



2025 NEBRASKA ANTIMICROBIAL STEWARDSHIP SUMMIT

LONG-TERM CARE ANTIBIOTIC STEWARDSHIP WORKBOOK



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Add Course Objectives
Add QR code to ASAP website with
address written below

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Antibiotic Stewardship KNOWLEDGE CHECK

How do you define antibiotic stewardship in terms of your role?

What do you hope to learn about antibiotic stewardship?

What other question can we put here?

- ---
- ---
- ---
- ---
- ---
- ---
- ---

Summary of Core Elements for Antibiotic Stewardship in Nursing Homes



Leadership commitment

Demonstrate support and commitment to safe and appropriate antibiotic use in your facility



Accountability

Identify physician, nursing and pharmacy leads responsible for promoting and overseeing antibiotic stewardship activities in your facility



Drug expertise

Establish access to consultant pharmacists or other individuals with experience or training in antibiotic stewardship for your facility



Action

Implement **at least one** policy or practice to improve antibiotic use



Tracking

Monitor **at least one process** measure of antibiotic use and **at least one outcome** from antibiotic use in your facility



Reporting

Provide regular feedback on antibiotic use and resistance to prescribing clinicians, nursing staff and other relevant staff



Education

Provide resources to clinicians, nursing staff, residents and families about antibiotic resistance and opportunities for improving antibiotic use

Core Elements of Antibiotic Stewardship

- How does leadership at your facility demonstrate support for antibiotic stewardship efforts?
-
-
-
-

What challenges do you foresee in gaining full leadership commitment to antibiotic stewardship?

Opportunities

Threats

Core Elements of Antibiotic Stewardship

Learning Goals

Resources

Opportunities

Strengths/Weaknesses

Threats

MICRO PATIENT CASE

command words

The word that provides the instruction as to what kind of skill you need to apply in the question. E.g. analyse, discuss, explain, explore, describe

concept words

The words that refer to specific concepts from the syllabus that will be examined in the question. E.g. representation, context, values, attitudes

condition words

The words that refer to the parameters placed on you that influence the way you respond to the question. E.g. with reference to two texts, and/or, visual text, a written text

critical words

The words that help refine your response and add nuance. They distinguish strong responses from weaker ones. E.g. a 'central' idea, a 'dominant' attitude, a 'controversial' issue

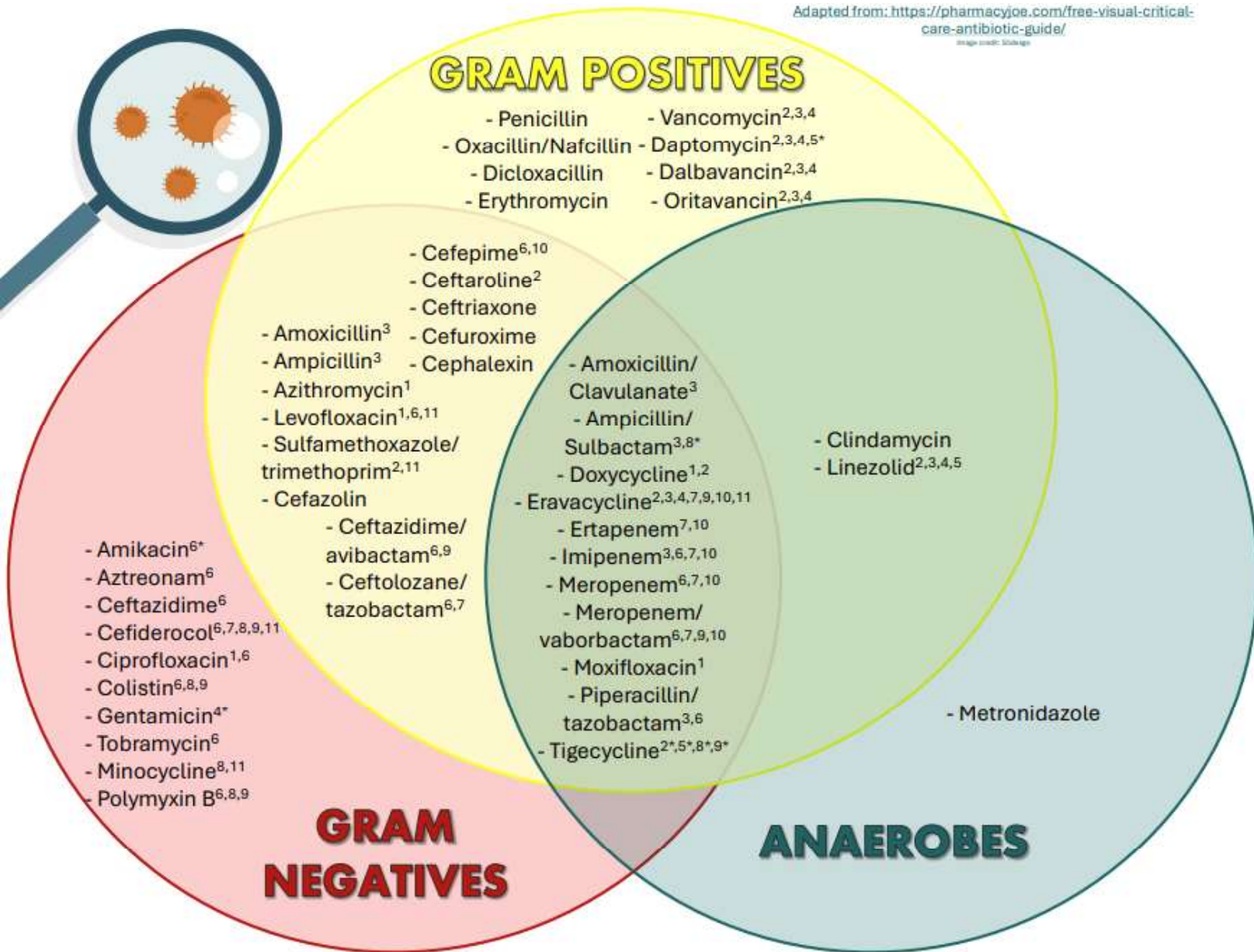


Collecting Bacterial Cultures

- Only collect bacterial cultures from residents with signs or symptoms suggesting bacterial infection.
- Bacteria growing in urine or sputum in residents without evidence of infection usually indicates bacterial colonization and does not require antibiotics.
- If a bacterial infection is suspected, follow local recommendations to obtain a good specimen that can be used to diagnose the infection and guide antibiotic therapy.
- A contaminated specimen, which may be due to poor collection techniques, can lead to unnecessary antibiotic prescribing and cause harm to patients.



Adapted from: <https://pharmacyjoel.com/free-visual-critical-care-antibiotic-guide/>
Image credit: Shutterstock



ANTIBIOTIC SPECTRUM OF ACTIVITY

1	Atypical Pneumonia
2	MRSA
3	<i>Enterococcus faecalis</i>
4	<i>Enterococcus faecium</i>
5	VRE
6	<i>Pseudomonas aeruginosa</i>
7	ESBL
8	<i>Acinetobacter</i>
9	Carbapenem-resistant Enterobacterales
10	AmpC
11	<i>Stenotrophomonas</i>
*	Requires combination therapy or special dosing

CONTAMINANTS VS PATHOGENS

BLOOD

Normally sterile

Pathogens – any organism isolated

Likely Contaminants

Coagulase-negative staphylococci
Alpha-hemolytic streptococci
Bacillus spp.
Corynebacterium spp. (except *C. jeikeium*)
Propionibacterium acnes
NOTE: Must take into consideration how many cultures were drawn versus how many are positive and what the organism is

TISSUE AND BODY FLUIDS

Should be sterile

Pathogens – any organism isolated; use judgement to evaluate the possibility of normal flora being present in relation to the source of the specimen

Normal Flora

Eye/Ear
Coagulase-negative staphylococci
non-hemolytic streptococci

alpha-hemolytic streptococci
Diphtheroids
Skin
Coagulase-negative staphylococci
Propionibacterium acnes
diphtheroids
alpha-hemolytic streptococci
Bacillus spp.

GENITAL

Pathogens

Neisseria gonorrhoeae
B-hemolytic streptococci
Listeria spp.
Gardnerella vaginalis
Predominant numbers of *S. aureus*
Predominant numbers of yeast

Normal flora

Staphylococcus spp.
Lactobacillus spp.
Diphtheroids
Enterococcus spp.
Streptococcus spp.
Gram-negative rods
Anaerobes
Yeast

URINE

Should be sterile

Pathogens

Enterobacteriaceae
Enterococcus spp.
Pseudomonas spp. and other non-fermenters

group B *Streptococcus* (*Streptococcus agalactiae*)
S. aureus and *S. saprophyticus*
Yeast

Likely Contaminants

Diphtheroids
coagulase-negative staphylococci
alpha-hemolytic streptococci
Lactobacillus spp.
Gram-negative rods
Bacillus spp.
NOTE: significance of organism is determined by colony count

GASTROINTESTINAL TRACT

Pathogens

Salmonella spp.
Shigella spp.
Campylobacter jejuni
E. coli O157:H7
Aeromonas/Plesiomonas spp.
Yersinia enterocolitica
Vibrio spp.
Clostridium difficile (toxin)
S. aureus (in the context of enterotoxin food poisoning)
Helicobacter pylori (antigen)

Normal Flora

Enterobacteriaceae
Staphylococcus spp.
Streptococcus spp.
Enterococcus spp.
Pseudomonas spp.
Anaerobes
Yeast

RESPIRATORY TRACT

Pathogens

Group A *Streptococcus* (*Streptococcus pyogenes*)
Streptococcus pneumoniae
Predominant *S. aureus*
H. influenzae
Neisseria meningitidis/gonorrhoeae
Predominant
Enterobacteriaceae
Predominant *Pseudomonas spp.* and other non-fermenters
Corynebacterium diphtheriae
Bordetella pertussis
Legionella pneumophila
Mycobacterium spp.
Nocardia spp.
Predominant *Moraxella catarrhalis*
Predominant yeast

Normal Flora

Staphylococcus spp.
alpha-hemolytic streptococci
Gram-negative rods
B-hemolytic streptococci other than group A
Neisseria spp.
Enterococcus spp.
Corynebacterium spp.
Bacillus spp.
Yeast
Anaerobes
Haemophilus spp.
Micrococcus spp.
Stomatococcus spp.
NOTE: amount of organism present, source of culture, and patient age may determine significance as a pathogen

PNEUMONIA PATIENT CASE

Read this poem by Robert Frost. Answer the questions using text evidence to support your answers.



The Road Not Taken

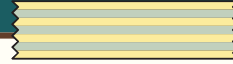
by ROBERT FROST

Two roads diverged in a yellow wood,
And sorry I could not travel both
And be one traveler, long I stood
And looked down one as far as I could
To where it bent in the undergrowth;

Then took the other, as just as fair,
And having perhaps the better claim,
Because it was grassy and wanted wear;
Though as for that the passing there
Had worn them really about the same,

And both that morning equally lay
In leaves no step had trodden black.
Oh, I kept the first for another day!
Yet knowing how way leads on to way,
I doubted if I should ever come back.

I shall be telling this with a sigh
Somewhere ages and ages hence:
Two roads diverged in a wood, and I—
I took the one less traveled by,
And that has made all the difference.



What does the road symbolize in the poem "The Road Not Taken"?



What details from the poem support your answer?

UTI PATIENT CASE

WEEK:

MONTH:

YEAR:

THINGS THAT I AM MOST GRATEFUL THIS WEEK

WEEKLY WINS

GOALS FOR NEXT WEEK

ACCOMPLISHED GOALS

☐☐☐☐☐

HAVE I FULFILLED MOST OF MY HABITS?

☐☐☐☐

NO

MORE OR LESS

YES

HOW HAVE I FELT THIS WEEK?

☐☐☐☐

GOOD

NOT GOOD

☒ TO START ☒ OK ☒ DELAY ☒ STUCK ☒ CANCEL

IDENTIFYING DELIRIUM

ABCs OF IDENTIFICATION



Acute/subacute

- Altered mental status with change in attention

Behavioral disturbance

- (Restless, agitated, combative)

Changes in consciousness

- (Jittery, drowsy, difficult to arouse)

COMMON CAUSES OF DELIRIUM

- Sleep deprivation
- Dehydration
- Pain
- Medications
- Immobility

COMMON SYMPTOMS

- Drowsiness or agitation
- Arguing with staff or family members
- Hallucinating
- Refusing therapy/meals/medications
- Wandering off



VA



U.S. Department
of Veterans Affairs



TREATING AND PREVENTING DELIRIUM

MODIFY ENVIRONMENT

1

- Orient often—time, date, place
- Provide calendar/clock in room
- Surround with familiar faces

PROMOTE NORMAL SLEEP

2

- Reduce noise, dim lights
- Promote sleep at night, activity during day

CORRECT SENSORY DEFICITS

3

- Eyeglasses
- Hearing aids
- Pain management
- Good lighting

ENHANCE DAYTIME ACTIVITIES

4

- Cognitive stimulation—word games, crossword puzzles, current events discussion
- Encourage physical therapy/occupational therapy
- Active while awake, only sleep at night
- MOBILIZE!

PREVENT DEHYDRATION

5

- Small sips of water throughout the day
- Encourage good nutrition—supplement if necessary with smoothies and protein drinks
- Address constipation



AHRQ
Agency for Healthcare
Research and Quality

VA



U.S. Department
of Veterans Affairs

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



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.



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

Signs & Symptoms of a UTI

For Residents Without a Urinary Catheter

- ☐ Dysuria
- OR**
- ☐ Fever ($>100^{\circ}\text{F}$ or $>2^{\circ}\text{F}$ 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 ($>100^{\circ}\text{F}$ 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)

Review of Antibiotic Prophylaxis in the Management of Recurrent Urinary Tract Infections (UTI) in Adults

Continuous antibiotic prophylaxis, while effective in the short-term, carries many risks including medication side effects in older patients¹, increased risk for multi-drug resistant organisms², and risk for *Clostridioides difficile* colitis³.

Before considering antibiotic prophylaxis for recurrent UTIs, these non-antibiotic measures should be attempted first:

- Confirm the resident is experiencing true UTIs, not asymptomatic bacteriuria
- Maintain adequate hydration
- Encourage regular voiding. Holding in urine or not draining the bladder fully increases the risk of UTIs
- Ensure appropriate personal hygiene practices and proper care of urinary catheters
- Avoid sitting in wet or dirty undergarments for prolonged periods
- For post-menopausal women with risk factors such as atrophic vaginitis, prescribe topical vaginal estrogens
- Evaluate for underlying risk factors that may be the reason for recurrent UTIs and manage those accordingly
- Consider evaluation for kidney stones or a urology evaluation in functional patients

Non-Antibiotic Therapies & Supplements to Prevent UTIs

Local estrogen therapy

The use of vaginal estrogen therapy has been an underutilized tool for preventing UTIs. Estrogen therapy helps maintain vaginal pH levels and bacterial flora balance. Multiple studies have demonstrated a reduction in the frequency of UTIs among postmenopausal women using topical vaginal estrogen therapy.^{4,5}

Methenamine hippurate (1 gram PO twice daily)

Methenamine is hydrolyzed to formaldehyde and ammonia in acidic environments which has a bactericidal effect by denaturing proteins and nucleic acid. Therefore, acidic urine increases efficacy, so patients are often advised to consume acidic foods to maintain an acidic urinary pH. While generally well-tolerated, common side effects include gastrointestinal upset and bladder irritation. It has been described as an antibiotic-sparing option for those patients with recurrent UTIs and trials indicate it may be helpful in female patients with no urinary tract abnormalities.^{6,7}

Cranberry Supplements

Cranberry may decrease the adherence of uropathogens to the uroepithelial cells due to high concentrations of proanthocyanidins (PACs). Research on cranberry effectiveness has yielded mixed results; however, several studies suggest a potential benefit in reducing the frequency of UTIs⁸. Cranberry products are available in various formulations, including juice, liquid concentrates, tablets, capsules, and powder forms. The product chosen should be evaluated to ensure it contains PACs – some cranberry flavored supplements do not actually contain any PACs. It remains unclear what the optimal dose of cranberry should be, but studies suggest that the PAC dose be at least 36 mg/day⁸. Consideration should also be given to the amount of sugar consumed daily if utilizing cranberry juice.

D-mannose

D-mannose is a sugar that mimics the host's uroepithelial receptor and competitively binds to the uropathogen decreasing bacterial attachment to the mucosa. In a 2024 randomized clinical trial of 598 women, daily d-mannose did not reduce the proportion of women with recurrent UTI in primary care who experienced a subsequent clinically suspected UTI. D-Mannose should not be recommended for prophylaxis in this patient group.⁹

Using Prophylactic Antibiotics

Use of any antibiotic for a prolonged period is associated with adverse effects and increased resistance.

If antibiotic prophylaxis is used, it should be after all other measures have failed.

Antibiotic prophylaxis is not recommended for patients with an indwelling urinary catheter.

No data has supported one agent over another for preventing UTIs, so antibiotic choice should be guided by recent culture results and sensitivities should be confirmed before initiating any prophylactic therapy. In addition, antibiotic allergies, medical comorbidities, and drug interactions should be considered. Fluoroquinolones should always be avoided due to risk for rare but catastrophic adverse events in the elderly. Therapeutic doses of antibiotics are not warranted. There is no strong evidence for or against the use of rotating antibiotics for prophylaxis of UTIs.

Some agents and doses that have been studied include:

Antibiotic	Dosing
Sulfamethoxazole-Trimethoprim	1 Single Strength tab PO once daily
Nitrofurantoin	50-100 mg PO once daily
Cephalexin	250 mg PO once daily
Trimethoprim	100 mg PO once daily

Counseling Points for Residents and Families:

- Antibiotic prophylaxis is not a lifelong treatment. The goal of a prolonged course of antibiotics is to allow time for the bladder wall to heal, making UTIs less likely. There is no evidence of additional benefit beyond 6-12 months. Therefore, antibiotic treatment should be stopped ideally after 6 months.
- Long-term antibiotic prophylaxis will cause antibiotic resistance and will limit future treatment options.

Managing Patients on Prolonged Antibiotic Prophylaxis

All patients initiated on antibiotic prophylaxis for recurrent UTIs should be reviewed at least every 3 months by the prescriber. During the review, a clinical decision should be made to stop or continue prophylactic antibiotic therapy. The decision should be documented in the patient's medical record.

If a resident develops a recurrent UTI after stopping prophylactic antibiotics, it is important to determine whether proper self-care measures are being followed. If they are, further investigation may include renal tract ultrasound, post void bladder residual volume scan, and referral to a urologist.

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1. Panel BtAGSBCUE. American Geriatrics Society 2023 updated AGS Beers Criteria® for potentially inappropriate medication use in older adults. *Journal of the American Geriatrics Society*. 2023;71(7):2052-2081.
2. Talan DA, Takhar SS, Krishnadasan A, et al. Emergence of Extended-Spectrum β -Lactamase Urinary Tract Infections Among Hospitalized Emergency Department Patients in the United States. *Annals of Emergency Medicine*. 2021;77(1):32-43.
3. Ashraf MS, Gaur S, Bushen OY, et al. Diagnosis, Treatment, and Prevention of Urinary Tract Infections in Post-Acute and Long-Term Care Settings: A Consensus Statement From AMDA's Infection Advisory Subcommittee. *Journal of the American Medical Directors Association*. 2020;21(1):12-24.e2.
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7. Botros C, Lozo S, Iyer S, et al. Methenamine hippurate compared with trimethoprim for the prevention of recurrent urinary tract infections: a randomized clinical trial. *International Urogynecology Journal*. 2022;33(3):571-580.
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9. Hayward G, Mort S, Hay AD, et al. d-Mannose for Prevention of Recurrent Urinary Tract Infection Among Women: A Randomized Clinical Trial. *JAMA Intern Med*. Published online April 08, 2024. doi:10.1001/jamainternmed.2024.0264

Pharmacist Monthly UTI Prophylactic Antibiotic Audit

Resident Name:					Sex:	Age:
Prophylactic Antibiotic Therapy	Antibiotic	Dose/Sig	Duration	Date Prescribed	Prescriber	
Is prophylaxis being cycled?	☐ Yes (List all cycled antibiotics above) If yes, how often? ☐ Monthly ☐ Every 2 months ☐ Every 3 months ☐ Other:				☐ No	
Does the resident have a long-term urinary catheter? ☐ Yes ☐ No						
If yes, has the physician been notified to consider discontinuing antibiotics due to concern for resistance?						
☐ Yes, Date: _____		☐ No			☐ N/A	
Additional prescriptions for UTI while on prophylaxis? ☐ Yes ☐ No						
If yes, how many antibiotics in previous 12 months?						
If several antibiotics in previous 12 months, has the provider been notified to consider stopping prophylaxis due to failure of the strategy?			☐ Yes, Date: _____		☐ No	☐ N/A
Acute UTI Antibiotic Therapy (Previous 12 months)	Antibiotic	Dose/Sig	Duration	Date prescribed	Prescriber	
Any antibiotic prescribed for acute UTI same as prophylaxis?				☐ Yes ☐ No		
Any urine culture with resistance to prophylaxis?		☐ Yes ☐ No		If yes, has the prescriber been notified to consider discontinuing antibiotic prophylaxis?		
				☐ Yes, Date: _____		☐ No
Has the prescriber documented review of the prophylactic antibiotic in the last 6 months?				☐ Yes, Date: _____		☐ No
Documented plan for prophylaxis duration/stop date?						
Audit conducted by:					Date:	

SSTI PATIENT CASE

Read this poem by Robert Frost. Answer the questions using text evidence to support your answers.



The Road Not Taken

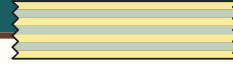
by ROBERT FROST

Two roads diverged in a yellow wood,
And sorry I could not travel both
And be one traveler, long I stood
And looked down one as far as I could
To where it bent in the undergrowth;

Then took the other, as just as fair,
And having perhaps the better claim,
Because it was grassy and wanted wear;
Though as for that the passing there
Had worn them really about the same,

And both that morning equally lay
In leaves no step had trodden black.
Oh, I kept the first for another day!
Yet knowing how way leads on to way,
I doubted if I should ever come back.

I shall be telling this with a sigh
Somewhere ages and ages hence:
Two roads diverged in a wood, and I—
I took the one less traveled by,
And that has made all the difference.



What does the road symbolize in the poem "The Road Not Taken"?



What details from the poem support your answer?

Patient Name: _____ MRN: _____ Location: _____

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

UTI: ☐ evaluated ☐ criteria metLRTI: ☐ evaluated ☐ criteria metSSTI: ☐ evaluated ☐ criteria metFUO: ☐ evaluated ☐ criteria met

Suspected Infection Syndrome	Minimum Criteria for Starting Antibiotic Therapy
Urinary tract infection <i>without catheter</i>	Either one of the following criteria ☐ Acute dysuria, OR ☐ Temp >37.9 °C (100 °F) or 1.5 °C (2.4 °F) above baseline, AND ≥1 of the following new or worsening symptoms ☐ Urgency ☐ Suprapubic pain ☐ Urinary incontinence ☐ Frequency ☐ Gross hematuria ☐ Costovertebral angle tenderness
<i>with catheter</i>	At least one of the following criteria ☐ Rigors ☐ New onset delirium ☐ Temp >37.9 °C (100 °F) or 1.5 °C (2.4 °F) above baseline ☐ New costovertebral angle tenderness
Note: Residents with intermittent catheterization or condom catheter should be categorized as 'without catheter' Urine culture should be sent prior to starting antibiotics Antibiotics should not be started for cloudy or foul-smelling urine	
Lower respiratory tract infection <i>with temp >38.9 °C (102 °F)</i>	At least one of the following criteria ☐ Productive cough ☐ Respiratory rate >25 breaths / minute
<i>with temp >37.9 °C (100 °F) or 1.5 °C (2.4 °F) above baseline</i>	Both of the following criteria ☐ Cough, AND ☐ At least one of the following criteria ☐ Pulse >100 beats / minutes ☐ Rigors ☐ Delirium ☐ Respiratory rate >25 breaths / minute
<i>afebrile with COPD and >65 years old</i>	Both of the following criteria ☐ New or increased cough ☐ Purulent sputum production
<i>afebrile without COPD</i>	All of the following criteria ☐ New cough ☐ Purulent sputum production ☐ At least one of the following criteria ☐ Delirium ☐ Respiratory rate >25 breaths / minute
<i>with new infiltrate on chest X-ray consistent with pneumonia</i>	At least one of the following criteria ☐ Productive cough ☐ Respiratory rate >25 breaths / minute ☐ Temp >37.9 °C (100 °F) or 1.5 °C (2.4 °F) above baseline
Note: Consider ordering chest X-ray and CBC with differential for febrile residents with cough and any of these criteria (HR >100, worsening mental status, or rigors) Antibiotics should not be used for up to 24 h after large-volume aspiration in those without COPD but with temp ≤38.9°C (102 °F) and non-productive cough	
Skin and soft-tissue infection	Either one of the following criteria ☐ New or increasing purulent drainage, OR ☐ At least two of the following criteria ☐ Redness (erythema) ☐ Tenderness ☐ Warmth ☐ Temp >37.9 °C (100 °F) or 1.5 °C (2.4 °F) above baseline ☐ New or increasing swelling at affected site
Note: These criteria do not apply to residents with burns Surgical consultation and hospitalization are required for certain soft-tissue infections (e.g., necrotizing fasciitis or gas gangrene)	
Fever where the Focus of Infection is Unknown	Both of the following criteria ☐ Temp >37.9 °C (100 °F) or 1.5 °C (2.4 °F) above baseline, AND ☐ At least one of the following criteria ☐ Rigors ☐ Delirium
Note: Antibiotic should not be started in residents with fever and altered mental status that does not meet delirium criteria (e.g., reduced functional activities, withdrawal, loss of appetite)	

S	Situation: I am following up on [resident's name: _____] who was started on antibiotic(s) recently.
B	Background: This patient was started on: Antibiotic #1: _____ Start date: _____ Antibiotic #2: _____ Start date: _____ For: ☐ UTI ☐ Pneumonia ☐ Bronchitis ☐ Skin infection ☐ GI infection ☐ Fever of unknown source ☐ Other, specify: _____ Vitals at initial presentation were as follows: BP ____ / ____ HR ____ Resp. rate ____ Temp. ____ O ₂ Sats. ____ Symptoms and positive exam findings at that time were: _____ The diagnosis fits: ☐ McGeer criteria ☐ Loeb criteria ☐ Neither ☐ Assessment tool not used
A	Assessment: Current vital signs: BP ____ / ____ HR ____ Resp. rate ____ Temp. ____ O ₂ Sats. ____ Since starting antibiotic(s), the resident: ☐ now has <u>no</u> signs or symptoms of infection ☐ has remained the same ☐ has improved but continues to have signs and symptoms of: _____ ☐ has <u>new or worsening</u> signs/symptoms of: _____ Microbiology culture result (fax microbiology report if available): ☐ has not returned yet ☐ has <u>no</u> growth ☐ was not obtained ☐ has positive Gram stain/growth of [specify Gram stain/microorganism: _____] Is susceptible to the antibiotic(s) prescribed: ☐ Yes ☐ No ☐ Don't know ☐ Not tested by lab ☐ Not yet performed by lab Other antibiotics the organism is sensitive to: _____
R	Recommendation: ☐ Patient is not improving and needs further evaluation. ☐ Patient has improved and needs final antibiotic therapy plan.
Nurse's Signature: _____ Date/Time: _____ ☐ Faxed or ☐ Called to: _____ By: _____ Date/Time: _____	

Physician Orders/Response (Please check all that apply)

☐ I have reviewed the above **SBAR**.

☐ Continue current antibiotic to complete a total antibiotic course of _____ days. Specify Antibiotic End date: _____

☐ Change antibiotic therapy to:

Drug: _____ Dose: _____ Route: _____ Frequency: _____ Duration: _____

☐ Stop antibiotic now

☐ Other (Please specify): _____

Physician Signature:	Date/Time:
----------------------	------------

Please Fax Back To: _____ or ☐ **Telephone Order**

File Under Physician Order/Progress Notes

[Facility Logo]

Resident Label

S	Situation I am concerned about a suspected UTI for the above resident.																																					
B	Background Indwelling catheter ☐ Yes ☐ No If yes, ☐ Urethral ☐ Suprapubic Incontinence ☐ Yes ☐ No If yes, is this new or worsening ☐ Yes ☐ No UTI in last 6 months ☐ Yes ☐ No If yes, Date: _____ Organism: _____ Treatment: _____ Active diagnosis (especially bladder, kidney, genitourinary conditions; diabetes; receiving dialysis, anticoagulants): _____ Advance directives for limiting treatment (especially antibiotic use): _____ Medication allergies: _____																																					
A	Assessment Vital signs: BP _____ / _____ HR _____ Resp. rate _____ Temp. _____ O ₂ Sats. _____																																					
	Resident <u>WITH</u> indwelling catheter The criteria are met to initiate antibiotics if one of the following are selected: <table style="width: 100%;"> <tr> <td style="width: 5%;">No</td> <td style="width: 5%;">Yes</td> <td></td> </tr> <tr> <td>☐</td> <td>☐</td> <td>Fever of 100°F (38°C), or 2°F (1.1°C) above baseline, or repeated temperatures of 99°F (37°C)</td> </tr> <tr> <td>☐</td> <td>☐</td> <td>New back or flank pain</td> </tr> <tr> <td>☐</td> <td>☐</td> <td>Rigors / shaking / chills</td> </tr> <tr> <td>☐</td> <td>☐</td> <td>New onset delirium (new dramatic change in mental status)</td> </tr> <tr> <td>☐</td> <td>☐</td> <td>Hypotension (significant change in baseline BP or SBP <90)</td> </tr> <tr> <td>☐</td> <td>☐</td> <td>Acute suprapubic pain</td> </tr> <tr> <td>☐</td> <td>☐</td> <td>Acute pain, swelling or tenderness of the scrotal area</td> </tr> </table>	No	Yes		☐	☐	Fever of 100°F (38°C), or 2°F (1.1°C) above baseline, or repeated temperatures of 99°F (37°C)	☐	☐	New back or flank pain	☐	☐	Rigors / shaking / chills	☐	☐	New onset delirium (new dramatic change in mental status)	☐	☐	Hypotension (significant change in baseline BP or SBP <90)	☐	☐	Acute suprapubic pain	☐	☐	Acute pain, swelling or tenderness of the scrotal area	Resident <u>WITHOUT</u> indwelling catheter Criteria are met to initiate antibiotics if one of the three situations are met: <table style="width: 100%;"> <tr> <td style="width: 5%;">No</td> <td style="width: 5%;">Yes</td> <td></td> </tr> <tr> <td>☐</td> <td>☐</td> <td>Any one of the following two: ☐ Acute dysuria alone (pain or burning while urinating) ☐ Acute pain, swelling or tenderness of the scrotal area _____ OR _____ </td> </tr> <tr> <td>☐</td> <td>☐</td> <td>Single temp of 100°F (38°C), or 2°F (1.1°C) above baseline, or repeated temperatures of 99°F (37°C) <u>and</u> at least one of the following new or worsening symptoms: ☐ Urgency ☐ Suprapubic pain ☐ Frequency ☐ Gross hematuria ☐ Back or flank pain ☐ Urinary incontinence _____ OR _____ </td> </tr> <tr> <td>☐</td> <td>☐</td> <td>No fever, but two or more of the following new or worsening symptoms: ☐ Urgency ☐ Suprapubic pain ☐ Frequency ☐ Gross hematuria ☐ Urinary incontinence </td> </tr> </table>	No	Yes		☐	☐	Any one of the following two: ☐ Acute dysuria alone (pain or burning while urinating) ☐ Acute pain, swelling or tenderness of the scrotal area _____ OR _____	☐	☐	Single temp of 100°F (38°C), or 2°F (1.1°C) above baseline, or repeated temperatures of 99°F (37°C) <u>and</u> at least one of the following new or worsening symptoms: ☐ Urgency ☐ Suprapubic pain ☐ Frequency ☐ Gross hematuria ☐ Back or flank pain ☐ Urinary incontinence _____ OR _____	☐	☐	No fever, but two or more of the following new or worsening symptoms: ☐ Urgency ☐ Suprapubic pain ☐ Frequency ☐ Gross hematuria ☐ Urinary incontinence
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☐	☐	No fever, but two or more of the following new or worsening symptoms: ☐ Urgency ☐ Suprapubic pain ☐ Frequency ☐ Gross hematuria ☐ Urinary incontinence																																				
R	Recommendation ☐ Protocol criteria met. Resident may require UA and urine culture or an antibiotic. ☐ Protocol criteria are NOT met. Resident <u>DOES NOT</u> need immediate antibiotic but may need additional observation.																																					
	Nurse's Signature: _____ Date/Time: _____ ☐ Notification of Family/POA Name: _____ Date/Time: _____ ☐ Faxed or ☐ Called to: _____ By: _____ Date/Time: _____																																					

Physician Orders/Response (Please check all that apply)

☐ I have reviewed the above SBAR.

☐ Urine culture (if indicated)

☐ Encourage 4oz of cranberry juice or another liquid (_____) for _____ times/day, until symptoms resolve

☐ Record fluid intake & output until symptoms resolve (output can also be measured from urinal or by weighing diapers, etc.)

☐ Assess vital signs, including temp; every _____ hours for _____ hours

☐ Monitor and notify PCP if symptoms worsen or unresolved in _____ hours

☐ Other: _____

☐ For antibiotic orders (if needed) please complete script below:

Drug: _____ Dose: _____ Route: _____ Frequency: _____ Duration: _____ Indication: _____

Please Fax Back To: _____ or ☐ Telephone Order

File Under Physician Order/Progress Notes

[Facility Logo]

Resident Label

S	Situation	I am concerned about a suspected cellulitis / soft-tissue infection / wound infection for the above patient.		
B	Background	History of recurrent skin infections ☐ Yes ☐ No History of diabetes ☐ Yes ☐ No History of peripheral vascular disease ☐ Yes ☐ No History of chronic ulcer ☐ Yes ☐ No Active chronic diagnosis (especially chronic lung, heart, or renal diseases, malignancies, asplenia, immunosuppression, diabetes): _____ Is the resident on warfarin (Coumadin®) ☐ Yes ☐ No Advance directives for limiting treatment (especially antibiotic use): _____ Medication allergies: _____		
A	Assessment	Vital signs: BP ____/____ HR ____ Resp. rate ____ Temp. ____ O ₂ Sats.. ____ Minimum criteria to initiate antibiotics are met if ONE of the following 2 scenarios are selected: No Yes ☐ ☐ New or increasing purulent drainage at a wound, skin, or soft-tissue site ☐ ☐ At least 2 of the following new or worsening signs or symptoms: ☐ More heat (warmth) at affected site relative to other areas of the body ☐ Redness (erythema) at affected site ☐ Swelling at affected site ☐ Increased tenderness or pain at affected site ☐ Fever of 100°F (38°C), repeated temp of 99°F (37°C), or temp of 2°F (1°C) above baseline Additional description of affected site: Location ☐ Left side ☐ Right side ☐ Multiple sites Body site ☐ Face/head/neck ☐ Upper extremities ☐ Chest/abdomen ☐ Groin ☐ Back ☐ Buttock ☐ Lower extremities ☐ Others: _____ Depth ☐ Intact skin ☐ Superficial wound ☐ Deep wound Drainage ☐ None ☐ Serous ☐ Serosanguinous ☐ Purulent Other significant findings: _____		
R	Recommendations	☐ Protocol criteria met. Resident may require antibiotics with or without wound care. ☐ Protocol criteria NOT met. Resident does not need immediate antibiotic order but may need additional observation.		
Nurse's Signature: _____ Date: _____ ☐ Notification of Family/POA Name: _____ Date/Time: _____ ☐ Faxed or ☐ Called to: _____ By: _____ Time: _____				

Physician Orders/Response (Please check all that apply)☐ I have reviewed the above SBAR.

☐ For wound care, apply _____ OR ☐ Consult wound care team	
☐ For fever / pain relief, use [Drug: _____ Dose: _____ Route: _____ Frequency: _____ Duration: _____]	
☐ Encourage _____ ounces of fluid intake _____ times daily, until fever / symptoms resolve.	
☐ Record fluid intake & output until symptoms resolve (output can also be measured from urinal or by weighing briefs, etc.).	
☐ Assess vital signs, including temp, every _____ hours for _____ hours; notify PCP if symptoms worsened or unresolved in _____ hours.	
☐ Other orders: _____	
☐ For antibiotic orders (if needed) please complete script	
Drug: _____ Dose: _____ Route: _____ Frequency: _____ Duration: _____ Indication: _____	
Additional Drug: _____	

Physician Signature	Date
---------------------	------

Please Fax Back To: _____

☐ Telephone Order

File Under Physician Order/Progress Notes

SBAR Communication Tool Template for Suspected Lower Respiratory Tract Infection

[Facility Logo]

Resident Label

S	Situation	I am concerned about a suspected lower respiratory tract infection (pneumonia/bronchitis) for the above patient.			
B	Background	History of COPD ☐ Yes ☐ No History of heart failure ☐ Yes ☐ No History of LRTI in last 6 months ☐ Yes ☐ No Use of supplemental O₂ ☐ Yes ☐ No O₂ requirement has increased ☐ Yes ☐ No if yes, Date: _____ Treatment: _____ Active chronic diagnosis (especially chronic lung, heart, or renal diseases, malignancies, asplenia, immunosuppression, diabetes): _____ Advance directives for limiting treatment (especially antibiotic use): _____ Medication allergies: _____			
A	Assessment	Vital signs: BP _____ / _____ HR _____ Resp. rate _____ Temp. _____ O ₂ Sats. _____			
		Residents with fever ≥102°F (38.9°C) Criteria are met to initiate antibiotics if ONE of the following are selected: No Yes ☐ ☐ New or increased cough ☐ ☐ New or increased sputum production ☐ ☐ Respiratory rate ≥25 breaths/minute ☐ ☐ O ₂ sat <94% on room air or >3% decrease from baseline O ₂ sat ☐ ☐ New or changed lung exam abnormalities ☐ ☐ Pleuritic chest pain	Residents with fever ≥100°F (37.9°C) but <102°F (38.9°C) or ≥2.4°F (1.5°C) above baseline temperature Criteria are met to start antibiotics if BOTH of the following are selected: No Yes ☐ ☐ New or increased cough, <u>AND</u> ☐ ☐ At least one of the following: ☐ Pulse >100 beats / minute ☐ New or worsened delirium ☐ Rigors ☐ Respiratory rate ≥25 breaths/minute		
		Afebrile resident with COPD and age >65 years old Criteria are met to initiate antibiotic if BOTH of the following are selected: No Yes ☐ ☐ New or increased cough, <u>AND</u> ☐ ☐ Purulent sputum production	Afebrile resident without COPD and age >65 years old Criteria are met to initiate antibiotic if ALL of the following are selected: No Yes ☐ ☐ New or increased cough, <u>AND</u> ☐ ☐ Purulent sputum production, <u>AND</u> ☐ ☐ At least one of the following: ☐ New or worsened delirium ☐ Respiratory rate ≥25 breaths/minute		
R	Recommendations	☐ Protocol criteria met. Resident may require a chest X-ray, CBC with differential, and/or antibiotics. ☐ Protocol criteria NOT met. Resident <u>does not</u> need immediate antibiotic order but may need additional observation.			
		Nurse's Signature: _____ Date: _____ ☐ Notification of Family/POA Name: _____ Date/Time: _____ ☐ Faxed or ☐ Called to: _____ By: _____ Time: _____			

Physician Orders/Response (Please check all that apply)

☐ I have reviewed the above SBAR.

☐ Chest X-Ray ☐ For cough, use cough suppressant: _____ Dose: _____ Route: _____ Frequency: _____ Duration: _____ ☐ For fever, use acetaminophen. Dose: _____ Route: _____ Frequency: _____ Duration: _____ ☐ For shortness of breath, inhale/nebulize: _____ Dose: _____ Route: _____ Frequency: _____ Duration: _____ ☐ Encourage 4 oz. of fluid (_____) TID, until symptoms resolve. ☐ Record fluid intake & output until symptoms resolve (output can also be measured from urinal or by weighing briefs, etc.). ☐ Assess vital signs, including temp, every _____ hours for _____ hours; notify PCP if symptoms worsened or unresolved in _____ hours. ☐ Other orders: _____
--

SBAR Communication Tool Template for Suspected Lower Respiratory Tract Infection

☐ For antibiotic orders (if needed) please complete script

Drug: _____ Dose: _____ Route: _____ Frequency: _____ Duration: _____ Indication: _____

Physician Signature

Date

Please Fax Back To: _____
File Under Physician Order/Progress Notes

☐ Telephone Order

Tracking & Reporting Antibiotic Use

01

02

03

Education & Communication



Summary of Today

NURSING HOME ANTIMICROBIAL STEWARDSHIP

WHAT IS AN ANTIMICROBIAL STEWARDSHIP PROGRAM?

An antimicrobial stewardship program is a **team effort** to make sure antibiotics are used correctly for patient safety.

The goal is to give the **right drug, at the right dose, for the right amount of time**, to the right resident, while avoiding unnecessary use.

WHO SHOULD PARTICIPATE?

- Medical Directors: set standards for antibiotic prescribing practices
- Directors of Nursing: set standards for nursing practices
- Infection Preventionists: be responsible for the Infection Prevention & Control Program and support Antimicrobial Stewardship Program activities
- Consultant Pharmacists: perform drug use review, provide antibiotic use data and assist with developing treatment guidelines
- Prescribers: prescribe antimicrobials only when clearly indicated
- Nursing Staff: evaluate patient using standardized assessment tools and communicate patients' symptoms to prescribers

CDC Core Elements provide a framework:



WHY IS ANTIMICROBIAL STEWARDSHIP NEEDED?

- ✓ 25-75% of antibiotic use is considered inappropriate
- ✓ Inappropriate antibiotic use leads to increases in antibiotic resistance and side effects such as *Clostridioides difficile* infections

WHAT CAN ANTIMICROBIAL STEWARDSHIP PROGRAMS DO?

- ✓ Improve the quality of care and outcomes for nursing home residents
- ✓ Minimize side effects from antimicrobials
- ✓ Limit the development of antimicrobial resistance
- ✓ Educate nursing home prescribers, staff, residents, and family members on best practices for antibiotic use

What are the steps to start an Antimicrobial Stewardship Program?

Practical steps of implementation include:

- ☐ Obtain program support from facility leadership
- ☐ Partner with physicians or pharmacists with infectious diseases or antimicrobial stewardship expertise
- ☐ Form an Antimicrobial Stewardship Committee
- ☐ Review data on infection assessment practices, and antimicrobial use and resistance patterns
- ☐ Determine program goals such as the types and extents of interventions (e.g., use assessment tools for all suspected infections, eliminate treatment of asymptomatic bacteriuria)
- ☐ Educate prescribers and staff on the types, reasons and goals of the selected interventions
- ☐ Track outcomes after implementation of interventions
- ☐ Report and educate program activities and outcomes to prescribers, staff and residents/families



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DEPT OF HEALTH AND HUMAN SERVICES

Content developed based on resources provided by the Centers for Disease Control and Prevention (CDC)



The Core Elements of **Antibiotic Stewardship for Nursing Homes**



National Center for Emerging and Zoonotic Infectious Diseases
Division of Healthcare Quality Promotion



CORE ELEMENTS OF ANTIBIOTIC STEWARDSHIP FOR NURSING HOMES

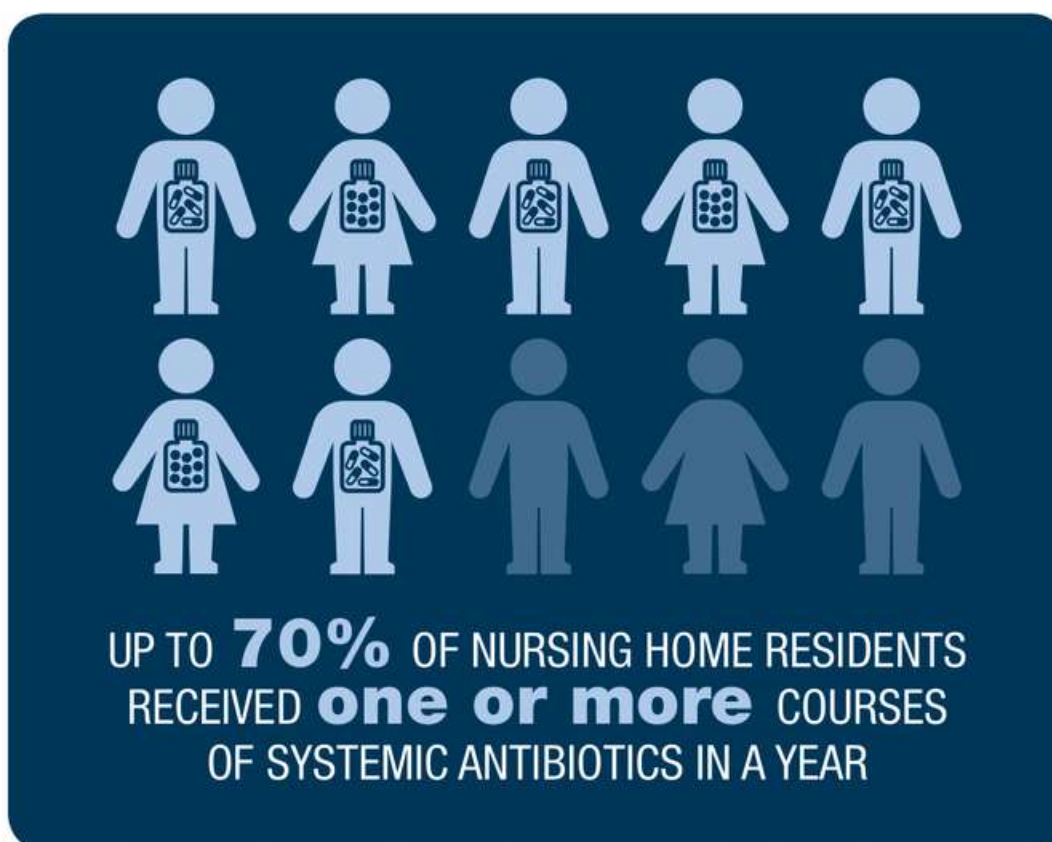
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Introduction

Improving the use of antibiotics in healthcare to protect patients and reduce the threat of antibiotic resistance is a national priority.¹ Antibiotic stewardship refers to a set of commitments and actions designed to “optimize the treatment of infections while reducing the adverse events associated with antibiotic use.”² The Centers for Disease Control and Prevention (CDC) recommends that all acute care hospitals implement an antibiotic stewardship program (ASP) and outlined the seven core elements which are necessary for implementing successful ASPs.² CDC also recommends that all nursing homes take steps to improve antibiotic prescribing practices and reduce inappropriate use.

Antibiotics are among the most frequently prescribed medications in nursing homes, with up to 70% of residents in a nursing home receiving one or more courses of systemic antibiotics when followed over a year.^{3,4} Similar to the findings in hospitals,^{5,6} studies have shown that 40–75% of antibiotics prescribed in nursing homes may be unnecessary or inappropriate.^{3,4} Harms from antibiotic overuse are significant for the frail and older adults receiving care in nursing homes. These harms include risk of serious diarrheal infections from *Clostridium difficile*, increased adverse drug events and drug interactions, and colonization and/or infection with antibiotic-resistant organisms.



This document adapts the [CDC Core Elements of Hospital Antibiotic Stewardship](#) into practical ways to initiate or expand antibiotic stewardship activities in nursing homes. While the elements are the same for both hospitals and nursing homes, the implementation of these elements may vary based on facility staffing and resources. Nursing homes are encouraged to work in a step-wise fashion, implementing one or two activities to start and gradually adding new strategies from each element over time. Any action taken to improve antibiotic use is expected to reduce adverse events, prevent emergence of resistance, and lead to better outcomes for residents in this setting.



Leadership Commitment

Nursing home leaders commit to improving antibiotic use. Facility leadership, both owners and administrators, as well as regional and national leaders if the facility is part of a larger corporation, can demonstrate their support in the following ways:

Write statements in support of improving antibiotic use to be shared with staff, residents and families

Include stewardship-related duties in position descriptions for the medical director, clinical nurse leads, and consultant pharmacists in the facility

Communicate with nursing staff and prescribing clinicians the facility's expectations about use of antibiotics and the monitoring and enforcement of stewardship policies

Create a culture, through messaging, education, and celebrating improvement, which promotes antibiotic stewardship



Accountability

Nursing homes identify individuals accountable for the antibiotic stewardship activities who have the support of facility leadership:

Empower the medical director to set standards for antibiotic prescribing practices for all clinical providers credentialed to deliver care in a nursing home and be accountable for overseeing adherence. To be effective in this role, the medical director should review antibiotic use data (see Tracking and Reporting section) and ensure best practices are followed in the medical care of residents in the facility.¹⁰

Empower the director of nursing to set the practice standards for assessing, monitoring and communicating changes in a resident's condition by front-line nursing staff. Nurses and nurse aides play a key role in the decision-making process for starting an antibiotic. The knowledge, perceptions and attitudes among nursing staff of the role of antibiotics in the care of nursing home residents can significantly influence how information is communicated to clinicians who are deciding whether to initiate antibiotic therapy. Therefore the importance of antibiotic stewardship is conveyed by the expectations set by nursing leadership in the facility.

Engage the consultant pharmacist in supporting antibiotic stewardship oversight through quality assurance activities such as medication regimen review and reporting of antibiotic use data.

Nursing home antibiotic stewardship leads utilize existing resources to support antibiotic stewards' efforts by working with the following partners:

Infection prevention program coordinator

Infection prevention coordinators have key expertise and data to inform strategies to improve antibiotic use. This includes tracking of antibiotic starts, monitoring adherence to evidence-based published criteria^{12,13} during the evaluation and management of treated infections, and reviewing antibiotic resistance patterns in the facility to understand which infections are caused by resistant organisms. When infection prevention coordinators have training, dedicated time, and resources to collect and analyze infection surveillance data, this information can be used to monitor and support antibiotic stewardship activities.

Consultant laboratory

Nursing homes contracting laboratory services can request reports and services to support antibiotic stewardship activities. Examples of laboratory support for antibiotic stewardship include developing a process for alerting the facility if certain antibiotic-resistant organisms are identified, providing education for nursing home staff on the differences in diagnostic tests available for detecting various infectious pathogens (e.g., EIA toxin test vs. nucleic amplification tests for *C. difficile*), and creating a summary report of antibiotic susceptibility patterns from organisms isolated in cultures. These reports, also known as antibiograms, help inform empiric antibiotic selection (i.e., before culture results are available) and monitor for new or worsening antibiotic resistance.¹⁴

State and local health departments

Nursing homes benefit from the educational support and resources on antibiotic stewardship and infection prevention which are provided by the Healthcare-Associated Infection (HAI) Prevention programs at state and local health departments.



Drug Expertise

Nursing homes establish access to individuals with antibiotic expertise to implement antibiotic stewardship activities. Receiving support from infectious disease consultants and consultant pharmacists with training in antibiotic stewardship can help a nursing home reduce antibiotic use and experience lower rates of positive *C. difficile* tests.¹¹ Examples of establishing antibiotic expertise include:

Work with a consultant pharmacist who has received specialized infectious diseases or antibiotic stewardship training. Example training courses include the Making a Difference in Infectious Diseases (MAD-ID) antibiotic stewardship course (<http://mad-id.org/antimicrobial-stewardship-programs/>), and the Society for Infectious Diseases Pharmacists antibiotic stewardship certificate program (<https://sidp.org/Stewardship-Certificate>).

Partner with antibiotic stewardship program leads at the hospitals within your referral network.

Develop relationships with infectious disease consultants in your community interested in supporting your facility's stewardship efforts.



Take Action through Policy and Practice Change to Improve Antibiotic Use

Nursing homes implement prescribing policies and change practices to improve antibiotic use. The introduction of new policies and procedures which address antibiotic use should be done in a step-wise fashion so staff become familiar with and not overwhelmed by new changes in practice. Prioritize interventions based on the needs of your facility and share outcomes from successful interventions with nursing staff and clinical providers. Below are brief descriptions of policy and practice changes. For more details, see *Appendix A: Policy and practice actions to improve antibiotic use*.

Policies that support optimal antibiotic use

Ensure that current medication safety policies, including medication regimen review, developed to address Centers for Medicare and Medicaid Services (CMS) regulations¹⁵⁻¹⁷ are being applied to antibiotic prescribing and use.

Broad interventions to improve antibiotic use

Standardize the practices which should be applied during the care of any resident suspected of an infection or started on

an antibiotic. These practices include improving the evaluation and communication of clinical signs and symptoms when a resident is first suspected of having an infection, optimizing the use of diagnostic testing, and implementing an antibiotic review process, also known as an “antibiotic time-out,” for all antibiotics prescribed in your facility. Antibiotic reviews provide clinicians with an opportunity to reassess the ongoing need for and choice of an antibiotic when the clinical picture is clearer and more information is available.

Pharmacy interventions to improve antibiotic use

Integrate the dispensing and consultant pharmacists into the clinical care team as key partners in supporting antibiotic stewardship in nursing homes. Pharmacists can provide assistance in ensuring antibiotics are ordered appropriately, reviewing culture data, and developing antibiotic monitoring and infection management guidance in collaboration with nursing and clinical leaders.

Infection and syndrome specific interventions to improve antibiotic use

Identify clinical situations which may be driving inappropriate courses of antibiotics such as asymptomatic bacteriuria or urinary tract infection prophylaxis^{18,19} and implement specific interventions to improve use.



Tracking and Reporting Antibiotic Use and Outcomes

Nursing homes monitor both antibiotic use practices and outcomes related to antibiotics in order to guide practice changes and track the impact of new interventions. Data on adherence to antibiotic prescribing policies and antibiotic use are shared with clinicians and nurses to maintain awareness about the progress being made in antibiotic stewardship. Clinician response to antibiotic use feedback (e.g., acceptance) may help determine whether feedback is effective in changing prescribing behaviors. Below are examples of antibiotic use and outcome measures. For more details, see *Appendix B: Measures of antibiotic prescribing, use and outcomes*.

Process measures: Tracking how and why antibiotics are prescribed

Perform reviews on resident medical records for new antibiotic starts to determine whether the clinical assessment, prescription documentation and antibiotic selection were in accordance with facility antibiotic use policies and practices. When conducted over time, monitoring process measures can assess whether antibiotic prescribing policies are being followed by staff and clinicians.

Antibiotic use measures: Tracking how often and how many antibiotics are prescribed

Track the amount of antibiotic used in your nursing home to review patterns of use and determine the impact of new stewardship interventions. Some antibiotic use measures (e.g., prevalence surveys) provide a snap-shot of information; while others, like

nursing home initiated antibiotic starts and days of therapy (DOT) are calculated and tracked on an ongoing basis.^{20,21} Selecting which antibiotic use measure to track should be based on the type of practice intervention being implemented. Interventions designed to shorten the duration of antibiotic courses, or discontinue antibiotics based on post-prescription review (i.e., “antibiotic time-out”), may not necessarily change the rate of antibiotic starts, but would decrease the antibiotic DOT.

Antibiotic use data from nursing homes to improve antibiotic stewardship efforts is important both for individual facility improvements and for public health action. Expansion of electronic health records in nursing homes will allow for facilities to obtain systems which integrate pharmacy and laboratory data and make antibiotic use and resistance data to inform stewardship efforts more accessible to facility staff and leadership. CDC is working closely with many nursing home partners including providers, long-term care pharmacies, and professional organizations, to develop an Antibiotic Use (AU) reporting option for nursing homes within the CDC’s National Healthcare Safety Network (NHSN). The NHSN AU option allows for standardized antibiotic use data, submitted electronically, to be aggregated and summarized for developing facility-adjusted national benchmarks.

Antibiotic outcome measures: Tracking the adverse outcomes and costs from antibiotics

Monitor clinical outcomes such as rates of *C. difficile* infections, antibiotic-resistant organisms or adverse drug events to demonstrate that antibiotic stewardship activities are successful in improving patient outcomes. Nursing homes already tracking these clinical outcomes for their infection prevention program can submit data on *C. difficile* and selected antibiotic-resistant bacteria, such as methicillin-resistant *Staphylococcus aureus* (MRSA) and carbapenem-resistant *Enterobacteriaceae* (CRE) into the CDC’s NHSN Laboratory-identified event reporting module for long-term care facilities.



Education

Nursing homes provide antibiotic stewardship education to clinicians, nursing staff, residents and families. Effective educational programs address both nursing staff and clinical providers on the goal of an antibiotic stewardship intervention, and the responsibility of each group for ensuring its implementation.^{3,22} There are a variety of mechanisms for disseminating antibiotic education to nursing home staff including flyers, pocket-guides, newsletters or electronic communications; however, interactive academic detailing (e.g., face-to-face interactive workshops) has the strongest evidence for improving medication prescribing practices.²³

Nursing homes sustain improvements by incorporating both education and feedback to providers. One nursing home antibiotic stewardship intervention demonstrated a sustained reduction in antibiotic use for two years after the intervention by linking education with feedback on physician prescribing practices.²⁴ Another study showed a 64% reduction in inappropriate antibiotic use (i.e., prescriptions which did not adhere to guidelines), by providing feedback on individual physician prescribing practices and adherence to the guidelines over 12 months.²⁵

Nursing homes engage residents and their family members in antibiotic use and stewardship educational efforts to ensure clinicians have their support to make appropriate antibiotic use decisions. Working with residents and families will reduce the perception that their expectations may be a barrier to improving antibiotic use in nursing homes.^{26,27}



Conclusion

The core elements of antibiotic stewardship are the same for both hospitals and nursing homes. This guide provides examples of how these elements can be applied by nursing home leadership, clinicians and staff to monitor and improve antibiotic use. Nursing homes are encouraged to select one or two activities to start with and over time, as improvements are implemented, expand efforts to add new strategies to continue improving antibiotic use. Commit now to ensure antibiotic stewardship policies and practices are in place to protect patients and improve clinical care in nursing homes.



Checklist for Core Elements of Antibiotic Stewardship in Nursing Homes

The following checklist is a companion to the Core Elements of Antibiotic Stewardship in Nursing Homes. The CDC recommends that all nursing homes take steps to implement antibiotic stewardship activities. Before getting started, use this checklist as a baseline assessment of policies and practices which are in place. Then use the checklist to review progress in expanding stewardship activities on a regular basis (e.g., annually). Over time, implement activities for each element in a step-wise fashion.

LEADERSHIP SUPPORT

ESTABLISHED
AT FACILITY

1. Can your facility demonstrate leadership support for antibiotic stewardship through one or more of the following actions?

☐ Yes

☐ No

If yes, indicate which of the following are in place (select all that apply)

- ☐ Written statement of leadership support to improve antibiotic use
- ☐ Antibiotic stewardship duties included in medical director position description
- ☐ Antibiotic stewardship duties included in director of nursing position description
- ☐ Leadership monitors whether antibiotic stewardship policies are followed
- ☐ Antibiotic use and resistance data is reviewed in quality assurance meetings

ACCOUNTABILITY

2. Has your facility identified a lead(s) for antibiotic stewardship activities?

☐ Yes

☐ No

If yes, indicate who is accountable for stewardship activities (select all that apply)

- ☐ Medical director
- ☐ Director or assistant director of nursing services
- ☐ Consultant pharmacist
- ☐ Other: _____

DRUG EXPERTISE

3. Does your facility have access to individual(s) with antibiotic stewardship expertise?

☐ Yes

☐ No

If yes, indicate who is accountable for stewardship activities (select all that apply)

- ☐ Consultant pharmacy has staff trained/is experienced in antibiotic stewardship
- ☐ Partnering with stewardship team at referral hospital
- ☐ External infectious disease/stewardship consultant
- ☐ Other: _____

ACTIONS TO IMPROVE USE

4. Does your facility have policies to improve antibiotic prescribing/use?

☐ Yes

☐ No

If yes, indicate which policies are in place (select all that apply)

- ☐ Requires prescribers to document a dose, duration, and indication for all antibiotic prescriptions
- ☐ Developed facility-specific algorithm for assessing residents
- ☐ Developed facility-specific algorithms for appropriate diagnostic testing (e.g., obtaining cultures) for specific infections
- ☐ Developed facility-specific treatment recommendations for infections
- ☐ Reviews antibiotic agents listed on the medication formulary
- ☐ Other: _____

5. Has your facility implemented practices to improve antibiotic use?

☐ Yes

☐ No

If yes, indicate which practices are in place (select all that apply)

- ☐ Utilizes a standard assessment and communication tool for residents suspected of having an infection
 - ☐ Implemented process for communicating or receiving antibiotic use information when residents are transferred to/from other healthcare facilities
 - ☐ Developed reports summarizing the antibiotic susceptibility patterns (e.g., facility antibiogram)
 - ☐ Implemented an antibiotic review process/"antibiotic time out"
 - ☐ Implemented an infection specific intervention to improve antibiotic use
- Indicate for which condition(s): _____

6. Does your consultant pharmacist support antibiotic stewardship activities? ☐ Yes ☐ No
- If yes, indicate activities performed by the consultant pharmacist (select all that apply)
- ☐ Reviews antibiotic courses for appropriateness of administration and/or indication
 - ☐ Establishes standards for clinical/laboratory monitoring for adverse drug events from antibiotic use
 - ☐ Reviews microbiology culture data to assess and guide antibiotic selection

TRACKING: MONITORING ANTIBIOTIC PRESCRIBING, USE, AND RESISTANCE

7. Does your facility monitor one or more measures of antibiotic use? ☐ Yes ☐ No
- If yes, indicate which of the following are being tracked (select all that apply)
- ☐ Adherence to clinical assessment documentation (signs/symptoms, vital signs, physical exam findings)
 - ☐ Adherence to prescribing documentation (dose, duration, indication)
 - ☐ Adherence to facility-specific treatment recommendations
 - ☐ Performs point prevalence surveys of antibiotic use
 - ☐ Monitors rates of new antibiotic starts/1,000 resident-days
 - ☐ Monitors antibiotic days of therapy/1,000 resident-days
 - ☐ Other: _____
8. Does your facility monitor one or more outcomes of antibiotic use? ☐ Yes ☐ No
- If yes, indicate which of the following are being tracked (select all that apply)
- ☐ Monitors rates of *C. difficile* infection
 - ☐ Monitors rates of antibiotic-resistant organisms
 - ☐ Monitors rates of adverse drug events due to antibiotics
 - ☐ Other: _____

REPORTING INFORMATION TO STAFF ON IMPROVING ANTIBIOTIC USE AND RESISTANCE

9. Does your facility provide facility-specific reports on antibiotic use and outcomes with clinical providers and nursing staff? ☐ Yes ☐ No
- If yes, indicate which of the following are being tracked (select all that apply)
- ☐ Measures of antibiotic use at the facility
 - ☐ Measures of outcomes related to antibiotic use (i.e., *C. difficile* rates)
 - ☐ Report of facility antibiotic susceptibility patterns (within last 18 months)
 - ☐ Personalized feedback on antibiotic prescribing practices (to clinical providers)
 - ☐ Other: _____

EDUCATION

10. Does your facility provide educational resources and materials about antibiotic resistance and opportunity for improving antibiotic use? ☐ Yes ☐ No
- If yes, indicate which of the following are being tracked (select all that apply)
- ☐ Clinical providers (e.g., MDs, NPs, PAs, PharmDs)
 - ☐ Nursing staff (e.g., RNs, LPNs, CNAs)
 - ☐ Residents and families
 - ☐ Other: _____

BRAND TO GENERIC ANTIINFECTIVES REFERENCE

Brand Name (A to Z)	Generic Name
Amoxil	Amoxicillin
Augmentin	Amoxicillin-Clavulanate
Avelox	Moxifloxacin
Bactrim	Sulfamethoxazole/Trimethoprim
Bexdela	Delafloxacin
Biaxin	Clarithromycin
Ceclor	Cefaclor
Ceftin	Cefuroxime
Cefzil	Cefprozil
Cipro	Ciprofloxacin
Cleocin	Clindamycin
Cresemba	Isavuconazonium
Difcid	Fidaxomicin
Diflucan	Fluconazole
Duricef	Cefadroxil
Dynapen	Dicloxacillin
Eryc	Erythromycin
Ery-Tab, Eryc	Erythromycin
Flagyl	Metronidazole
Garamycin	Gentamicin
Hiprex	Methenamine
Invanz	Ertapenem
Keflex	Cephalexin
Lamisil	Terbinafine
Levaquin	Levofloxacin
Macrobid	Nitrofurantoin
Macrodantin	Nitrofurantoin
Mandelamine	Methenamine
Minocin	Minocycline
Monurol	Fosfomycin
N/A	Not listed
Noxafil	Posaconazole
Omnicef	Cefdinir
Primsol	Trimethoprim
Principen, Omnipen	Ampicillin
Relenza	Zanamivir
Rifadin	Rifampin
Rocephin	Ceftriaxone
Septra	Sulfamethoxazole/Trimethoprim
Sivetro	Tedizolid
Sporanox	Itraconazole
Sumycin	Tetracycline
Suprax	Cefixime
Tamiflu	Oseltamivir
Tindamax	Tinidazole
Valcyte	Valganciclovir
Valtrex	Valacyclovir
Vancocin IV	Vancomycin, IV
Vancocin PO	Vancomycin, oral
Veetids	Penicillin V
Vfend	Voriconazole
Vibramycin	Doxycycline
Zithromax	Azithromycin
Zovirax	Acyclovir
Z-Pak	Azithromycin
Zyvox	Linezolid

Loeb and McGeer Criteria

A PRACTICAL GUIDE FOR USE IN LONG-TERM CARE

Clinical and Surveillance Criteria—Why do we have both?

Clinical criteria are meant to inform decisions on individual patients when care is needed.

- When these criteria are used for clinical decision making (e.g., to start an antibiotic), clinical information (e.g., diagnostic test results, condition duration) is often unknown.
- Clinical criteria take into account patient factors, like indwelling devices.
- Clinical criteria are important because we treat patients, not case definitions.

Surveillance criteria are used to count true case events (i.e., diagnosed infections) and to estimate the actual incidence/prevalence of disease conditions.

- These criteria are applied retrospectively (after the fact), often with new information (e.g., diagnostic culture results, which can take days to receive) that was not available during initial clinical assessment.
- Surveillance criteria are designed to increase the likelihood that all patients counted truly have the infection of interest.
- Because infections in long-term care patients might not have typical symptoms, failure to meet surveillance definitions does not always mean there was no infection present.

Loeb Criteria are Designed for Clinical Use

Loeb criteria are meant to be a minimum set of signs and symptoms which, when met, indicate that the resident likely has an infection and that an antibiotic might be indicated, even if the infection has not been confirmed by diagnostic testing.

- When criteria are met, there is reasonable expectation that the resident has an infection.
- Clinical criteria err on the side of caution, leading to treatment of some likely infections, not just confirmed infections. For this reason, these criteria are not used for retrospectively counting true infections.

Because they summarize information available to prescribers when making initial treatment decisions, Loeb criteria can be used retrospectively to assess antibiotic initiation and selection appropriateness.

McGeer and NHSN Criteria are Designed for Surveillance

Revised McGeer criteria (Stone 2012) are used for retrospectively counting true infections.

- To meet the criteria for definitive infection, more diagnostic information (e.g., positive laboratory tests) is often necessary.
- Surveillance criteria are not intended for informing antibiotic initiation because they depend on information that might not be available when that decision must be made.

If, instead of Loeb criteria, these McGeer guidelines are used to retrospectively assess antibiotic initiation appropriateness, they should be applied without inclusion of diagnostic criteria (e.g., positive urine culture, chest x-ray) that were not available at the time of antibiotic initiation.

- If diagnostic information that was not available in real-time is included in an antibiotic appropriateness assessment, measures of inappropriate prescribing might be artificially increased. This is because the metric would incorporate information (e.g., negative urine culture) unavailable to the prescriber at the time of antibiotic initiation.

National Healthcare Safety Network (NHSN) criteria are used for active, resident-based, prospective surveillance of events.

- Criteria might be based on laboratory results alone (CDI LabID) or include specific signs and/or symptoms.
- Criteria are specifically designed to remove subjectivity and ensure accurate, reproducible, and comparable surveillance data for a facility over time and across facilities.
- Participation in NHSN reporting can provide a way for facilities to benchmark infection rates with other U.S. facilities.
- NHSN criteria are not intended for clinical decision making.

Find more information about these criteria and about implementing antibiotic stewardship in long-term care at [Antibiotic Resistance and Stewardship for Health Professionals \(https://www.health.state.mn.us/diseases/antibioticresistance/hcp/index.html\)](https://www.health.state.mn.us/diseases/antibioticresistance/hcp/index.html).

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06/05/19

To obtain this information in a different format, call: 651-201-5414.



Recommended DURATION OF THERAPY

Infection Syndrome	Typical Duration of Therapy
Uncomplicated cystitis ^{1,2}	5 days for Nitrofurantoin 3 days for TMP/SMX 1 dose for Fosfomycin 3 days for Fluoroquinolones 3-7 days for Beta-Lactams
Pyelonephritis ¹	7 days for Fluoroquinolones 14 days for TMP/SMX 10-14 days for Beta-Lactams
Catheter-associated urinary tract infection ³ or complicated* UTI ^{2,4}	7 days if prompt resolution of symptoms 10-14 days if delayed response to therapy
Pneumonia ⁵	5-7 days
Bronchitis ^{6,7}	No antibiotic therapy is recommended
Acute exacerbation of COPD ⁸	5 days if treatment criteria met
Influenza ^{9,10}	5 days for treatment Minimum of 2 weeks, continuing for at least 7 days after the last known case was identified for chemoprophylaxis in influenza outbreak
Pharyngitis, streptococcal ¹¹	Up to 10 days for penicillin, amoxicillin, 1 st -generation oral cephalosporins, clindamycin 5 days for azithromycin
Sinusitis ¹²	5-7 days if improvement after 3-5 days of treatment 7- 10 days if delayed response or switched to alternative therapy due to lack of response
Cellulitis or cutaneous abscess ¹³	5-7 days
Shingles ¹⁴	7 days for famciclovir, valacyclovir 7-10 days for acyclovir
<i>Clostridium difficile</i> infection ¹⁵	10-14 days 10 days for fidaxomicin
Gastroenteritis, bacterial ¹⁶	3-5 days if treatment criteria met

Table 2. Factors Associated with Complicated UTI⁴

Factors	Examples	
Obstruction	Ureteric or urethral strictures Nephrolithiasis Diverticula Renal cysts	Tumors of the urinary tract Prostatic hypertrophy Pelvic/colic obstruction Congenital abnormalities
Instrumentation	Indwelling urethral catheter Ureteric stent Urologic procedures	Intermittent catheterization Nephrostomy tube
Impaired voiding	Neurogenic bladder Vesicoureteral reflux	Cystocele Ileal conduit
Metabolic abnormalities	Nephrocalcinosis Renal failure (eCrCl <30 mL/min) ¹⁷	Medullary sponge kidney
Others	Immunosuppressed (e.g., renal transplant) Male sex	Pregnancy

Abbreviations: eCrCl = estimated creatinine clearance

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