq 50\%$ from
baseline

Mean arterial pressure $< 60 - 70$ mmHg

10.1017/ice.2020.1282

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Hyperglycemia

- Connection between hyperglycemia and acute illness
- Little evidence for specific thresholds or changes in values
- Thoughtful consideration of cause and effect

10.1017/ice.2020.1282

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Summary for Non-Localizing Signs

Possible Sign of Infection

Fever

Delirium

Hypotension

Hypothermia

Hyperglycemia

Unlikely Sign of Infection

Poor appetite (anorexia)

Change in mental status


Falls

Functional decline

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Signs and Symptoms


Urinary Tract Infection
Dysuria
Urgency
Flank pain or suprapubic pain
New/worsening incontinence
Gross hematuria
Fever and/or shaking chills



https://en.wikipedia.org/wiki/Optical_illusion

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Signs and Symptoms



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

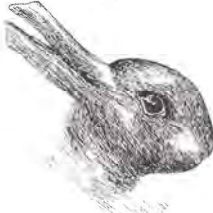
https://en.wikipedia.org/wiki/Optical_illusion

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Signs and Symptoms		
Urinary Tract Infection	  	Something Else
Dysuria		Occasional tingling or funny feeling
Urgency		Urinary retention
Flank pain or suprapubic pain		Change in mental status, behavior, or functional status
New/worsening incontinence		Dark or funny smelling urine
Gross hematuria		Falls
Fever and/or shaking chills		Family or resident request

https://en.wikipedia.org/wiki/Optical_illusion

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Signs and Symptoms of...		
Acute Cystitis		May Have Causes that are NOT Acute Cystitis
Dysuria		Yeast infection, enlarged prostate, LUTS, urethral stricture...
Urgency		Instrumentation, urge incontinence
Flank pain or suprapubic pain		Spinal issues, muscle spasm, shingles, GI issues, renal stones...
New/worsening incontinence		Mobility, stones, neurogenic bladder, pelvic floor weakness...
Gross hematuria		Prostate issues, stones, renal/bladder cancer, medications...
Fever and/or shaking chills		A systemic infection...

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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 _____.

Nace *et al.*. JAMDA 2014;15:133-139

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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

➔



Create a culture of safety around antibiotic prescribing



Learn best practices for common infectious syndromes

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<https://www.ahrq.gov/antibiotic-use/index.html>; 10.1001/jamanetworkopen.2022.0181

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Outcomes

Metrics	Baseline Rate per 1000 Days of Care	Endline Rate per 1000 Days of Care	P-value
Antibiotic starts	7.89	7.48	0.02
Fluoroquinolones	1.49	1.28	0.002
Antibiotic Days of Therapy	64.1	61.1	0.07
Fluoroquinolones	10.6	9.41	0.01
Urine cultures collected	3.01	2.63	0.001
<i>C. difficile</i> LabID events*	1.66	1.50	0.52

*per 10,000 days of care

- Decrease in the number of antibiotic starts (prescribers,
- Decrease in the number of urine cultures collected (nurses)
- Ownership of the process**
- <https://www.ahrq.gov/antibiotic-use/long-term-care/index.html>

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10.1001/jamanetworkopen.2022.0181

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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)

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<https://www.ahrq.gov/antibiotic-use/index.html>; 10.1001/jamanetworkopen.2022.0181

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Suspected Urinary Tract Infection (UTI) in Long-Term Care Residents

Signs & Symptoms of a UTI

For Residents Without a Urinary Catheter

Dysuria
OR
Fever (>100°F or >2°F above baseline)
AND at least one of the following symptoms that is new or worsening:
Urgency
Frequency
Suprapubic pain
Gross hematuria
Costovertebral angle tenderness

For Residents With a Urinary Catheter or if Nonverbal

One or more of the following **without another recognized cause:**
Fever (>100°F or a 2°F increase from baseline)
New costovertebral angle tenderness
Rigors
New-onset delirium*
*If adequate workup for other causes of delirium has been performed and no other cause for delirium is identified

Send a urinalysis (UA) & urine culture (UCx)
Increase hydration
Start antibiotics before UA and UCx results, if resident appears ill
If UA & UCx are positive and the resident has ongoing UTI symptoms, modify antibiotics or start antibiotics (if not receiving active antibiotics)

Do NOT Send a Urinalysis and Urine Culture:

If the urine is foul smelling or cloudy, without other urinary symptoms
Routinely after urethral catheter change
Routinely upon admission
After treatment to “document care” or “test of cure”
For mental status changes (without vital sign changes or urinary symptoms for noncatheterized residents)

AHRQ Safety Program for Improving Antibiotic Use

Urine Culture Collection

- Health care workers and residents should perform hand hygiene before collecting urine cultures; health care workers should wear gloves and use a sterile container.
- Assist residents with cleaning the peri-urethral region before collecting urine cultures.
- Collect a midstream clean-catch specimen; if this not possible, perform an in-and-out catheterization.
- For residents with catheters, urine culture specimens should be obtained from newly placed catheters whenever possible.
- Transport urine samples to the lab within 15 minutes. Immediately place samples in the refrigerator if this is not possible.

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AHRQ Pub. No. 17(21)-0029 June 2011

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One-Pagers

Asymptomatic Bacteriuria

Diagnosis

- Asymptomatic bacteriuria (ASB) is a positive urine culture from a person with NO symptoms of a urinary tract infection (UTI) such as dysuria, frequency, urgency, fever, or flank pain.
- ASB is common and often associated with **UTI, indwelling catheter, and urinary tract obstruction** (powered field).

Population	Prevalence of ASB	Prevalence of Pyuria in Persons With ASB
Female long-term care residents	25-30%	40%
Male long-term care residents	25-30%	40%
Women 65-74 years old	22-30%	40%
Healthy premenopausal women	5-10%	80%
Women with diabetes	9-30%	80%
Men with diabetes	10-30%	80%
People receiving hemodialysis	10-30%	40%
Presence of indwelling urinary catheter	80%	80-90%

Treatment

- The majority of people with ASB and/or asymptomatic pyuria SHOULD NOT be treated with antibiotics.
- Treatment of ASB does not prevent future UTIs.
- Treatment of ASB is associated with adverse events related to antibiotic use and can increase the likelihood of developing future UTIs that are antibiotic resistant.
- Exception relevant to long-term care
 - Individuals with ASB about to undergo urologic procedures in which mucosal bleeding is expected (not including urinary catheter placement)
 - ★ A short treatment course (<3 days) may prevent urosepsis.

Frequently Asked Questions

- How can I prevent unnecessary treatment of asymptomatic bacteriuria?
 - Do not order urine cultures unless a resident has signs and symptoms of a UTI.
 - ★ This includes residents undergoing preoperative evaluations or residents with urinary catheters.
 - What should I do for residents with dark or foul-smelling urine?
 - Dark, foul-smelling, or cloudy urine most likely indicates dehydration; therefore, encourage hydration.
 - What should I do for residents with a change in mental status?
 - There are many reasons for a change in mental status that are not related to UTIs. Assess for dehydration, pain, change in medications, poor sleep, constipation, and mood disorders.

Diagnosis

- **First, ask about SYMPTOMS**
 - Acute cystitis: dysuria, frequency, urgency, suprapubic pain^{1,2}
 - Pyelonephritis: fever, rigors, flank pain¹
 - Catheter-associated UTI (CAUTI): suprapubic pain and fever; residents with catheters may not report dysuria, frequency, or urgency^{1,2}
- If UTI symptoms present, obtain a urinalysis (UA) and culture
 - A positive UA shows evidence of inflammation (e.g., elevated white blood cells)
 - A positive urine culture is defined as ≥100,000 c.f.u.s. of a urinary pathogen¹ (≥1,000 in residents with urinary catheters)²
- If a chronic indwelling catheter is in place, remove and replace it before sending UA and culture⁴
- Do not start antibiotics in residents with a positive UA and/or culture until confirming that relevant symptoms are present^{1,2}
- UTI in males in the absence of obstructive pathology (e.g., enlarged prostate, renal stone, stricture) or urinary catheter is uncommon^{1,8,10}

Supportive Care

- Encourage oral hydration.
- Consider phenazopyridine (pyridium) to relieve urinary pain.¹¹
- For residents with dysuria that does not resolve with antibiotics, assess for other causes such as vaginal atrophy, yeast infection, enlarged prostate, and sexually transmitted infections.¹¹⁻¹³
- In men, severe urinary tract symptoms may be caused by overactive bladder or, more commonly, by benign prostatic hyperplasia (BPH) and consequent bladder outlet obstruction.^{1,8,12}

Treatment

Assess prior urine culture data, as previous antibiotic susceptibility patterns can help guide antibiotic choice.

- **Uncomplicated acute cystitis**¹³
 - Oral therapy preferred; avoid fluoroquinolones
 - [Place local treatment recommendations here]
 - [Place local treatment recommendations here]
- **Uncomplicated pyelonephritis in women**¹⁴
 - Fluoroquinolones and trimethoprim-sulfamethoxazole are preferred given excellent penetration into the kidney; their use as empiric therapy should be based on local E. coli susceptibility data.
 - [Place local treatment recommendations here]
 - [Place local treatment recommendations here]
- **Complicated UTI**¹⁵
 - Remove and do not replace urinary catheters whenever possible
 - If concern for obstructive pathology or urosepsis, determine if resident requires transfer to an acute care facility for evaluation and management.
 - [Place local treatment recommendations here]
 - [Place local treatment recommendations here]

Duration

Uncomplicated acute cystitis	Nitrofurantoin or cephalosporin: 5 days ¹³ Trimethoprim-sulfamethoxazole (TMP-SMX): 3 days ¹⁴
Uncomplicated pyelonephritis	Fluoroquinolone: Levofloxacin 5 days, Ciprofloxacin 7 days ¹⁴ TMP-SMX or N/oral cephalosporin: 10-14 days (10 days if early response) ¹⁵
Complicated UTI (including CAUTI)	3 days if lower tract CAUTI in women ≥65 years if catheter is removed/not replaced Other residents: 7 days if prompt resolution of symptoms or 10-14 days if delayed response, obstruction, or other urologic abnormality

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<https://www.ahrq.gov/antibiotic-use/index.html>; 10.1001/jamanetworkopen.2022.0181

Talking with Family Members about UTIs

My father is not himself today. His urine is dark and smells bad. Does he have a urinary tract infection?

Would you just check his urine... just to be sure?

- The most common symptoms of urinary tract infections (UTIs) are a burning feeling when urinating and a strong urge to urinate often.
- Dark, foul-smelling, and cloudy urine are not enough to decide if someone has a UTI.
- Confusion or disorientation without vital sign changes suggesting infection or urinary symptoms are rarely, if ever, symptoms of a UTI.
- Your father may be a little dehydrated. You can help with that by encouraging him to drink juice or water.

- Sometimes people, including health care practitioners, think that a positive urine test means there is an infection, but we have newer data indicating that a positive urine test does not mean that there is an infection.
- Also, nearly half of nursing home residents have bacteria colonizing their bladder. This is called asymptomatic bacteriuria. It does not cause people to get sick.

<https://www.ahrq.gov/antibiotic-use/index.html>; 10.1001/jamanetworkopen.2022.0181

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Management of Skin and Soft Tissue Infections

Nonpurulent

- Bilateral
- Minimal or chronic symptoms
- No systemic illness

- Acute onset
- Unilateral
- Systemic symptoms (fever, leukocytosis)

Uncomplicated

- Immunocompetent
- No open wounds
- Clinically stable

• Elevate legs

• Physical therapy

• Compression stockings

• Lotion

Complicated

- Ill appearing, febrile, tachycardic, hypotensive
- Rapidly spreading

• Cephalexin, cefadroxil, amoxicillin/clavulanate (PO) for 5–7 days

• Severe PCN allergy: clindamycin (PO) or linezolid (PO) for 5–7 days

• Cefazolin or ampicillin/sulbactam (IV)*

• Severe PCN allergy: vancomycin (IV)*

• Transfer to hospital if consistent with goals of care; otherwise treat for ~7 days

* Patients who have severe sepsis or septic shock should receive broad-spectrum antibiotics

Management of Skin and Soft Tissue Infections

Purulent

Incision and Drainage

Send fluid for culture

- Minimal surrounding erythema
- Abscess < 2 cm

• Wound care

• Elevate legs

- Ill appearing, febrile, tachycardic, hypotensive
- Abscess ≥ 2 cm
- Extensive surrounding erythema

Mild systemic symptoms:

- Doxycycline (PO) or TMP-SMX (PO) for 5–7 days

Moderate/severe symptoms:

- Vancomycin (IV) or linezolid (IV/PO)
- Transfer to hospital if consistent with goals of care; otherwise treat for ~7 days

The Four Moments of Antibiotic Decision Making

AHRQ Pub. No. 17(21)-0029
June 2021

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Skin Care and MDRO Prevention: AHRQ Safety Program for MRSA Prevention

-  Keep Skin Clean & Safe
-  Reduce MDRO Transmission
-  Use Antibiotics Wisely
-  Clean High-Touch Surfaces



- **18-month FREE program beginning June 2023**
- Access to case-based webinars, tools, and various education materials to guide frontline staff in proper skin care and infection prevention.
- FREE continuing education credits offered
- Access to infectious disease experts during monthly office hours
- Register here!
 - <https://safetyprogram4mrsaprevention.org>
 - MRSAPrevention@norc.org







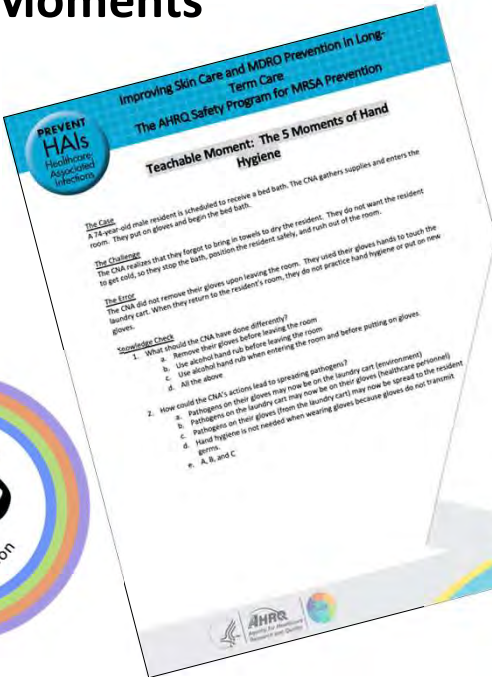
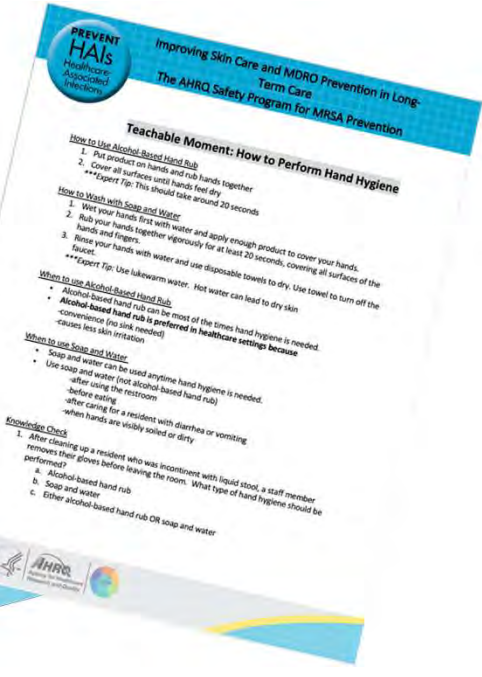









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CA0


Teachable Moments

-  Keep Skin Clean & Safe
-  Reduce MDRO Transmission
-  Use Antibiotics Wisely
-  Clean High-Touch Surfaces







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Slide 38

CAO We may want to update the header for these documents to include LTC? Will likely need to add all documents once team approves?
Caylin Andrews, 2023-02-01T16:34:53.651

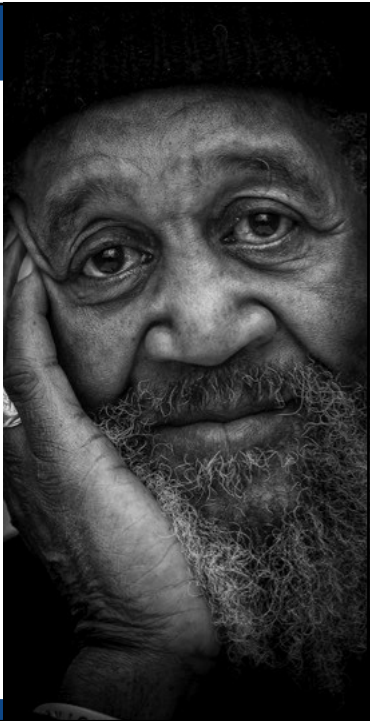
KSO 0 Change the program title to the one for this cohort.
Kathleen Speck, 2023-02-20T17:12:36.260

CAO 1 Addressed. Only put 2 of the 4 TM on the slide because 4 seemed to make it too crowded. Let me know if you prefer to have all 4 on the slide...
Caylin Andrews, 2023-02-20T17:42:38.059

Nursing Home Haiku

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

Thank you!
robinjump@gmail.com or Robin.Jump@va.gov



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PREVENT HAIs Healthcare-Associated Infections

Skin Care and MDRO Prevention: AHRQ Safety Program for MRSA Prevention

- **18-month FREE program beginning June 2023**
- Access to case-based webinars, tools, and various education materials to guide frontline staff in proper skin care and infection prevention.
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- Register here!
 - <https://safetyprogram4mrsaprevention.org>
 - MRSAPrevention@norc.org

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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>

