



Indiana
Department
of
Health

Long-term Care Antibiotic Stewardship Toolkit

This toolkit is a collection of resources designed to assist with initiating or implementing an antibiotic stewardship program for long-term care facilities.

To **promote**, **protect**, and **improve** the health and safety of all Hoosiers

Indiana Department of Health

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Infection Prevention Guide

TO LONG-TERM CARE

2nd Edition



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Association for Professionals in
Infection Control and Epidemiology

Infection Prevention Guide

TO LONG-TERM CARE

2nd Edition

Antimicrobial Stewardship

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KEY CONCEPTS

- A robust antimicrobial stewardship program is an integral component of the infection prevention and control (IPC) plan.
- Antimicrobial stewardship programs increase infection cure rates and reduce treatment failures, resulting in optimal resident clinical and safety outcomes.
- The antimicrobial stewardship program must be integrated with both the infection prevention and quality assessment and assurance committees to promote resident safety and prevent harm.
- The Centers for Disease Control and Prevention's *Core Elements for Antibiotic Stewardship in Nursing Homes* provides an expert framework for promoting antimicrobial stewardship.

Antibiotics are commonly prescribed to patients and residents in long-term care (LTC). One to three million serious infections occur every year in nursing homes, which may result in hospitalization; up to 380,000 persons die annually from infections.² Residents in LTC facilities are at greater risk for infection due to underlying co-morbidities, the use of invasive devices, aging-associated changes, and institutional exposure to pathogens.³ When properly used to treat bacterial infections, antibiotics can be lifesaving.¹ However, the misuse and overuse of antibiotics can have serious adverse consequences. To ensure appropriate use of antibiotics, culture results and other laboratory studies must be correlated with the resident's or patient's clinical presentation.^{3,4}

On average, 6 to 10 percent of LTC residents take antibiotics at any given time, and more than half receive at least one antibiotic prescription in a single year.⁵ Leading infections include urinary tract infections, pneumonia, diarrhea, and skin and soft tissue infections, with pneumonia and lower respiratory tract infections being the leading causes of mortality.⁶

Antibiotics are the only medication that can impact other LTC residents. Through their use there's the potential for transmitting antibiotic-resistant organisms to other residents and healthcare personnel. There is also the risk of *C. difficile* environmental contamination and transmission. See Figure 4.1 for examples of how antibiotic resistance spreads.

APPROPRIATE PRESCRIBING

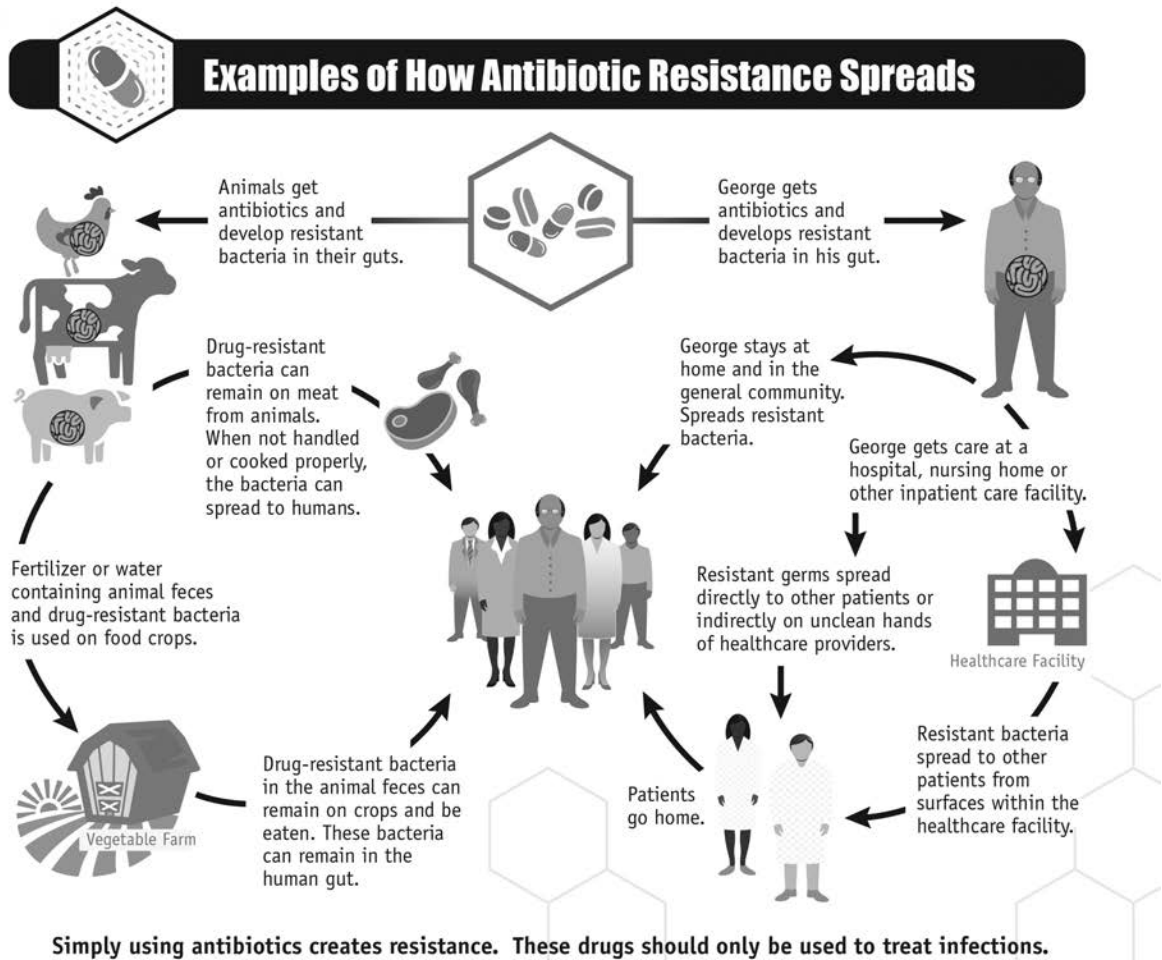
Studies have shown that 40 to 75 percent of antibiotics prescribed in nursing homes may be unnecessary or inappropriate.¹ This occurs when therapy is prescribed for nonspecific clinical changes that are attributed to infection even in the absence of evidence to confirm the infection; this results in infection overdiagnosis and overtreatment with empiric, broad-spectrum therapy.³

The most common circumstance leading to inappropriate antibiotic therapy is suspected urinary tract infection (UTI), which accounts for 30 to 56 percent of antibiotics prescribed, with up to a third of these being prescribed for asymptomatic bacteriuria.⁵

There are numerous potential harms whenever an antibiotic is prescribed:

- Anaphylaxis (e.g., penicillin)
- *C. difficile*
- Oral and vaginal superinfection (due to disruption of normal flora)
- Adverse drug reactions (e.g., Levofloxacin and tendon rupture)
- Increased healthcare expenditures
- Resident and family suffering
- Microbiome changes

FIGURE 4.1: HOW ANTIBIOTIC RESISTANCE SPREADS



Source: Centers for Disease Control and Prevention. Available at <https://www.cdc.gov/antibiotic-use/community/images/howAR-spreads.jpg>.

- Potential heavier work burden (e.g., more nursing care)
- Unnecessary diagnostic testing
- Toxicity (e.g., gentamycin)
- Unfavorable public perception of a facility with increased infection rates
- Increased risk of multidrug-resistant organism (MDRO) colonization and infection
- Related costs and burdens of adding Transmission-Based Precautions

An LTC antibiotic prescriber should take the following variables into account before ordering the medication:

- The nurse’s clinical description
- Confidence in the nursing care (e.g., agency use, staff shortages)
- Trust in the laboratory studies (e.g., false negative findings)
- Relieving prescriber anxiety (e.g., the need to do something)
- Fear of litigation
- Dealing with a demanding resident or family
- Not having an infectious diseases physician consult or support
- Value of administering for end of life (e.g., hospice situation)

Aggressive antibiotic therapy when residents are at the end of life or on hospice is controversial due to a poor prognosis. Residents in these situations may be more susceptible to infection due to their underlying disease or therapy. Antibiotic use may not be consistent with the resident’s or family’s wishes. The medication may prolong the dying process, increase suffering, result in side effects, and add additional expenditures. In addition, there is the risk of additional antibiotic resistance—which may impact other residents.

Bacteria, due to their genetic structure, will find numerous ways of naturally inactivating antibiotics. Antibiotic resistance occurs when bacteria resist and adapt to antibiotics that had previously killed them.

ANTIBIOTIC RESISTANCE

The World Health Organization (WHO) notes that “antibiotic resistance is one of the biggest threats to global health, food security, and development today.”⁷ When compared to infections that are easily treatable with antibiotics, antibiotic-resistant bacterial infections can result in the following:

- Prolonged and costlier treatments
- Extended hospitalizations
- Additional use of healthcare resources (e.g., manpower, equipment)
- Greater disability and mortality

MDROs can be transmitted to LTC residents with wounds and invasive devices (e.g., central lines, tracheostomies, respiratory therapy devices, feeding tubes, dialysis, or indwelling urinary devices) and increase their infection risk.

Being a resident in an LTC facility is one of the most significant risk factors for colonization with an MDRO. The estimated methicillin-resistant *Staphylococcus aureus* (MRSA) colonization rate for LTC residents exceeds 50 percent. This surpasses the estimated colonization rate of 5 to 10 percent among hospitalized patients. The colonization rate of multidrug-resistant Gram-negative bacilli among nursing home residents ranges from 20 to 30 percent.⁸

From a national perspective, the CDC states that at least two million people acquire an antibiotic-resistant infection, and at least 23,000 people die as a result of these infections each year.⁹

New antibiotics, vaccines, and treatments all take years to develop, to be studied, and to receive regulatory approval. The cost of bringing an antibiotic to market can be \$1 billion.¹⁰ Compared to medications used for chronic conditions, antibiotics are typically prescribed for acute, short-term conditions, which may affect pharmaceutical profits, even as the drug may be rendered ineffective due to bacterial resistance.

ANTIMICROBIAL STEWARDSHIP PROGRAMS

Antimicrobial stewardship attempts to reduce antibiotic resistance and optimize antibiotic usage. APIC, the Society for Healthcare Epidemiology of America, and the Society of Infectious Diseases Pharmacists developed an Antimicrobial Stewardship Position Paper that notes:

“[Antimicrobial] stewardship refers to collaborative, coordinated programs and interventions designed to improve antimicrobial prescribing (right drug, dose, duration, and route of administration when antibiotics are needed) to optimize clinical outcomes while minimizing unintended consequences of antimicrobial use such as toxicity, selection of pathogenic organisms, and emergence of resistance. [Antimicrobial] stewardship programs have been shown to improve patient outcomes, reduce antimicrobial agent-related adverse events, and decrease antimicrobial resistance.”¹¹

Antimicrobial stewardship programs increase infection cure rates¹² and reduce treatment failures, resulting in optimal resident clinical and safety outcomes. Antimicrobial stewardship programs include the following components:

- Ensuring the correct diagnosis (e.g., following laboratory and radiology studies for confirmation).
- Confirming the correct antibiotic for the infection and pathogen.
- Verifying the correct dose (e.g., serum therapeutic levels, weight based).
- Administering the optimal route (e.g., intravenous to oral conversion).
- Implementing an antibiotic time-out in 2–3 days to evaluate if the diagnosis is correct, assess the clinical response, de-escalate from broad spectrum therapy (which treats a wide range of organisms) to narrow spectrum therapy (which is effective against the causative organism) or to discontinue the therapy all together.
- Recommending debridement and source control (e.g., incision and drainage to hasten treatment, keeping the wound covered).
- Ensuring the appropriate antibiotic and dose is administered if an LTC resident is emergently transferred to an acute care facility for surgery.
- In the case of transfers to an acute care facility, the acute care facility would administer the antibiotic; however, the LTC infection preventionist’s (IPs) knowledge of the medication, dose, and time administered would be helpful in the event the resident develops a postoperative surgical site infection. Indeed, this information will assist with researching possible improvement opportunities.

ANTIBIOTIC STEWARDSHIP IN NURSING HOMES

The CDC has taken the lead in promoting antimicrobial stewardship in LTC. *Core Elements for Antibiotic Stewardship in Nursing Homes*¹ provides an expert framework for implementation and sustainability.

The core elements address:

- **Leadership commitment.** The LTC facility’s leadership—including owners, administrators, and corporate leaders—can demonstrate support by:
 - Providing written statements supporting antimicrobial stewardship efforts and sharing this commitment with staff, residents, and families.
 - Including stewardship-related duties in position statements with the medical director, nursing leadership, and consulting pharmacists.
 - Communicating prescription expectations, with monitoring and enforcement of stewardship policies.
 - Creating a culture to promote antimicrobial stewardship.
- **Accountability.** The LTC facility identifies the following key individuals accountable for antibiotic stewardship activities:
 - Medical director, who sets standards for prescribing practices, oversees adherence, and promotes staff awareness of antibiotic use data.
 - Director of nursing, who sets nursing practice standards for assessing, monitoring, and communicating changes in resident condition by frontline staff, which influences antibiotic prescribing.
 - Consultant pharmacist, who is responsible for reviewing the medication regimen and reporting antibiotic use data.
 - IP, who is responsible for tracking antibiotic starts, monitoring adherence to evidence-based criteria, reviewing the antibiogram (summary of antibiotic susceptibility patterns from organisms isolated in cultures) and sharing findings with the medical and nursing staff.
 - Consultant laboratory, which is responsible for alerting the facility when antibiotic-resistant organisms are identified, educating nursing staff on the different diagnostic tests to identify pathogens, and creating antibiograms as indicated.
 - Health departments, which are responsible for healthcare-associated infection (HAI) prevention program resources and performance improvement initiatives.
- **Drug expertise.** The LTC facility establishes relationships with consulting pharmacists or other individuals with antimicrobial stewardship training or experience. Examples include:
 - Working with a consulting pharmacist with specialized training.
 - Partnering with antimicrobial stewardship program leads at hospitals within the referral network.
 - Developing relationships with infectious disease physician consultants.
- **Action.** The LTC facility implements at least one policy or practice to improve antibiotic use. It’s important to ensure policies and procedures are aligned with the Centers for Medicare & Medicaid Services’s (CMS’s) regulatory requirements.¹³ Policies and procedures to standardize nursing care practices with any resident suspected of having an infection can address:
 - Improving the evaluation and communication of clinical signs and symptoms when infection is first suspected (e.g., Situation-Background-Assessment-Recommendation [SBAR]) tool.¹⁴ See Figure 4.2 for the UTI SBAR as an example to determine whether to treat. (See Appendix for a link to the complete sets of SBARs.)
 - Optimizing diagnostic testing (e.g., when to collect a urine culture).
 - Requiring an antibiotic time-out for all new antibiotic starts.

FIGURE 4.2: SUSPECTED UTI SBAR

Suspected UTI SBAR

Complete this form before contacting the resident's physician. Date/Time _____

Nursing Home Name _____

Resident Name _____ Date of Birth _____

Physician/NP/PA _____ Phone _____

Fax _____

Nurse _____ Facility Phone _____

Submitted by Phone Fax In Person Other _____

S Situation

I am contacting you about a suspected UTI for the above resident.

Vital Signs BP _____ / _____ HR _____ Resp. rate _____ Temp. _____

B Background

Active diagnoses or other symptoms (especially, bladder, kidney/genitourinary conditions)
Specify _____

No Yes The resident has an indwelling catheter

No Yes Patient is on dialysis

No Yes The resident is incontinent **If yes, new/worsening?** No Yes

No Yes Advance directives for limiting treatment related to antibiotics and/or hospitalizations
Specify _____

No Yes Medication Allergies
Specify _____

No Yes The resident is on Warfarin (Coumadin®)

FIGURE 4.2 Continued

Nursing Home Name _____ Facility Fax _____
 Resident Name _____

A Assessment Input (check all boxes that apply)

Resident WITH indwelling catheter The criteria are met to initiate antibiotics if one of the below are selected	Resident WITHOUT indwelling catheter Criteria are met if one of the three situations are met												
<p>No Yes</p> <p><input type="checkbox"/> <input type="checkbox"/> Fever of 100°F (38°C) or repeated temperatures of 99°F (37°C)*</p> <p><input type="checkbox"/> <input type="checkbox"/> New back or flank pain</p> <p><input type="checkbox"/> <input type="checkbox"/> Acute pain</p> <p><input type="checkbox"/> <input type="checkbox"/> Rigors /shaking chills</p> <p><input type="checkbox"/> <input type="checkbox"/> New dramatic change in mental status</p> <p><input type="checkbox"/> <input type="checkbox"/> Hypotension (significant change from baseline BP or a systolic BP <90)</p>	<p>No Yes</p> <p><input type="checkbox"/> <input type="checkbox"/> 1. Acute dysuria alone</p> <p>_____ OR _____</p> <p><input type="checkbox"/> <input type="checkbox"/> 2. Single temperature of 100°F (38°C) and at least one new or worsening of the following:</p> <table border="0"> <tr> <td><input type="checkbox"/> urgency</td> <td><input type="checkbox"/> suprapubic pain</td> </tr> <tr> <td><input type="checkbox"/> frequency</td> <td><input type="checkbox"/> gross hematuria</td> </tr> <tr> <td><input type="checkbox"/> back or flank pain</td> <td><input type="checkbox"/> urinary incontinence</td> </tr> </table> <p>_____ OR _____</p> <p><input type="checkbox"/> <input type="checkbox"/> 3. No fever, but two or more of the following symptoms:</p> <table border="0"> <tr> <td><input type="checkbox"/> urgency</td> <td><input type="checkbox"/> suprapubic pain</td> </tr> <tr> <td><input type="checkbox"/> frequency</td> <td><input type="checkbox"/> gross hematuria</td> </tr> <tr> <td><input type="checkbox"/> incontinence</td> <td></td> </tr> </table>	<input type="checkbox"/> urgency	<input type="checkbox"/> suprapubic pain	<input type="checkbox"/> frequency	<input type="checkbox"/> gross hematuria	<input type="checkbox"/> back or flank pain	<input type="checkbox"/> urinary incontinence	<input type="checkbox"/> urgency	<input type="checkbox"/> suprapubic pain	<input type="checkbox"/> frequency	<input type="checkbox"/> gross hematuria	<input type="checkbox"/> incontinence	
<input type="checkbox"/> urgency	<input type="checkbox"/> suprapubic pain												
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<input type="checkbox"/> back or flank pain	<input type="checkbox"/> urinary incontinence												
<input type="checkbox"/> urgency	<input type="checkbox"/> suprapubic pain												
<input type="checkbox"/> frequency	<input type="checkbox"/> gross hematuria												
<input type="checkbox"/> incontinence													

Nurses: Please check box to indicate whether or not criteria are met

Nursing home protocol criteria are met. Resident may require UA with C&S or an antibiotic.†

Nursing home protocol criteria are NOT met. The resident does NOT need an immediate prescription for an antibiotic, but may need additional observation.††

R Request for Physician/NP/PA Orders

Orders were provided by clinician through Phone Fax In Person Other _____

Order UA

Urine culture

Encourage _____ ounces of liquid intake _____ times daily until urine is light yellow in color.

Record fluid intake.

Assess vital signs for _____ days, including temp, every _____ hours for _____ hours.

Notify Physician/NP/PA if symptoms worsen or if unresolved in _____ hours.

Initiate the following antibiotic

Antibiotic: _____ Dose: _____ Route: _____ Duration: _____

No Yes Pharmacist to adjust for renal function

Other _____

Physician/NP/PA signature _____ Date/Time _____

Telephone order received by _____ Date/Time _____

Family/POA notified (name) _____ Date/Time _____

* For residents that regularly run a lower temperature, use a temperature of 2°F (1°C) above the baseline as a definition of a fever.
 † This is according to our understanding of best practices and our facility protocols. Minimum criteria for a UTI must meet 1 of 3 criteria listed in box.
 †† This is according to our understanding of best practices and our facility protocols. The information is insufficient to indicate an active UTI infection.

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Source: Agency for Healthcare Research and Quality. Available at https://www.ahrq.gov/sites/default/files/wysiwyg/nhguide/4_TK1_T1-SBAR_UTL_Final.pdf.¹⁷

- Involving the pharmacy to ensure appropriate antibiotic ordering, to review culture data, and to monitor antibiotic use.
- Clearly defining clinical situations driving inappropriate antibiotic use such as treating asymptomatic bacteriuria or UTI prophylaxis.
- **Tracking.** The LTC facility monitors at least one process and one outcome measure of antibiotic use. It is important to monitor antibiotic use practices and the resultant outcomes, and share the findings with healthcare personnel. Examples include:
 - Determining if antibiotics are prescribed per policy (process measure).
 - Tracking the amount of antibiotic use to review patterns of use and determining the impact of stewardship efforts. Outcome measures include days of therapy, antibiotic starts, and prevalence surveys.
 - Monitoring clinical outcomes (e.g., *C. difficile* rates, MDRO rates, and adverse drug events [outcome measures]).
- **Reporting.** The LTC facility provides regular feedback on antibiotic use and resistance to prescribing clinicians, nursing staff, and other relevant staff. This will heighten awareness of antimicrobial stewardship efforts, promote sustainability, and assist with improvement interventions.
- **Education.** The LTC facility provides resources to clinicians, nursing staff, residents, and families about antibiotic resistance and opportunities to improve use. Examples to promote clinical awareness include flyers, pocket-guides, newsletters, electronic communications, and face-to-face discussions. Educating residents and families will assist with garnering their support with the program while reducing the expectation of an automatic antibiotic prescription.

Additional keys for success involve allocating adequate time and resources to the program. Having antimicrobial stewardship as a standing infection prevention and quality assessment and assurance committees agenda item will heighten program awareness on an ongoing basis. Starting small (e.g., restricting selected antibiotic use) might be a helpful approach when launching the program.

HEALTHCARE PERSONNEL

Nurses also play a key role in promoting antimicrobial stewardship.¹⁵ The initiation of antibiotic-use protocols into the facility's policy will ensure that best practices are used to reduce unnecessary prescribing. The antibiotic-use protocol, integrated with the SBAR tool (see Appendix), aids with optimizing the best treatment approach.

Additional examples of nursing actions can include:

- Assessing for an antibiotic allergy
- Identifying any history of MDROs
- Obtaining timely cultures before an antibiotic is started
- Promoting active monitoring of the resident, with clinical changes not indicative of infection, with the intent to avoid unnecessary antibiotic therapy;⁸ focused interventions include:
 - Promoting hydration and a healthy food intake
 - Reviewing medications for side effects and interactions
 - Fostering healthy sleep habits

- Repositioning
- Assessing for incontinence
- Evaluating for depression
- Considering cardiac, pulmonary, and other metabolic problems
- Carefully monitoring vital signs, pulse oximetry, intake and output, signs and symptoms
- Administering antibiotics on time
- Obtaining timely antibiotic serum levels
- Monitoring the resident’s condition while on therapy
- Notifying the attending physician of the culture and other laboratory results
- Adhering to isolation precautions per facility policy
- Wearing appropriate personal protective equipment per facility policy
- Practicing hand hygiene and environmental hygiene per facility policy
- Practicing aseptic technique per facility policy
- Providing a continuum of care and accurate communication (e.g., infection location, treatment choice, treatment duration, MDRO history)
- Providing resident and family education
- Promoting vaccines per facility policy and regulations
- Discouraging use of indwelling urinary catheters
- Removing invasive devices when no longer indicated (e.g., central lines, peripheral IVs)
- Awareness of appropriate indications for ordering urine studies
- Avoiding presenteeism
- Preventing resident skin breakdown
- Understanding and using the antibiogram, a report that provides information with antibiotic sensitivity against bacteria (see Appendix.)

Figure 4.3 summarizes the role healthcare personnel, residents, and families play in supporting optimal antibiotic use and preventing infections in LTC facilities.

A recent review of LTC antimicrobial stewardship best practices identified several keys for a successful program.¹⁶ Providing multidisciplinary education—including nursing staff involvement—impacts urine culture collection and antibiotic prescribing practices. Enhancing communication when providing clinical information impacts prescribing. Integrating post-prescriptive recommendations into the prescriber’s workflow is also helpful. In addition, employing external consultants with expertise in infectious diseases provides optimal antibiotic guidance.

CMS—recognizing the impact infections have upon residents, families, and LTC facilities—has released updated regulatory requirements addressing the need to prevent the spread of antibiotic resistance through antimicrobial stewardship programs.¹³ The intent of the regulation is to ensure that a facility:

- Develops and implements protocols to optimize the treatment of infections by ensuring that residents who require an antibiotic are prescribed the appropriate antibiotic.

FIGURE 4.3: THE ROLE OF PROVIDERS, RESIDENTS, AND FAMILIES IN SUPPORTING OPTIMAL ANTIBIOTIC USE



HEALTHCARE PROVIDERS, RESIDENTS, AND FAMILIES PLAY A CRITICAL ROLE IN SUPPORTING OPTIMAL ANTIBIOTIC USE AND PREVENTING INFECTIONS IN NURSING HOMES.

What can healthcare providers do to support appropriate antibiotic use and prevent infections in nursing homes?

- Follow clinical guidelines when prescribing antibiotics.
 - ▶ Use the right antibiotic, at the right dose, for the right duration, and at the right time.
- Review antibiotic therapy 2-3 days after it is started based on the resident’s clinical condition and microbiology culture results.
- Talk to residents and their families about when antibiotics are and are not needed, and discuss possible harms such as allergic reactions, *C. difficile* and antibiotic-resistant infections.
 - ▶ Ask residents if they have ever had a *C. difficile* infection, and tailor antibiotic treatment accordingly.
- Be aware of antibiotic resistance patterns in your facility and community; use the data to inform prescribing decisions.
- Follow hand hygiene and other infection prevention measures with every resident.

What can residents and families do to support appropriate antibiotic use and prevent infections in nursing homes?

- Talk to your healthcare provider about when antibiotics will and won’t help, and ask about antibiotic resistance.
- Ask what infection an antibiotic is treating, how long antibiotics are needed, and what side effects might happen.
- Ask what your nursing home is doing to protect you from antibiotic-resistant and *C. difficile* infections.
- Insist that everyone cleans their hands before touching you.
- Ask visitors and family not to visit when they feel ill.
- Get vaccinated for flu and pneumonia, and encourage others to stay up-to-date on vaccines.

Source: Centers for Disease Control and Prevention. Available at <https://www.cdc.gov/antibiotic-use/stewardship-report/index.html>.¹⁹

- Reduces the risk of adverse events, including the development of antibiotic-resistant organisms, from unnecessary or inappropriate antibiotic use.
- Develops, promotes, and implements a facility-wide system to monitor the use of antibiotics.

IPs should be familiar with the regulatory requirements and work with the interdisciplinary committee to ensure compliance. A summary of the requirements is presented in Table 4.1. This can be a useful tool for the IPs to use to indicate the current process followed in the facility for each requirement, after which potential improvement opportunities can be identified.

Antimicrobial stewardship is an integral component of LTC resident safety. The IP working in LTC must play an essential role in ensuring that a robust antimicrobial stewardship program fulfills its goals, maintains sustainability, and meets regulatory compliance.

TABLE 4.1: A CHECKLIST OF THE KEY ELEMENTS OF AN ANTIMICROBIAL STEWARDSHIP PROGRAM

F881: 483.80(a): The facility must establish an IPC program that must include, at a minimum, the following elements. 483.80(a)(3). An antimicrobial stewardship program that includes antibiotic use protocols and a system to monitor antibiotic use.

	Current Process	Improvement Opportunities
The antimicrobial stewardship program protocols shall describe how the program will be implemented and antibiotic use will be monitored. Consequently protocols must:		
Be incorporated in the overall IPC program	<input type="checkbox"/>	<input type="checkbox"/>
Be reviewed on an annual basis and as needed	<input type="checkbox"/>	<input type="checkbox"/>
Contain a system of reports related to monitoring antibiotic usage and resistance data. Examples may include the following:	<input type="checkbox"/>	<input type="checkbox"/>
Summarizing antibiotic use from pharmacy data, such as the rate of new starts, types of antibiotics prescribed, or days of antibiotic treatment per 1,000 resident days	<input type="checkbox"/>	<input type="checkbox"/>
Summarizing antibiotic resistance (e.g., antibiogram) based on laboratory data from, for example, the last 18 months	<input type="checkbox"/>	<input type="checkbox"/>
Tracking measures of outcome surveillance related to antibiotic use (e.g., <i>C. difficile</i> , MRSA, and/or carbapenem-resistant <i>Enterobacteriaceae</i> CRE).	<input type="checkbox"/>	<input type="checkbox"/>
Incorporate monitoring of antibiotic use, including the frequency of monitoring/review.	<input type="checkbox"/>	<input type="checkbox"/>
Monitor/review when the resident is new to the facility; when a prior resident returns or is transferred from a hospital or other facility	<input type="checkbox"/>	<input type="checkbox"/>
During each monthly medication regimen review when the resident has been prescribed or is taking an antibiotic, or any antibiotic regimen review as requested by the QAA committee.	<input type="checkbox"/>	<input type="checkbox"/>
Establish the frequency and mode or mechanism of feedback (e.g., verbal, written note in record) to prescribing practitioners regarding antibiotic resistance data, antibiotic use, and compliance with facility antibiotic use protocols	<input type="checkbox"/>	<input type="checkbox"/>
Feedback on prescribing practices and compliance with facility antibiotic use protocols may include information from medical record reviews for new antibiotic starts to determine whether the resident had signs or symptoms of an infection; laboratory tests ordered and the results; prescription documentation, including the indication for use (i.e., whether or not an infection or communicable disease has been documented), dosage, and duration	<input type="checkbox"/>	<input type="checkbox"/>
Any clinical justification for the use of an antibiotic beyond the initial duration ordered, such as a review of laboratory reports/cultures in order to determine if the antibiotic remains indicated or if adjustments to therapy should be made (e.g., more narrow spectrum antibiotic)	<input type="checkbox"/>	<input type="checkbox"/>
Assess LTC residents for any infection using standardized tools and criteria (e.g., SBAR tool for urinary tract infection assessment, Loeb minimum criteria for initiation of antibiotics)	<input type="checkbox"/>	<input type="checkbox"/>
Include the mode (e.g., verbal, written, online) and frequency (as determined by the facility) of education for prescribing practitioners and nursing staff on antibiotic use (stewardship) and the facility's antibiotic use protocols.	<input type="checkbox"/>	<input type="checkbox"/>
NOTE: Prescribing practitioners can include attending physicians and nonphysician practitioners (i.e., nurse practitioners, clinical nurse specialists, and physician assistants)		

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REFERENCES

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



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



The Core Elements of Antibiotic Stewardship for Nursing Homes is a publication of The National Center for Emerging and Zoonotic Infectious Diseases within the Centers for Disease Control and Prevention.

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Suggested citation:

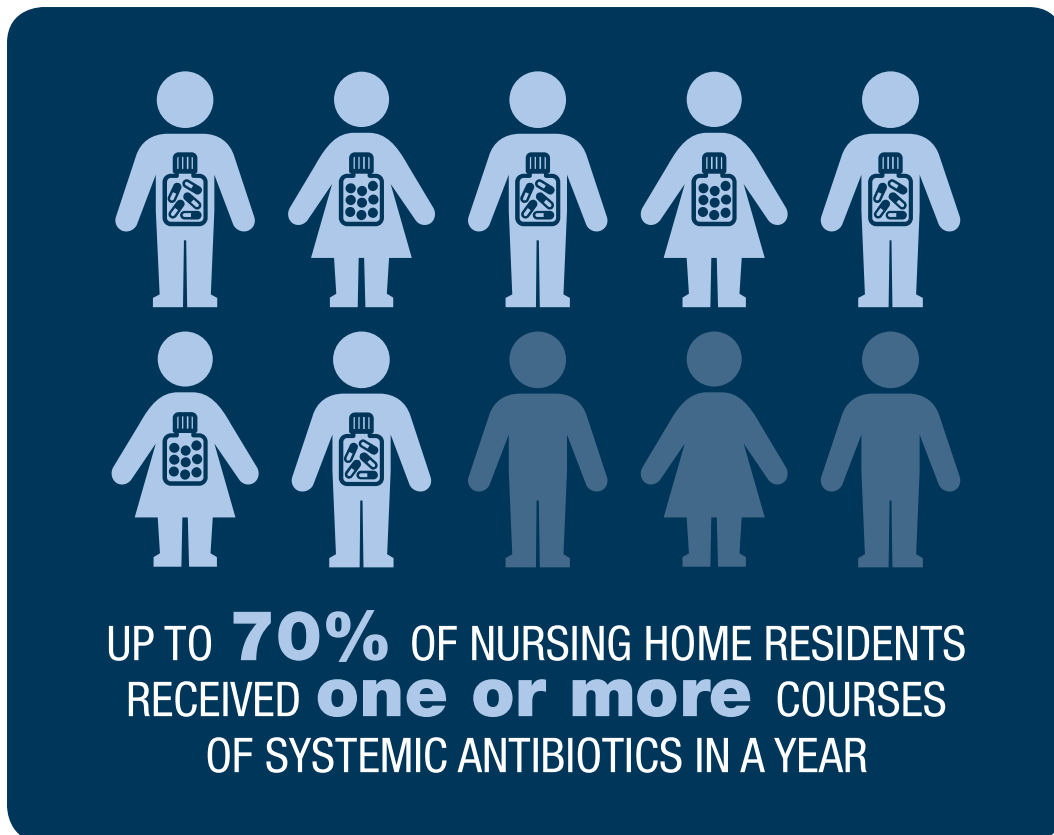
CDC. *The Core Elements of Antibiotic Stewardship for Nursing Homes*. Atlanta, GA: US Department of Health and Human Services, CDC; 2015. Available at: <http://www.cdc.gov/longtermcare/index.html>



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.



Antibiotic stewardship refers to a set of commitments and activities designed to *“optimize the treatment of infections while reducing the adverse events associated with antibiotic use.”*

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



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

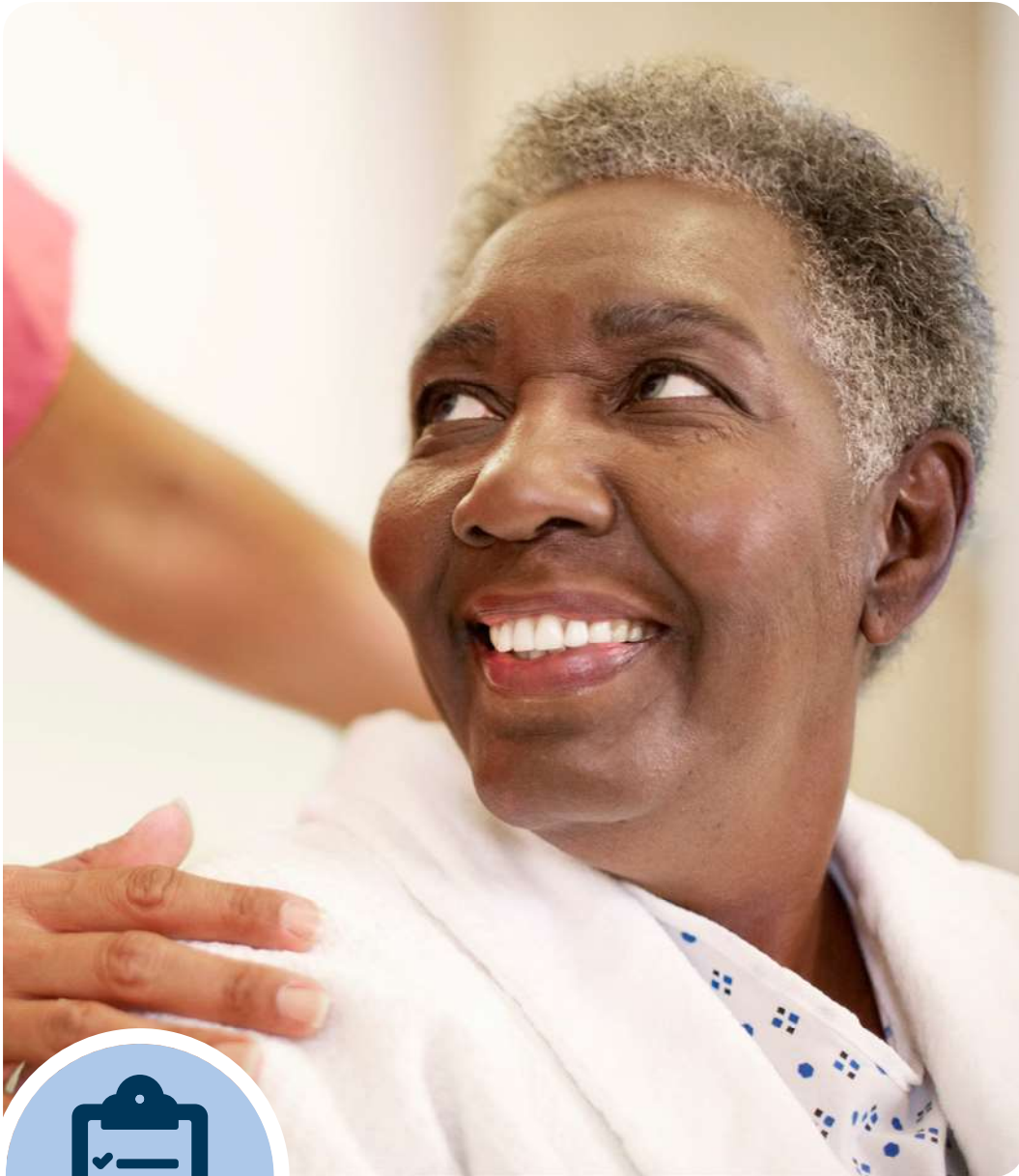
The core elements of antibiotic stewardship are the same for both hospitals and nursing homes. This guide provides examples of how these elements can be applied by nursing home leadership, clinicians and staff to monitor and improve antibiotic use. Nursing homes are encouraged to select one or two activities 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.



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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: _____



The Core Elements of Antibiotic Stewardship for Nursing Homes

CHECKLIST



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





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: _____



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

APPENDIX B: Measures of Antibiotic Prescribing, Use and Outcomes



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





Appendix B: Measures of antibiotic prescribing, use and outcomes

This document contains more detailed explanations of antibiotic use process and outcome measures which can be tracked by nursing homes to monitor the impact of their antibiotic stewardship activities.

Process measures for tracking antibiotic stewardship activities

Completeness of clinical assessment documentation at the time of the antibiotic prescription. Incomplete assessment and documentation of a resident's clinical status, physical exam or laboratory findings at the time a resident is evaluated for infection can lead to uncertainty about the rationale and/or appropriateness of an antibiotic. If a facility has developed algorithms or protocols for evaluating a resident suspected of having an infection, then perform audits of the quality of the assessment to ensure that algorithm was followed.

Completeness of antibiotic prescribing

documentation. Ongoing audits of antibiotic prescriptions for completeness of documentation, regardless of whether the antibiotic was initiated in the nursing home or at a transferring facility, should verify that the antibiotic prescribing elements have been addressed and recorded. These elements include: dose, (including route), duration (i.e., start date, end date and planned days of therapy), and indication (i.e., rationale and treatment site) for every course of antibiotics.

Antibiotic selection is consistent with recommended agents for specific indications.

If a facility has developed and implemented facility-specific treatment guidelines for one or more infections, then an intermittent review of antibiotic selection is warranted to ensure practices are consistent with facility policies.

Measures of antibiotic use

Point prevalence of antibiotic use. Point prevalence surveys of antibiotic use track the proportion of residents receiving antibiotics during a given time period (i.e., a single-day, a week, or a month). Because the data collection is time-limited, point prevalence surveys are an easier way to capture antibiotic use data. In addition to providing a snap-shot of the burden of antibiotic use in a facility, point-prevalence surveys can capture specific information about the residents receiving antibiotics and indications for antibiotic therapy.¹ Unlike other antibiotic use measures which focus only on the prescriptions initiated in the nursing home, prevalence surveys could also include data on residents admitted to the facility already receiving an antibiotic to track the total burden of individuals at risk for complications from antibiotic use (e.g., *C. difficile* infection).

- Percent of residents receiving antibiotics: (Number of residents on antibiotic/total residents in the facility) X 100
 - Prevalence data can be stratified by specific resident characteristics, for example percent of residents receiving antibiotics among short-stay versus long-stay residents
- Percent of new admissions receiving antibiotics: (Number of residents admitted to nursing home receiving antibiotics/total number of new admissions) X 100

Because prevalence surveys are often conducted for a brief window of time, this data may not portray the magnitude of antibiotic use over time. While a single-day prevalence survey may show 5% to 13% of residents are receiving an antibiotic, studies which follow a group of residents over long periods of time (e.g., 12 months) show that as many as 50% to 75% of residents receive one or more courses of antibiotics.²

Antibiotic starts. Most nursing home infection prevention and control programs already track new antibiotic starts occurring in the facility as part of their infection surveillance activity. Generally, rates of antibiotic starts are based on the prescriptions written after the resident has been admitted to the facility. Data on antibiotic starts can be calculated and reported in the following ways:

- Rate of new antibiotic starts initiated in nursing home (per 1,000 resident-days): (Number of new antibiotic prescriptions/total number of resident-days) X 1,000
 - Rate of antibiotic starts can be calculated by indication, for example: (Number of new antibiotic starts for urinary tract infection/total number of resident-days) X 1,000
- Rates of antibiotic starts could also be calculated for individual prescribers in the nursing home to compare

prescribing patterns among different providers practicing in the facility. However, prescriber-specific rates must take into account differences in the total number of residents cared for by each provider.

Tracking and reporting antibiotic start data could assess the impact of antibiotic stewardship initiatives designed to educate and guide providers on situations when antibiotics are not appropriate. However, interventions focused on shortening the number of days of therapy may not demonstrate significant changes in antibiotic starts.

Antibiotic days of therapy (DOT). Tracking antibiotic DOTs requires more effort than tracking antibiotic starts, but may provide a better measure to monitor changes in antibiotic use over time. The ratio of antibiotic DOT to total resident-days has been referred to as the antibiotic utilization ratio (AUR).³ Below are the steps for calculating monthly rates of antibiotic DOT and AUR.

- An antibiotic day: each day that a resident receives a single antibiotic
 - For example, if a resident is prescribed a 7-day course of amoxicillin, that course equals 7 antibiotic days. However, if a resident is prescribed a 7-day course of ceftriaxone plus azithromycin, then that course equals 14 antibiotic days.
- Antibiotic DOT: the sum of all antibiotic days for all residents in the facility during a given time frame (e.g., 1 month or 1 quarter)
 - Rate of antibiotic DOT (per 1,000 resident-days):
(Total monthly DOT/total monthly resident-days) X 1,000
 - Antibiotic utilization ratio: Total monthly DOT/total monthly resident-days

Antibiotic outcome measures

Track *C. difficile* and antibiotic resistance.

The National Healthcare Safety Network (NHSN) is a CDC-operated web-based system for tracking and reporting targeted infections and antibiotic-resistant organisms from healthcare facilities. In 2012, NHSN launched a reporting component specifically designed for use by nursing homes and other long-term care facilities. The Laboratory-identified event module in NHSN (<http://www.cdc.gov/nhsn/ltc/cdiff-mrsa/index.html>) allows facilities to track rates of *C. difficile* and selected multidrug-resistant organisms such as methicillin-resistant *Staphylococcus aureus* (MRSA) and antibiotic resistant gram-negative bacteria like *E.coli* using laboratory based surveillance as a proxy for infections.⁴

Track adverse drug events related to antibiotic use.

Adverse events due to use of medications in skilled nursing homes accounted for nearly 40% of harms identified in a recent report.⁵ Antibiotics are among the most frequently prescribed medications in LTCFs and have a high rate of adverse drug events.^{6,7}

Track costs related to antibiotic use.

Very few, if any, studies on antibiotic use in nursing homes have calculated the financial costs of antibiotic use.^{8,9} However, in acute care settings, antibiotic stewardship has been shown to reduce hospital pharmacy costs in addition to improving antibiotic use.¹⁰ This metric can be useful in justifying support of staff time and external consultant support for ASP activities.

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LTC Infection Surveillance Checklist

Patient Name _____ DOB _____

Date of infection: _____ Date of Review _____ Reviewed by _____

UTI Criteria met _____ SSTI Criteria met _____ URI Criteria met _____ GITI Criteria met _____

Constitutional Criteria for Infection			
Fever	Leukocytosis	Acute Mental Status Change	Acute Functional Decline
Single oral temp >37.8° C (100° F), OR Repeated oral temp >37.2° C (99° F), OR Repeated rectal temp >37.5° C (99.5° F), OR Single temp >1.1° C (2° F) from baseline from any site	>14,000 WBC/mm ³ , OR >6% bands, OR ≥1,500 bands/mm ³	Acute onset, AND Fluctuating course, AND Inattention, AND Either disorganized thinking, or Altered Level of Consciousness	3-point increase in baseline ADL score According to the following items: 1. Bed Mobility 2. Transfer 3. Locomotion within LTCF 4. Dressing 5. Toilet use 6. Personal Hygiene 7. Eating [Each scored from 0 (independent) toA 4 (total dependence)]

Urinary Tract Infection UTI Surveillance Definitions		
Syndrome	Criteria	Selected Comments ^f
UTI without indwelling catheter	Both 1 AND 2 must be fulfilled: 1. At least one of the following signs or symptoms: <ul style="list-style-type: none"> • Acute dysuria or pain, swelling or tenderness of testes, epididymis, or prostate • Fever or Leukocytosis, and ≥1 of the following: <ul style="list-style-type: none"> ○ Acute costovertebral angle pain or tenderness ○ Suprapubic pain ○ Gross hematuria ○ New or marked increase in incontinence ○ New or marked increase in urgency ○ New or marked increase in frequency 2. At least one of the following microbiologic criteria: <ul style="list-style-type: none"> • ≥10⁵ cfu/ml of no more than 2 species of organisms in a voided specimen • ≥10² cfu/ml of any organism(s) in a specimen collected by an in-and-out catheter 	The following 2 comments apply to both UTI with or without catheter: <ul style="list-style-type: none"> • UTI can be diagnosed without localizing symptoms if a blood isolate is the same as the organism isolated from urine and there is no alternate site of infection • In the absence of a clear alternate source of infection fever or rigors with a positive urine culture result in the non-catheterized resident or acute confusion in the catheterized resident will often be treated as UTI. However, evidence suggests that most of these episodes are likely not due to infection of a urinary source. • Urine specimens for culture should be processed as soon as possible preferably within 1-2 hours • If urine specimens cannot be processed within 30 minutes of collection, they should be refrigerated and processed for culture within 24 hours
UTI with indwelling catheter	Both 1 AND 2 must be fulfilled: 1. At least one of the following signs or symptoms: <ul style="list-style-type: none"> • Fever, rigors, or new-onset hypotension, with no alternate site of infection • Either acute change in mental status or acute functional decline, with no alternate diagnosis and leukocytosis • New-onset suprapubic pain or costovertebral angle pain or tenderness • Purulent discharge from around the catheter or acute pain, swelling or tenderness of the testes, epididymis, or prostate 2. Urinary catheter specimen culture with ≥10 ⁵ cfu/ml of any organism(s)	<ul style="list-style-type: none"> • Recent catheter trauma, catheter obstruction, or new-onset hematuria are useful localizing signs that are consistent with UTI but are not necessary for diagnosis • Urinary catheter specimens for culture should be collected after replacement of the catheter if it has been in place >14 days

- UTI Criteria met
 UTI Criteria not met

Revised McGeer's Criteria

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

Respiratory Tract Infection (RTI) Surveillance Definitions		
Syndrome	Criteria	Selected Comments*
Common cold syndrome or pharyngitis	<p>Must fulfill at least 2 criteria:</p> <ul style="list-style-type: none"> • Runny nose or sneezing • Stuffy nose or nasal congestion • Sore throat, hoarseness or difficulty in swallowing • Dry cough • Swollen or tender glands in the neck (cervical lymphadenopathy) 	<ul style="list-style-type: none"> • Fever may or may not be present • Symptoms must be new and not attributable to allergies
Influenza-like illness	<p>Both 1 and 2 must be fulfilled:</p> <ol style="list-style-type: none"> 1. Fever 2. At least three of the following criteria: <ul style="list-style-type: none"> • Chills • New headache or eye pain • Myalgias or body aches • Malaise or loss of appetite • Sore Throat • New or increased dry cough 	<ul style="list-style-type: none"> • If both criteria for influenza-like illness and another upper or lower RTI are met, only record diagnosis of influenza-like illness
Pneumonia	<p>Must fulfill 1, 2, & 3</p> <ol style="list-style-type: none"> 1. Chest XRay with Pneumonia or new infiltrate 2. At least one of the following criteria: <ul style="list-style-type: none"> • New or increased cough • New or increased sputum production • O₂ sat <94% on room air, or >3% decrease from baseline O₂ sat • New or changed lung exam abnormalities • Pleuritic chest pain • Respiratory rate ≥25 breaths/min 3. At least one of the following criteria: <ul style="list-style-type: none"> • Fever • Leukocytosis • Acute mental change • Acute functional decline 	<ul style="list-style-type: none"> • Conditions mimicking the presentation of RTI (e.g. congestive heart failure, interstitial lung diseases) should be excluded
Bronchitis or Tracheo-Bronchitis	<p>Must fulfill 1, 2, & 3</p> <ol style="list-style-type: none"> 1. Chest xRay not performed, or negative for pneumonia or a new infiltrate 2. At least two of the following criteria: <ul style="list-style-type: none"> • New or increased cough • New or increased sputum production • O₂ sat < 94% on room air, or >3% decrease from baseline O₂ sat • New or chased lung exam abnormalities • Pleuritic chest pain • Respiratory rate ≥25 breaths/min 3. At least one of the following criteria: <ul style="list-style-type: none"> • Fever • Leukocytosis • Acute mental status change • Acute functional decline 	<ul style="list-style-type: none"> • Conditions mimicking the presentation of RTI (e.g. congestive heart failure, interstitial lung diseases) should be excluded

RTI Criteria met
 RTI Criteria not met

Revised McGeer's Criteria

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

Skin and Soft Tissue Infection (SSTI) Surveillance Definitions		
Syndrome	Criteria	Selected Comments*
Cellulitis, soft tissue, or wound	<p>Must fulfill at least 1 criteria:</p> <ol style="list-style-type: none"> 1. Pus at wound site 2. At least four of the following new or increasing sign or symptom: <ul style="list-style-type: none"> • Heat (warmth) at affected site • Redness (erythema) at affected site • Swelling at affected site • Tenderness or pain at affected site • At least one of the following: <ul style="list-style-type: none"> ○ Fever ○ Leukocytosis ○ Acute change in mental status ○ Acute functional decline 	<ul style="list-style-type: none"> • More than 1 resident with streptococcal skin infection from the same serogroup (e.g. A, B, C G) may indicate an outbreak • Positive superficial wound swab culture is not sufficient evidence to establish a wound infection
Scabies	<p>Both 1 and 2 must be fulfilled:</p> <ol style="list-style-type: none"> 1. Maculopapular and/or itching rash 2. At least one of the following criteria: <ul style="list-style-type: none"> • Provider diagnosed • Lab confirmation (scraping or biopsy) • Epidemiologic linkage to a case of scabies that has been confirmed by lab 	<ul style="list-style-type: none"> • Must rule out rashes due to skin irritation, allergic reactions, eczema, and other non-infectious skin conditions • Epidemiologic linkage refers to geographical proximity, timing of symptom onset, evidence of common source of exposure
Oral Candidiasis	<p>Both 1 and 2 must be fulfilled:</p> <ol style="list-style-type: none"> 1. Presence of raised white patches on inflamed mucosa or plaques on oral oral mucosa 2. Medical or dental diagnosis 	
Fungal Skin infection	<p>Both 1 and 2 must be fulfilled:</p> <ol style="list-style-type: none"> 1. Characteristic rash or lesion 2. Physician diagnosis or lab confirmation of fungal pathogen from skin (scraping or biopsy) 	
Herpes Simplex Or Herpes Zoster	<p>Both 1 and 2 must be fulfilled:</p> <ol style="list-style-type: none"> 1. Vesicular rash 2. Physician diagnosis or lab confirmation 	<ul style="list-style-type: none"> • Reactivation of herpes simplex (cold sore) or herpes zoster (shingles) is not considered a healthcare-associated infection
Conjunctivitis	<p>Must fulfill at least 1 criteria:</p> <ul style="list-style-type: none"> • Pus from one or both eyes for ≥ 24 hrs • New or increased conjunctival erythema +/- itching • New or increased conjunctival pain for ≥ 24 hrs 	<ul style="list-style-type: none"> • Conjunctivitis symptoms (pink eye) should be due to allergy or trauma
<input type="checkbox"/> SSTI Criteria met <input type="checkbox"/> SSTI Criteria not met		

Revised McGeer's Criteria

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

Gastrointestinal tract infection(GITI) Surveillance Definitions		
Syndrome	Criteria	Selected Comments*
Gastroenteritis	<p>Must fulfill at least 1 criteria:</p> <ul style="list-style-type: none"> ● Diarrhea : ≥ 3 liquid or watery stools above what is normal for the resident within a 24 hour period ● Vomiting: ≥ 2 episodes within 24 hours ● Both of the following sign or symptom: <ul style="list-style-type: none"> ○ Stool specimen positive for a pathogen (e.g. <i>Salmonella</i>, <i>shigella</i>, <i>E Coli</i> 0157:H7, <i>Campylobacter</i> species, rotavirus) ○ At least one of the following criteria: <ul style="list-style-type: none"> ■ Nausea ■ Vomiting ■ Abdominal pain or tenderness ■ Diarrhea 	<ul style="list-style-type: none"> ● Exclude non-infectious causes of symptoms such as new medications causing diarrhea, nausea, or vomiting or diarrhea resulting fro initiation of new enteral feeding ● Presence of new GI symptoms in a single resident may prompt enhanced surveillance for additional cases ● In the presence of an outbreak, stool specimens should be sent to confirm the presence of norovirus or other pathogens (e.g. rotavirus, <i>E Coli</i> 0157:H7)
Norovirus gastroenteritis	<p>Both 1 and 2 must be fulfilled:</p> <ol style="list-style-type: none"> 1. At least one of the following criteria: <ul style="list-style-type: none"> ● Diarrhea : ≥ 3 liquid or watery stools above what is normal for the resident within a 24 hour period ● Vomiting: ≥ 2 episodes within 24 hours 2. A stool specimen positive for norovirus detected by electron microscopy, enzyme immunoassay, or molecular diagnostic testing 	<ul style="list-style-type: none"> ● In the absence of lab confirmation , a norovirus gastroenteritis outbreak (≥ 2 cases in a LTCF) may be assumed if all of the Kaplan Criteria are present: <ul style="list-style-type: none"> ○ Vomiting in $>50\%$ of affected persons ○ A mean or median incubation period of 24-48 hours ○ A mean or median duration of illness of 12-60 hours, and ○ No bacterial pathogen is identified in stool culture
<i>Clostridium difficile</i> infection	<p>Both 1 and 2 must be fulfilled:</p> <ol style="list-style-type: none"> 1. At least one of the following: <ul style="list-style-type: none"> ● Diarrhea: ≥ 3 Liquid or watery stools above what is normal for the resident within a 24 hour period ● Presence of toxic megacolon (radiologic finding of abnormally large bowel dilatation) 2. At least one of the following diagnostic criteria: <ul style="list-style-type: none"> ● Stool sample positive for <i>C difficile</i> toxin A or B, or detection of toxin-producing <i>C difficile</i> culture or PCR in stool sample ● Pseudomembranous colitis identified in endoscopic exam, surgery, or histopathologic exam of biopsy specimen 	<ul style="list-style-type: none"> ● Individual previously infected with <i>C difficile</i> may continue to be colonized even after symptoms resolve ● In the setting of an outbreak of GI infection, individuals could be <i>C difficile</i> toxin positive because of ongoing colonization and also be co-infected with another pathogen. Other surveillance criteria should be used to differentiate between infection in this scenario

- GITI Criteria met
- GITI Criteria not met

Revised McGeer's Criteria

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

Suspected UTI SBAR

Patient Name _____ DOB ____ / ____ / ____ Facility _____

S	Situation I am concerned about a suspected UTI for the above resident.			
B	Background <input type="checkbox"/> Indwelling catheter <input type="checkbox"/> Urethral or Suprapubic <input type="checkbox"/> Incontinence <input type="checkbox"/> New or Worsening UTI in last 6 months Date _____ Organism _____ Treatment _____ Active Diagnosis/pertinent information: (Include bladder, kidney, dialysis, genitourinary conditions, diabetes, anticoagulants) _____ Advanced Directives for limiting treatment _____ Medication Allergies _____			
A	Assessment Vital signs: BP _____ / _____ HR _____ Resp _____ Temp _____ O ₂ Sats _____ % <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <tr> <td style="width: 50%; vertical-align: top;"> Resident WITH indwelling catheter The criteria are met to initiate antibiotics if one of the following are selected: <input type="checkbox"/> Fever of 100°F (38°C), or 2°F (1.1°C) above baseline, or repeated temperatures of 99°F (37°C) <input type="checkbox"/> New back or flank pain <input type="checkbox"/> Rigors/shaking/chills <input type="checkbox"/> New onset delirium (new dramatic change in mental status) <input type="checkbox"/> Hypotension (Significant change change in baseline BP or SBP<90) <input type="checkbox"/> Acute suprapubic pain <input type="checkbox"/> Acute pain, swelling or tenderness of the scrotal area </td> <td style="width: 50%; vertical-align: top;"> Resident WITHOUT indwelling catheter Criteria are met to initiate antibiotics if one of the three situations are met: Any of the following two: <input type="checkbox"/> Acute dysuria alone (pain or burning while urinating) <input type="checkbox"/> 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) AND at least one of the following new or worsening symptoms: <input type="checkbox"/> Urgency <input type="checkbox"/> Gross hematuria <input type="checkbox"/> Suprapubic pain <input type="checkbox"/> Back or flank pain <input type="checkbox"/> Frequency <input type="checkbox"/> Urinary incontinence OR Two or more of the following new or worsen symptoms: <input type="checkbox"/> Urgency <input type="checkbox"/> Gross hematuria <input type="checkbox"/> Suprapubic pain <input type="checkbox"/> Frequency <input type="checkbox"/> Back or flank pain <input type="checkbox"/> Urinary incontinence </td> </tr> </table>		Resident WITH indwelling catheter The criteria are met to initiate antibiotics if one of the following are selected: <input type="checkbox"/> Fever of 100°F (38°C), or 2°F (1.1°C) above baseline, or repeated temperatures of 99°F (37°C) <input type="checkbox"/> New back or flank pain <input type="checkbox"/> Rigors/shaking/chills <input type="checkbox"/> New onset delirium (new dramatic change in mental status) <input type="checkbox"/> Hypotension (Significant change change in baseline BP or SBP<90) <input type="checkbox"/> Acute suprapubic pain <input type="checkbox"/> Acute pain, swelling or tenderness of the scrotal area	Resident WITHOUT indwelling catheter Criteria are met to initiate antibiotics if one of the three situations are met: Any of the following two: <input type="checkbox"/> Acute dysuria alone (pain or burning while urinating) <input type="checkbox"/> 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) AND at least one of the following new or worsening symptoms: <input type="checkbox"/> Urgency <input type="checkbox"/> Gross hematuria <input type="checkbox"/> Suprapubic pain <input type="checkbox"/> Back or flank pain <input type="checkbox"/> Frequency <input type="checkbox"/> Urinary incontinence OR Two or more of the following new or worsen symptoms: <input type="checkbox"/> Urgency <input type="checkbox"/> Gross hematuria <input type="checkbox"/> Suprapubic pain <input type="checkbox"/> Frequency <input type="checkbox"/> Back or flank pain <input type="checkbox"/> Urinary incontinence
Resident WITH indwelling catheter The criteria are met to initiate antibiotics if one of the following are selected: <input type="checkbox"/> Fever of 100°F (38°C), or 2°F (1.1°C) above baseline, or repeated temperatures of 99°F (37°C) <input type="checkbox"/> New back or flank pain <input type="checkbox"/> Rigors/shaking/chills <input type="checkbox"/> New onset delirium (new dramatic change in mental status) <input type="checkbox"/> Hypotension (Significant change change in baseline BP or SBP<90) <input type="checkbox"/> Acute suprapubic pain <input type="checkbox"/> Acute pain, swelling or tenderness of the scrotal area	Resident WITHOUT indwelling catheter Criteria are met to initiate antibiotics if one of the three situations are met: Any of the following two: <input type="checkbox"/> Acute dysuria alone (pain or burning while urinating) <input type="checkbox"/> 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) AND at least one of the following new or worsening symptoms: <input type="checkbox"/> Urgency <input type="checkbox"/> Gross hematuria <input type="checkbox"/> Suprapubic pain <input type="checkbox"/> Back or flank pain <input type="checkbox"/> Frequency <input type="checkbox"/> Urinary incontinence OR Two or more of the following new or worsen symptoms: <input type="checkbox"/> Urgency <input type="checkbox"/> Gross hematuria <input type="checkbox"/> Suprapubic pain <input type="checkbox"/> Frequency <input type="checkbox"/> Back or flank pain <input type="checkbox"/> Urinary incontinence			
R₁	Recommendation when criteria are <u>NOT</u> met but <u>ACTIVE MONITORING</u> is being initiated <input type="checkbox"/> Res. DOES NOT need immediate antibiotic but may need the following active monitoring protocol measures: <input type="checkbox"/> Give/encourage liquid intake: _____ oz/mL _____ times/day, until symptoms resolve <input type="checkbox"/> Record fluid intake and output until symptoms resolve (measured from urinals or if incontinent weigh briefs) <input type="checkbox"/> Regular assessment of vital signs every _____ hours for _____ hours <input type="checkbox"/> Monitor and notify if S&S worsen or are unresolved in _____ hours <input type="checkbox"/> Contact consultant pharmacist to review medication regimen for possible explanation of S&S <input type="checkbox"/> Contact you (the Provider) with an update of resident's condition in _____ hours/day <input type="checkbox"/> Other (specify): _____			
Nurse's Signature _____ Date/time _____ Notification of Family/POA Name: _____ Date/time _____ <input type="checkbox"/> Faxed to _____ Date/time _____ <input type="checkbox"/> Called to _____ Date/time _____				
Physician/Provider Signature _____ Date _____ Please fax back to: _____				



Res Name _____ DOB _____ **Suspected UTI SBAR Criteria MET for Antibiotics**

Physician/Provider's Orders/Response (Please check all that apply)

R₂	<p>Recommendation when criteria <u>ARE</u> met and <u>SIMPLE CYSTITIS</u> is suspected</p> <p>Resident MET criteria for UTI and appear to have cystitis requiring the following measures:</p> <p><input checked="" type="checkbox"/> Urinalysis and urine culture (Obtain under Medical Director standing order)</p> <p><input checked="" type="checkbox"/> Initiate empiric antibiotic therapy using the options below</p> <hr/> <p>Provider: Please select an antibiotic regimen</p> <p><input type="checkbox"/> Initiate empiric antibiotic therapy based on Linden Court antibiotic susceptibilities:</p> <p><input type="checkbox"/> Nitrofurantoin (Macrobid) 100 mg PO BID x _____ days. [If estimated creatinine clearance (eCrCl) >30 ml/min]</p> <p><input type="checkbox"/> Cephalexin (Keflex) 500 mg PO BID x _____ days. (If eCrCl ≥ 10 ml/min)</p> <p><input type="checkbox"/> Cephalexin 250 mg PO BID x _____ days (If eCrCl ≥ 10 ml/min)</p> <p><input type="checkbox"/> SMX-TMP (Bactrim) 1 PO 800/160 mg (DS or double strength) BID x _____ days (If eCrCl ≥ 30 ml/min)</p> <p><input type="checkbox"/> SMX-TMP (Bactrim) 1 PO 400/80 mg (SS or single strength) BID x _____ days (If eCrCl 15- 30 ml/min)</p> <p><input type="checkbox"/> Fosfomycin (Monural) 3g PO once (for female residents)</p> <p><input type="checkbox"/> Fosfomycin (Monural) 3g PO once every 3 days for 3 doses (for male residents)</p> <p><input type="checkbox"/> If above cannot be used, Ciprofloxacin 250 mg PO BID x _____ days (If eCrCl > 30 ml/min)</p> <p><input type="checkbox"/> If above cannot be used, Ciprofloxacin 250 mg PO daily x _____ days (If eCrCl ≤30 ml/min)</p> <p><input type="checkbox"/> Other _____ Dose _____ Route _____ Freq _____ Duration _____ days (based on resident's urine culture within 6 months)</p>
R₃	<p>Recommendation when criteria <u>ARE</u> met and <u>COMPLICATED UTI</u> is suspected</p> <p>Resident MET criteria for UTI and appear to have Complicated UTI (e.g. pyelonephritis) requiring the following measures:</p> <p><input checked="" type="checkbox"/> Urinalysis and urine culture (Obtain under Medical Director standing order)</p> <p><input type="checkbox"/> Obtain Blood Culture</p> <p><input checked="" type="checkbox"/> Initiate empiric antibiotic therapy using the options for complicated UTI below</p> <hr/> <p>Provider: Please select an antibiotic regimen</p> <p><input type="checkbox"/> Initiate empiric antibiotic therapy based on Linden Court antibiotic susceptibilities:</p> <p><input type="checkbox"/> Ceftriaxone 1g IM once</p> <p style="text-align: center;">-----FOLLOWED BY-----</p> <p><input type="checkbox"/> SMX-TMP (Bactrim) 1 PO 800/160 mg (DS or double strength) BID x _____ days (If eCrCl ≥ 30 ml/min)</p> <p><input type="checkbox"/> SMX-TMP (Bactrim) 1 PO 400/80 mg (SS or single strength) BID x _____ days (If eCrCl 15- 30 ml/min)</p> <p><input type="checkbox"/> If above cannot be used, Ciprofloxacin 500 mg PO BID x _____ days (If eCrCl > 30 ml/min)</p> <p><input type="checkbox"/> If above cannot be used, Ciprofloxacin 500 mg PO daily x _____ days (If eCrCl ≤30 ml/min)</p> <p><input type="checkbox"/> Oral Beta-lactam- _____ Dose _____ Route _____ Freq _____ Duration _____ days</p> <p><input type="checkbox"/> Other _____ Dose _____ Route _____ Freq _____ Duration _____ days (based on resident's urine culture within 6 months)</p>
<p>Nurse's Signature _____ Date/time _____</p> <p>Notification of Family/POA Name: _____ Date/time _____</p> <p><input type="checkbox"/> Faxed to _____ Date/time _____</p> <p><input type="checkbox"/> Called to _____ Date/time _____</p>	
<p>Physician/Provider Signature _____ Date _____</p> <p>Please fax back to: _____</p>	



Suspected URI SBAR

Patient Name _____ DOB _____ Facility _____

S	Situation I am concerned about a suspected lower respiratory tract infection (pneumonia/bronchitis) for the above resident.	
B	Background <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <div style="width: 45%;"> <input type="checkbox"/> History of COPD <input type="checkbox"/> History of heart failure </div> <div style="width: 45%;"> <input type="checkbox"/> Use of supplemental Oxygen <input type="checkbox"/> O₂ requirement has increased </div> </div> History of LRTI in last 6 months If yes, Date _____ Treatment _____ Active chronic diagnosis: _____ Advanced directives for limiting treatment _____ Medication allergies _____	
A	Assessment Vital signs: BP _____ / _____ HR _____ Resp _____ Temp _____ O ₂ Sats _____ %	
	Residents with fever $\geq 102^{\circ}$ F (38.9$^{\circ}$ C) Criteria are met to initiate antibiotics if ONE of the following are selected: <input type="checkbox"/> New or increased cough <input type="checkbox"/> New or increased sputum production <input type="checkbox"/> Resp rate ≥ 25 breaths/minute <input type="checkbox"/> O ₂ sat <94% on room air or > 3% decrease from baseline <input type="checkbox"/> New or changed lung exam abnormalities <input type="checkbox"/> Pleuritic chest pain	Residents with fever $\geq 100^{\circ}$ F (37.9$^{\circ}$ C) but <102$^{\circ}$ F (38.9$^{\circ}$ C) or $\geq 2.4^{\circ}$F (1.5$^{\circ}$C) above baseline temperature Criteria are met to start antibiotics if BOTH of the following are selected: <input type="checkbox"/> New or increased cough AND <input type="checkbox"/> At least one of the following: <input type="checkbox"/> HR >100 beats/min <input type="checkbox"/> New or worsened delirium <input type="checkbox"/> Rigors <input type="checkbox"/> Resp rate ≥ 25 breaths/min
	Afebrile Resident <u>WITH</u> COPD and age >65 years Criteria are met to initiate antibiotics if BOTH of the following are selected: <input type="checkbox"/> New or increased cough and <input type="checkbox"/> Purulent sputum production	Afebrile resident <u>WITHOUT</u> COPD and age >65 years Criteria are met to initiate antibiotic if ALL of the following are selected: <input type="checkbox"/> New or increased cough and <input type="checkbox"/> Purulent sputum production and <input type="checkbox"/> At least one of the following: <input type="checkbox"/> New or worsened delirium <input type="checkbox"/> Resp rate ≥ 25 breaths/min
R	Recommendations <input type="checkbox"/> Protocol criteria met. Resident may require a Chest-ray, CDC w/diff, and or antibiotics <input type="checkbox"/> Protocol criteria not met. Resident does not need immediate antibiotic order but may need additional observation	

Nurse's Signature _____ Date/time _____

Notification of Family/POA Name: _____ Date/time _____

Faxed to _____ Date/time _____

Called to _____ Date/time _____

Physician/Provider's Orders/Response (Please check all that apply)

Chest X-ray

For cough: Med _____ Dose _____ Route _____ Freq _____ Duration _____

For fever: Acetamenophen Dose _____ Quantity _____ Route _____ Freq _____ Duration _____

For Shortness of breath, inhale/nebulize: _____ Dose _____ Freq _____ Duration _____

Encourage 4oz. Fluid (_____) TID until symptoms resolve

Record Fluid I&O until symptoms resolve (Output can be measured by urinal or by weighing briefs)

Full vital signs every _____ hours for _____ hours. Notify Provider if symptoms worsened or unresolved in _____ hours

Physician/Provider Signature _____ Date _____

Please fax back to: _____



Suspected SSTI SBAR

Patient Name _____ DOB _____ Facility _____

S	Situation I am concerned about a suspected cellulitis/soft tissue infection/wound infection for the above resident			
B	Background <input type="checkbox"/> Hx of recurrent skin infections <input type="checkbox"/> Hx of peripheral vascular disease <input type="checkbox"/> Hx of Diabetes <input type="checkbox"/> Hx of chronic ulcer Other active Diagnoses: _____ <input type="checkbox"/> The resident is on warfarin (Coumadin) <input type="checkbox"/> Advance directives for limiting treatment _____ <input type="checkbox"/> Medication allergies _____			
A	Assessment Vital signs: BP _____ / _____ HR _____ Resp _____ Temp _____ O ₂ Sats _____ % <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; padding: 5px;"> Minimum criteria to initiate antibiotics are met if ONE of the following 2 scenarios are selected: <input type="checkbox"/> New or increased purulent drainage <input type="checkbox"/> At least 2 of the following new or increasing S/S: <input type="checkbox"/> Heat/warmth to affect site <input type="checkbox"/> Redness/erythema of site <input type="checkbox"/> Swelling at site <input type="checkbox"/> Increased tenderness or pain <input type="checkbox"/> Fever of 100°F (38°C), or 2°F (1.1°C) above baseline, or repeated temperatures of 99°F (37°C) </td> <td style="width: 50%; padding: 5px;"> Additional description of affected site: Location <input type="checkbox"/> Left <input type="checkbox"/> Right Body site <input type="checkbox"/> Face/head/neck <input type="checkbox"/> Upper extremities <input type="checkbox"/> Chest/abdomen <input type="checkbox"/> Groin <input type="checkbox"/> Back <input type="checkbox"/> Buttock <input type="checkbox"/> Lower extremities <input type="checkbox"/> Other _____ Depth <input type="checkbox"/> Intact Skin <input type="checkbox"/> Superficial wound <input type="checkbox"/> Deep wound Drainage <input type="checkbox"/> None <input type="checkbox"/> Serous <input type="checkbox"/> Serosanguinous <input type="checkbox"/> Purulent Other findings _____ </td> </tr> </table>		Minimum criteria to initiate antibiotics are met if ONE of the following 2 scenarios are selected: <input type="checkbox"/> New or increased purulent drainage <input type="checkbox"/> At least 2 of the following new or increasing S/S: <input type="checkbox"/> Heat/warmth to affect site <input type="checkbox"/> Redness/erythema of site <input type="checkbox"/> Swelling at site <input type="checkbox"/> Increased tenderness or pain <input type="checkbox"/> Fever of 100°F (38°C), or 2°F (1.1°C) above baseline, or repeated temperatures of 99°F (37°C)	Additional description of affected site: Location <input type="checkbox"/> Left <input type="checkbox"/> Right Body site <input type="checkbox"/> Face/head/neck <input type="checkbox"/> Upper extremities <input type="checkbox"/> Chest/abdomen <input type="checkbox"/> Groin <input type="checkbox"/> Back <input type="checkbox"/> Buttock <input type="checkbox"/> Lower extremities <input type="checkbox"/> Other _____ Depth <input type="checkbox"/> Intact Skin <input type="checkbox"/> Superficial wound <input type="checkbox"/> Deep wound Drainage <input type="checkbox"/> None <input type="checkbox"/> Serous <input type="checkbox"/> Serosanguinous <input type="checkbox"/> Purulent Other findings _____
Minimum criteria to initiate antibiotics are met if ONE of the following 2 scenarios are selected: <input type="checkbox"/> New or increased purulent drainage <input type="checkbox"/> At least 2 of the following new or increasing S/S: <input type="checkbox"/> Heat/warmth to affect site <input type="checkbox"/> Redness/erythema of site <input type="checkbox"/> Swelling at site <input type="checkbox"/> Increased tenderness or pain <input type="checkbox"/> Fever of 100°F (38°C), or 2°F (1.1°C) above baseline, or repeated temperatures of 99°F (37°C)	Additional description of affected site: Location <input type="checkbox"/> Left <input type="checkbox"/> Right Body site <input type="checkbox"/> Face/head/neck <input type="checkbox"/> Upper extremities <input type="checkbox"/> Chest/abdomen <input type="checkbox"/> Groin <input type="checkbox"/> Back <input type="checkbox"/> Buttock <input type="checkbox"/> Lower extremities <input type="checkbox"/> Other _____ Depth <input type="checkbox"/> Intact Skin <input type="checkbox"/> Superficial wound <input type="checkbox"/> Deep wound Drainage <input type="checkbox"/> None <input type="checkbox"/> Serous <input type="checkbox"/> Serosanguinous <input type="checkbox"/> Purulent Other findings _____			

R	Recommendations <input type="checkbox"/> Protocol criteria met. Resident may require antibiotics with or without wound care. <input type="checkbox"/> Protocol criteria NOT met. Resident does not need immediate antibiotic order but may need additional observation.
----------	---

Nurse's Signature _____	Date/time _____
Notification of Family/POA Name: _____	Date/time _____
<input type="checkbox"/> Faxed to _____	Date/time _____
<input type="checkbox"/> Called to _____	Date/time _____

Physician/Provider's Orders/Response (Please check all that apply)

<input type="checkbox"/> For wound care, apply _____
<input type="checkbox"/> For fever/pain relief: Drug _____ Dose _____ Route _____ Freq _____ Duration _____
<input type="checkbox"/> Encourage _____ oz fluids frequency _____ Duration _____
<input type="checkbox"/> Record Fluid I&O until symptoms resolve (Output can be measured by urinal or by weighing briefs)
<input type="checkbox"/> Full vital signs every _____ hours for _____ hours. Notify Provider if symptoms worsened or unresolved in _____ hours
<input type="checkbox"/> Other orders _____
<input type="checkbox"/> Antibiotic: _____ Dose _____ Route _____ Freq _____ Duration _____
<input type="checkbox"/> Additional Drug _____ Dose _____ Route _____ Freq _____ Duration _____

Physician/Provider Signature _____	Date _____
Please fax back to: _____	

Time out SBAR

Patient Name _____ DOB _____ Facility _____

S	Situation I wanted to give an update on the above Resident's condition:: <input type="checkbox"/> Condition has improved <input type="checkbox"/> Condition has not changed <input type="checkbox"/> Condition has worsened <input type="checkbox"/> Urinalysis results available <input type="checkbox"/> Culture results available <input type="checkbox"/> Sensitivity report available <input type="checkbox"/> Other labs available <input type="checkbox"/> Resident is currently on antibiotic <input type="checkbox"/> Resident is currently not on an antibiotic	
B	Background Currently observing or treating for _____ Initial and/or current treatment: _____ _____ New Lab results _____ _____ X Ray Results _____ _____ Other _____ _____ Advanced directives for limiting treatment _____ Medication allergies _____	
A	Assessment Vital signs: BP _____ / _____ HR _____ Resp _____ Temp _____ O ₂ Sats _____ % <input type="checkbox"/> Resident is tolerating treatment <input type="checkbox"/> Resident is not tolerating treatment (Specify) _____ _____	
		Current Physical Assessment findings: (Specify pertinent findings) _____ _____ _____
R	Recommendations Based on clinical assessment and/or diagnostic results: <input type="checkbox"/> Resident meets criteria for initiation of antibiotics <input type="checkbox"/> Resident does not meet criteria for antibiotics <input type="checkbox"/> Can treatment be discontinued? <input type="checkbox"/> Can the antibiotic be narrowed (based on C&S) <input type="checkbox"/> Should antibiotic dose be lowered (based on renal function) <input type="checkbox"/> Should the route of administration be changed? (PO/IM/IV) <input type="checkbox"/> Should the duration of therapy be shortened? <input type="checkbox"/> Other (specify) _____	
Nurse's Signature _____ Date/time _____ Notification of Family/POA Name: _____ Date/time _____ <input type="checkbox"/> Faxed to _____ Date/time _____ <input type="checkbox"/> Called to _____ Date/time _____		
Physician/Provider's Orders/Response (Please check all that apply)		
<input type="checkbox"/> Discontinue Antibiotic <input type="checkbox"/> Initiate: Drug _____ Dose _____ Route _____ Freq _____ Duration _____ <input type="checkbox"/> Other orders (Specify) _____ _____		
Physician/Provider Signature _____ Date _____ Please fax back to: _____		

Patient Drug Allergy Comprehensive Assessment

1. Have you ever taken any Medication(s) that have caused a reaction?

Yes No

2. Describe the reaction you had.

True Allergy:

- | | |
|--------------------------------------|---|
| <input type="checkbox"/> Anaphylaxis | <input type="checkbox"/> Shortness of Breath |
| <input type="checkbox"/> Hives | <input type="checkbox"/> Angioedema |
| <input type="checkbox"/> Itching | <input type="checkbox"/> Rash/Serious skin reaction |
| <input type="checkbox"/> Other _____ | |

Intolerance/Adverse Effect

- | | | |
|-------------------------------------|---|---|
| <input type="checkbox"/> Dizziness | <input type="checkbox"/> Muscle Pain/Soreness | <input type="checkbox"/> Stomach Upset/Pain |
| <input type="checkbox"/> Drowsiness | <input type="checkbox"/> Nausea | <input type="checkbox"/> Vomiting |
| <input type="checkbox"/> Headache | <input type="checkbox"/> Swelling | <input type="checkbox"/> Diarrhea |
| <input type="checkbox"/> Weakness | <input type="checkbox"/> Vague Symptoms | <input type="checkbox"/> Other _____ |

3. How did you take this medication?

By Mouth Inhaled injection On the skin Other _____

4. How soon after starting the Medication did the reaction occur?

____Hours ____Days ____Weeks ____Months ____Years

5. How long ago did this reaction happen?

< 5 Years ago 5-10 Years ago >10 years ago

6. Did you seek medical attention for this reaction?

Yes No

7. If yes to #6, Were you seen in the:

ED Physician's office Urgent care Hospital Admission

8. Was the medication stopped by a doctor?

Yes No

9. Have you ever taken this medication or a similar one again?

Yes No

If yes, did you have the same reaction?

Yes No



Indiana State
Department of Health

*Inter-Facility Infection Control
Transfer Form*

This Inter-Facility Infection Control patient transfer form can assist in fostering communication during transitions of care for patients colonized or infected with a multidrug-resistant organism. Discharging facility should complete this transfer form and sign at the bottom after all fields are completed. Attach copy of records and latest laboratory reports with susceptibilities going with the patient to receiving facility. This form has been adapted from the Centers for Disease Control and Prevention (CDC).

Inter-facility Infection Control Transfer Form

This form must be filled out for transfer to accepting facility with information communicated prior to or with transfer.

Please attach copies of latest culture reports with susceptibilities if available.

Sending Healthcare Facility:

Patient/Resident Last Name	First Name	Date of Birth	Medical Record Number

Name/Address of Sending Facility	Sending Unit	Sending Facility Phone

Sending Facility Contacts	Contact Name	Phone	E-mail
Transferring RN/Unit			
Transferring physician			
Case Manager/Admin/SW			
Infection Preventionist			

Does the person* currently have an infection, colonization OR a history of positive culture of a multidrug-resistant organism (MDRO) or other potentially transmissible infectious organism?	Colonization or history (Check if YES)	Active infection on Treatment (Check if YES)
Methicillin-resistant <i>Staphylococcus aureus</i> (MRSA)	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes
Vancomycin-resistant <i>Enterococcus</i> (VRE)	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes
<i>Clostridioides difficile</i>	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes
<i>Acinetobacter</i> , multidrug-resistant	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes
Enterobacteriaceae (e.g., <i>E. coli</i> , <i>Klebsiella</i> , <i>Proteus</i>) producing-Extended Spectrum Beta-Lactamase (ESBL)	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes
Carbapenem-resistant Enterobacteriaceae (CRE)	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes
<i>Pseudomonas aeruginosa</i> , multidrug-resistant	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes
<i>Candida auris</i>	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes
Other, specify (e.g., lice, scabies, norovirus, influenza):	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes

Does the person* currently have any of the following? (Check here if none apply)

- | | |
|--|--|
| <input type="checkbox"/> Cough or requires suctioning | <input type="checkbox"/> Central line/PICC (Approx. date inserted <input type="text"/>) |
| <input type="checkbox"/> Diarrhea | <input type="checkbox"/> Hemodialysis catheter |
| <input type="checkbox"/> Vomiting | <input type="checkbox"/> Urinary catheter (Approx. date inserted <input type="text"/>) |
| <input type="checkbox"/> Incontinent of urine or stool | <input type="checkbox"/> Suprapubic catheter |
| <input type="checkbox"/> Open wounds or wounds requiring dressing change | <input type="checkbox"/> Percutaneous gastrostomy tube |
| <input type="checkbox"/> Drainage (source): <input type="text"/> | <input type="checkbox"/> Tracheostomy |

Inter-facility Infection Control Transfer Form

Is the person* currently in Transmission-Based Precautions? NO YES

Type of Precautions (check all that apply) Contact Droplet Airborne

Other: _____

Reason for Precautions: _____

Is the person* currently on antibiotics? NO YES (current use)

Antibiotic, dose, route, freq.	Treatment for:	Start date	Anticipated stop date	Date/time last dose

Vaccine	Date administered (If known)	Lot and Brand (If known)	Year administered (If exact date not known)	Does the person* self-report receiving vaccine?
Influenza (seasonal)				<input type="checkbox"/> Yes <input type="checkbox"/> No
Pneumococcal (PPSV23)				<input type="checkbox"/> Yes <input type="checkbox"/> No
Pneumococcal (PCV13)				<input type="checkbox"/> Yes <input type="checkbox"/> No
Other: _____				<input type="checkbox"/> Yes <input type="checkbox"/> No

*Refers to patient or resident depending on transferring facility

Required PPE







Name of staff completing form (print):

Signature:

If information communicated prior to transfer:

Name of individual at receiving facility:

Phone of individual at receiving facility:



What to Ask Your Healthcare Provider about Antibiotics

Antibiotic resistance is a growing problem, both in the United States and across the world. An important driver of antibiotic resistance is the overuse of antibiotics. When antibiotics are used correctly, you get the best effect on your health, your family's health, and the health of those around you. Here are some questions to ask your healthcare provider about antibiotics.



Questions to Ask your Healthcare Provider Before Asking for an Antibiotic

1. Could my symptoms be caused by something other than bacteria (e.g., a virus or something that is not an infection)?
2. What signs or symptoms should I look for that could mean I might need an antibiotic?
3. Can I be monitored to see if my symptoms improve with other remedies, without using antibiotics?



Questions to Ask your Healthcare Provider When you are Prescribed an Antibiotic


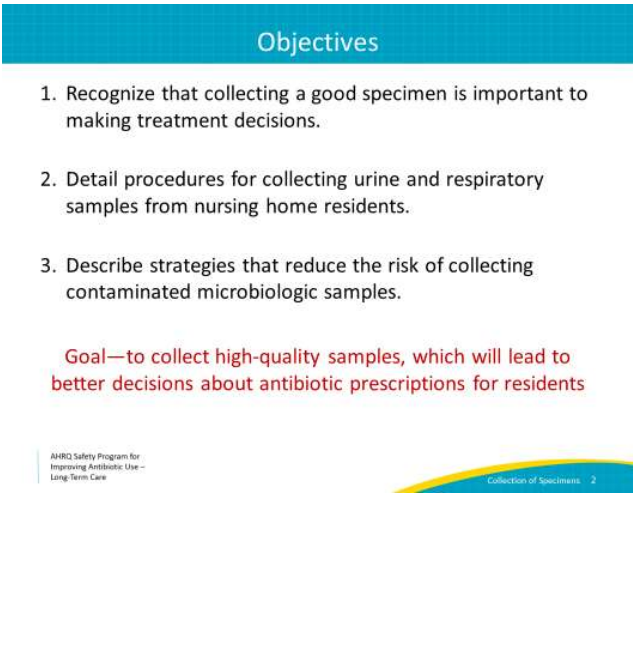
1. What infection is the antibiotic treating and how do you know I have that infection?
2. What side effects might occur from this antibiotic?
3. Could any of my other medications interact with this antibiotic?
4. How will I be monitored to know whether my illness is responding to the antibiotic?








AHRQ Safety Program for Improving Antibiotic Use




Appropriate Collection of Microbiologic Specimens Long-Term Care


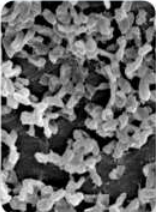

Slide Title and Commentary	Slide Number and Slide
<p>Appropriate Collection of Microbiologic Specimens Long-Term Care</p> <p>SAY:</p> <p>Welcome to this presentation, titled, “Appropriate Collection of Microbiological Specimens.”</p>	<p>Slide 1</p> 
<p>Objectives</p> <p>SAY:</p> <p>By the end of this presentation, you will be able to recognize that collecting a good microbiologic specimen is important to determine whether a resident needs to be treated with antibiotics. You will also be able to detail procedures for collecting urine and respiratory samples from nursing home residents.</p> <p>Finally, you will be able to describe strategies that reduce the risk of collecting contaminated microbiologic samples.</p> <p>The overall goal of this presentation is to help you collect high-quality samples, which will lead to better decisions about antibiotic prescribing for your residents—and protect your residents from unnecessary antibiotic exposure and associated harm.</p>	<p>Slide 2</p> 




Slide Title and Commentary	Slide Number and Slide
<p>Case 1: Clara</p> <p>SAY:</p> <p>Let's start by looking at a case.</p> <p>Clara is an 86-year-old resident who is in your facility for physical therapy after she broke her hip. Today, she tells you it burns when she urinates, and she feels like she always has to go.</p> <p>You tell the clinician about Clara's pain with urination, or dysuria, and urgency. She asks you to collect a urine sample for urinalysis and for culture.</p> <p>Let's take a minute to review our indications for collection of urine cultures. Residents without urinary catheters, who develop new pain with urination, or dysuria, should be evaluated with a urinalysis and culture. Change in urine color or odor, or incontinence or urgency alone—in the absence of pain with urination—are not indications to obtain a urine culture; these changes can be common in older adults and do not necessarily indicate infection.</p> <p>Clara did report new pain with urination, so we should obtain a urine specimen.</p>	<p>Slide 3</p> <p>Case 1: Clara</p>  <div data-bbox="1198 363 1469 636"> <p>Indications for Urine Collection</p> <ul style="list-style-type: none"> Residents without urinary catheters who develop new pain with urination, or dysuria <p>Commonly Mistaken Symptoms</p> <ul style="list-style-type: none"> Incontinence or urgency alone Foul smelling or cloudy urine </div> <p>AHRQ Safety Program for Improving Antibiotic Use – Long-Term Care</p> <p>Collection of Specimens 3</p>
<p>Case 1: Continued</p> <p>SAY:</p> <p>A midstream “clean catch” is the preferred method to collect urine. Unfortunately, Clara does not think she can stand long enough to do this on her own.</p> <p>This is often the case for residents in nursing homes, so let's discuss some alternatives for collecting the urine when these midstream specimens cannot be collected by the resident alone.</p>	<p>Slide 4</p> <p>Case 1: Continued</p> <div data-bbox="873 1312 1161 1444"> <p>“I do not think I can stand long enough to get a midstream, “clean catch” urine sample on my own.”</p> </div>  <p>AHRQ Safety Program for Improving Antibiotic Use – Long-Term Care</p> <p>Collection of Specimens 4</p>

Slide Title and Commentary	Slide Number and Slide
<p>Case 1: Options for Female Residents</p> <p>SAY:</p> <p>Take a minute now to think of some alternative ways to collect the urine when the resident is not able to on her own, and consider the pros and cons of each.</p> <p>One option would be to offer to help Clara catch the urine while she urinates.</p> <p>While this seems like a good idea in theory and does not require invasive techniques, this method is likely to lead to some bacterial contamination from her skin.</p> <p>An option in this case would be to help the resident take a shower or a sponge rinse with soap and water prior to collection to ensure her genitals are clean. Next, make sure that you allow the resident to void the first portion of her stream before you begin collection. This will minimize the bacterial contamination from her skin.</p> <p>The next option, giving her a toilet hat to collect urine, also runs the risk of obtaining a contaminated specimen. Toilet hats are great for measuring ins and outs, but they are not usually suitable for collecting urine for culture. Collecting the urine in a clean sterile container is important. Toilet hats are not sterile. The urine will be contaminated with bacteria from her skin and could be contaminated by the toilet hat itself. By the time toilet hats are in position, used to collect the urine, and removed, they will have bacterial contamination. The urine that is transferred from the hat to a sterile container and sent to the lab also will be contaminated.</p> <p>The last option, obtaining an in-and-out catheterization, is probably the best way to obtain a good sample if you cannot adequately obtain the sample with the clean-catch method. The downside to this approach is that it is invasive and can be uncomfortable for the resident. Using sterile technique and cleansing the genitals before obtaining the sample is important.</p>	<p>Slide 5</p> <p>Case 1: Options for Female Residents</p>  <ul style="list-style-type: none"> Offer to catch urine while she urinates. Provide a toilet hat to collect urine. Obtain an in and out catheterization. <p>AHRQ Safety Program for Improving Antibiotic Use – Long-Term Care</p> <p>Collection of Specimens 5</p>

Slide Title and Commentary	Slide Number and Slide
<p>Case 1: Options for Male Residents</p> <p>SAY:</p> <p>Let's consider how the previous case would change if the resident was a man.</p> <p>With male residents, it remains important to clean the skin around the genitals with a wipe or soap and water to reduce bacterial contamination. It is typically easier to obtain a midstream specimen in men, but if this is not possible, then consider placing a condom catheter to obtain the specimen. Condom catheters are generally more comfortable than performing an in-and-out catheterization though this is also an option for men.</p> <p>After the condom catheter is placed, check the collection bag every 30 minutes. Because this is a newly placed catheter, you can collect the sample from a collection bag that has held the urine for a short period of time.</p> <p>Regardless of the approach, you can take steps to minimize bacterial contamination of your sample by cleansing the genitals prior to collection, washing your hands, wearing clean gloves, and collecting the specimen in a sterile container.</p>	<p>Slide 6</p> <p>Case 1: Options for Male Residents</p>  <ul style="list-style-type: none"> • Catch midstream specimen. • Clean skin around genitals to reduce bacterial contamination. • Help clean the periurethral region and maintain midstream specimen.  <ul style="list-style-type: none"> • Provide condom catheter. <p>AHRQ Safety Program for Improving Antibiotic Use – Long-Term Care</p> <p>Collection of Specimens 6</p>
<p>Case 2: Bernard</p> <p>SAY:</p> <p>Let's move on to another case.</p> <p>One of the residents you are caring for in the nursing home has a chronic indwelling urinary catheter due to urinary retention and an inability to void independently.</p> <p>He develops a fever with flank pain, and you are concerned about a urinary tract infection. You call the clinician on call to report his symptoms, and she asks you to place a new urinary catheter before collecting a sample for urinary culture.</p> <p>Take a moment to consider the reason she recommended this, and we will discuss the possibilities on the next slide.</p>	<p>Slide 7</p> <p>Case 2: Bernard</p>  <ul style="list-style-type: none"> • Resident has chronic indwelling urinary catheter due to urinary retention and inability to void independently • Develops a fever with flank pain <p>AHRQ Safety Program for Improving Antibiotic Use – Long-Term Care</p> <p>Collection of Specimens 7</p>

Slide Title and Commentary	Slide Number and Slide
<p>Why We Collect Urine From a Clean Catheter</p> <p>SAY:</p> <p>Here are the reasons why it is important to obtain your urinary specimen from a new, clean catheter, rather than one that has been in place for a prolonged period.</p> <ol style="list-style-type: none"> 1. Rapid colonization <ul style="list-style-type: none"> • Within 1–3 days of placement, bacteria will colonize in urinary catheters and coat the plastic with a biofilm 2. Biofilm formation <ul style="list-style-type: none"> • A biofilm is a layer of slime secreted by bacteria that protects them from antibiotics, drying out, and other threats. Once the biofilm is formed, it is very challenging to eradicate bacteria without removing the catheter itself. 3. False positive culture <ul style="list-style-type: none"> • A “positive” urine culture obtained from an indwelling urinary catheter may grow bacteria that came from the biofilm. Bacteria from the biofilm do not usually cause problems for the resident, and are not necessarily representative of what is going on inside of the bladder. 	<p>Slide 8</p> <p style="background-color: #00A0C0; color: white; padding: 5px; text-align: center;">Why We Collect Urine from a Clean Catheter¹</p> <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div style="text-align: center;"> <p style="background-color: #00A0C0; color: white; padding: 2px; font-size: 8px;">Rapid Colonization</p>  </div> <div style="text-align: center;"> <p style="background-color: #00A0C0; color: white; padding: 2px; font-size: 8px;">Biofilm Formation</p>  </div> <div style="text-align: center;"> <p style="background-color: #00A0C0; color: white; padding: 2px; font-size: 8px;">False Positive Culture</p>  </div> </div> <p style="font-size: 8px; margin-top: 10px;"> <small>Bacteria image courtesy of 2020TheCatheterForDiseaseControl and the American Public Health Image Library (PHIL), Official Photo Archive of the Center for Communicable Disease Control and Prevention, Division of Field Epidemiology https://phil.cdc.gov/phil/details.aspx?imgid=5002 Accessed March 31, 2022.</small> </p> <p style="font-size: 8px; margin-top: 10px;"> <small>AHRQ Safety Program for Improving Antibiotic Use – Long-Term Care</small> </p> <p style="text-align: right; font-size: 8px; margin-top: 10px;">Collection of Specimens 8</p>

Slide Title and Commentary	Slide Number and Slide
<p>Case 2: True/False</p> <p>SAY:</p> <p>Let's go through the possible answers and decide if each is true or false.</p> <ol style="list-style-type: none"> 1. If the urinary catheter has been in too long, the urine specimen is not helpful. Is this true or false? <ul style="list-style-type: none"> • This is true. The plastic surfaces on the catheter become coated with a biofilm soon after placement. This biofilm contains bacteria that may not necessarily be related to the resident's new symptoms. A new catheter should be placed before obtaining the specimen. 2. Placing a new catheter can help hasten the resolution of symptoms. <ul style="list-style-type: none"> • This is also true. If a urinary catheter has been in place for more than 2 weeks, a new catheter can help hasten the resolution of symptoms and reduce the risk of a subsequent catheter-associated urinary tract infection. 3. The catheter does not need to be changed before the sample is collected. <ul style="list-style-type: none"> • This is false. It is actually recommended to change the urinary catheter before collecting a urine sample, particularly if it has been in place for more than 2 weeks. This is because colonizing bacteria from the catheter can get into the sample and lead to inaccurate culture results. Collecting a urine sample from a new catheter is good practice. 	<p>Slide 9</p> <p style="text-align: center;">Case 2: True/False</p> <p style="text-align: center;">Why place a new urinary catheter before collecting the sample?²</p> <div style="border: 1px solid green; border-radius: 10px; padding: 5px; margin-bottom: 5px;"> <p>If the urinary catheter has been in too long, the urine specimen is not helpful.</p> </div> <div style="border: 1px solid green; border-radius: 10px; padding: 5px; margin-bottom: 5px;"> <p>Placing a new catheter can help hasten the resolution of symptoms.</p> </div> <div style="border: 1px solid red; border-radius: 10px; padding: 5px;"> <p>The catheter does not need to be changed before collecting the sample.</p> </div> <p style="font-size: small; margin-top: 20px;"> <small>AHRQ Safety Program for Improving Antibiotic Use – Long-Term Care</small> <small>Collection of Specimens 9</small> </p>

Slide Title and Commentary	Slide Number and Slide
<p>Steps To Collect a Urine Sample From a Clean Catheter</p> <p>SAY:</p> <p>It is acceptable to collect urine from the port of a freshly placed catheter but not from a catheter that has been in place for at least 2 weeks. We recommend removing the catheter and placing a new catheter before obtaining the urine specimen.</p> <p>To obtain a urine sample from a clean, newly placed catheter, you must follow these steps:</p> <ul style="list-style-type: none"> • Wash your hands and change to new sterile gloves before obtaining your specimen. • If no urine is in the tube, clamp the tube for 15–30 minutes prior to procedure. • Alcohol wipe the port prior to access. • Insert a 10 cc syringe at an angle into the port. Draw back 3–5 mL. • Insert specimen into sterile container. • Date, label, and time the specimen. Transfer to lab or refrigerator within 15 minutes. 	<p>Slide 10</p> <p>Steps To Collect Urine From a Clean Catheter</p> <ul style="list-style-type: none"> • If no urine is in the tube, clamp the tube for 15–30 minutes prior to procedure. • Alcohol wipe the port prior to access. • Insert a 10 cc syringe at an angle into the port. Draw back 3–5 mL. • Insert specimen into sterile container. • Label the specimen with time, date, and type/source. Transfer to lab or refrigerator within 15 minutes.  <p>AHRQ Safety Program for Improving Antibiotic Use – Long-Term Care</p> <p>Collection of Specimens 10</p>
<p>Knowledge Check</p> <p>SAY:</p> <p>Now it's time for a quick knowledge check. Try and think about the correct answer to these questions, and then we will review.</p> <p>First, why do you need to change gloves before a new catheter is placed?</p> <ul style="list-style-type: none"> • You just removed a contaminated catheter. If you don't change gloves, you will immediately transfer bacteria to the new catheter and contaminate the urine specimen. 	<p>Slide 11</p> <p>Knowledge Check</p> <p>1 Why do you need to change gloves before a new catheter is placed?</p> <p>↓</p> <p>You just removed a contaminated catheter. If you don't change gloves, you will immediately transfer bacteria to the new catheter and contaminate the urine specimen.</p> <p>AHRQ Safety Program for Improving Antibiotic Use – Long-Term Care</p> <p>Collection of Specimens 11</p>

Slide Title and Commentary	Slide Number and Slide
<p>Knowledge Check</p> <p>SAY:</p> <p>Second, why is it important to refrigerate the specimen if it can't be transported to the lab within 2 hours?</p> <ul style="list-style-type: none"> • Specimens that aren't handled properly are at risk for bacterial overgrowth and should not be accepted for analysis in the laboratory. All the hard work and potential discomfort to the resident that went in to obtaining the urine sample will be useless if the specimen isn't stored and transported appropriately. 	<p>Slide 12</p> <p>Knowledge Check</p> <p>2 Why is it important to refrigerate the specimen if it can't be transported to the lab within 2 hours?</p> <p>Specimens that aren't handled properly are at risk for bacterial overgrowth and should not be accepted for analysis in the laboratory. All that hard work obtaining the urine sample will be useless if the specimen isn't stored and transported appropriately.</p> <p><small>AHRQ Safety Program for Improving Antibiotic Use – Long-Term Care</small></p> <p><small>Collection of Specimens 12</small></p>
<p>Take-Home Messages: Urine Collection</p> <p>SAY:</p> <p>Here are our take-home messages regarding good urine sample collection:</p> <ul style="list-style-type: none"> • Always help residents clean the periurethral region prior to collecting sample. • If midstream clean-catch specimens are not possible, perform an in and out catheterization for female residents or use a condom catheter for male residents. • For residents with a catheter, urine culture specimens should be obtained from freshly placed catheters when feasible. • Always wash your hands and obtain the specimen in a sterile container. • If urine samples cannot immediately be transported to the lab, they should be refrigerated promptly and until transport. 	<p>Slide 13</p> <p>Take-Home Messages: Urine Collection</p> <ul style="list-style-type: none"> • Help residents clean the periurethral region prior to collecting a urine sample. • If midstream clean-catch specimens are not possible, perform an in-and-out catheterization. • For residents with a catheter, urine culture specimens should be obtained from freshly placed catheters, when feasible. • Always wash your hands and obtain the specimen in a sterile container. • Transport urine samples promptly (within 15 minutes) to lab; refrigerate if samples cannot be transported immediately. <p><small>AHRQ Safety Program for Improving Antibiotic Use – Long-Term Care</small></p> <p><small>Collection of Specimens 13</small></p>

Case 3: Carol

SAY:

Let's move on to discuss sample collection of respiratory cultures.

One of the residents in your facility develops a new cough and a temperature of 100.4 degrees Fahrenheit. She appears ill and reports being short of breath. Her O2 saturation is 98 percent, and her vital signs are otherwise within normal limits.

Orders are placed to obtain a sputum sample and chest x ray to evaluate for pneumonia.

Before we move on to discuss the best way to obtain a sputum culture, what else do you think would be a good idea to send as part of the diagnostic evaluation here?

- A complete blood count (or CBC) with differential could help to determine if the resident had leukocytosis, or a high white blood cell count, which could be a sign of a developing bacterial infection.
- Urine *Legionella* and *Strep pneumoniae* antigen are great rapid diagnostic tests that can help to evaluate for common causes of pneumonia quickly. If one of these tests is positive, it can also help to choose the right antibiotic early on, which is a major benefit for the resident. If available, these tests should be considered for a resident with pneumonia.
- Respiratory viruses—rapid influenza testing is always recommended during flu season, from October to March. Influenza is very contagious, and if we don't monitor for it, an outbreak can occur in the facility. Also consider testing for other respiratory viruses such as SARS-CoV-2—the virus that causes Coronavirus disease 2019 or COVID-19—as appropriate based on community prevalence.
- Urine culture—the resident has symptoms of cough and fever, with no complaints of urinary symptoms. Without urinary symptoms and with another good reason for fever, there is no good reason to obtain a urine culture.

Slide 14

Case 3: Carol




What else should be sent in the evaluation?

- ✓ CBC with differential
- ✓ Urine legionella and urine *Strep pneumoniae* antigen (if available)
- ✓ Rapid influenza – during influenza season (and other respiratory viruses depending on local epidemiology)
- ✗ Urine culture – not indicated here, with other localizing symptoms (respiratory) and no complaints of urinary symptoms

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Collection of Specimens 14

Slide Title and Commentary	Slide Number and Slide
<p>Note that Coronavirus disease 2019, or COVID-19, a viral infection caused by severe acute respiratory syndrome coronavirus 2, or SARS-CoV-2, has emerged as a significant threat globally. Residents of long-term care facilities are at particular risk of severe infections due to the presence of other comorbidities and because of the ease with which infection with the virus can spread within a communal living setting. Although we will not discuss COVID-19 further in this presentation, like influenza, a single case of COVID-19 in the long-term setting requires an aggressive containment response and may need to be considered in your differential. Further information about management of COVID-19 in the long-term care setting can be found on the Centers for Disease Control and Prevention Web site and on State and local health department Web sites.</p>	

Slide Title and Commentary	Slide Number and Slide
<p>Case 3</p> <p>SAY:</p> <p>In the afternoon you ask the resident to cough and spit in a cup. She coughs twice, a dry cough, and then spits some clear fluid into the cup.</p> <p>After giving medications to the three other residents you are covering, you transfer the fluid from the cup into a sterile container and send the specimen to the lab.</p> <p>Next, she is started on broad-spectrum antibiotics.</p> <p>Two days later, the laboratory returns results from the specimen you sent. The results read: “Insufficient sample; normal respiratory flora.”</p> <p>At this point, the resident has had her chest x ray, which shows a right lower lobe pneumonia. Her influenza and SARS CoV-2 tests are negative, and she continues to cough.</p> <p>She continues on broad-spectrum antibiotics because culture results are not available to tailor the therapy to the bacteria growing in her lungs.</p> <p>Let’s consider how you could have prevented this from happening and improved the likelihood of obtaining a good sputum sample the first time.</p>	<p>Slide 15</p> <div data-bbox="852 258 1479 743"> <p>Case 3</p>  <p>How could you have—</p> <ul style="list-style-type: none"> • Prevented the resident from being started on broad-spectrum antibiotics? • Improved the likelihood of obtaining a good sputum sample the first time? • Avoided the mistakes that were made in the respiratory collection process? <p>AHRQ Safety Program for Improving Antibiotic Use – Long-Term Care</p> <p>Collection of Specimens 15</p> </div>

Slide Title and Commentary	Slide Number and Slide
<p>Collecting a Good Respiratory Sample</p> <p>SAY:</p> <p>Here are some suggestions to help you collect a good respiratory sample:</p> <ol style="list-style-type: none"> 1. Obtain an early-morning specimen. Often, residents are better at coughing up a good specimen in the early-morning hours, so we recommend obtaining specimens at this time when possible. 2. Wash hands and use new gloves for specimen collection. 3. Ask the resident to rinse her mouth out with water before collection. This helps to remove some of the loose cells from her mouth and may reduce contamination of the phlegm. 4. Explain to the resident that you need phlegm from her lungs, not just spit from her mouth. If the resident is unable to cough up a specimen, you want to request an order to give a treatment with aerosolized saline to induce a deep cough for the sputum collection. 5. Collect the specimen in a sterile container. Transferring it from a cup can increase the risk of contamination. 6. Transfer the specimen to the lab or refrigerator promptly. If the specimen sits at room temperature for more than 15 minutes, bacteria may die before being cultured. 	<p>Slide 16</p> <p>Collecting a Good Respiratory Sample</p> <p>Wash hands and use new gloves for specimen collection.</p> <p>Ask the resident to rinse her mouth with water prior to collection.</p> <p>Transfer to the lab or refrigerator promptly.</p> <p>Obtain an early-morning specimen, ideally before starting antibiotics.</p> <p>Explain to the resident that you need phlegm from her lungs, not just spit from her mouth.</p> <p>Collect the specimen in a sterile, labeled container.</p> <p><small>AHRQ Safety Program for Improving Antibiotic Use – Long-Term Care</small></p> <p><small>Collection of Specimens 16</small></p>

Slide Title and Commentary	Slide Number and Slide
<p>Remember That Clinical Context Is Important!</p> <p>SAY:</p> <p>While the resident in the previous case clearly had evidence of pneumonia with a new positive chest x ray, fever, and cough, we must remember that bacteria do colonize our mouth and upper respiratory tracts. A positive sputum culture must be interpreted based on the clinical presentation.</p> <ul style="list-style-type: none"> • Sputum cultures should only be sent on residents whom you are concerned have a lower respiratory tract infection. • A positive sputum culture does not necessarily mean that that organism is responsible for infection. Remember that bacteria and yeast colonize our mouths, and these can be captured if you do not obtain a good deep sputum specimen. For example, we often see sputum cultures positive for yeast, or <i>Candida albicans</i>. This almost never causes pneumonia and should not be treated without specific recommendation from an infectious disease specialist. • Sputum cultures should NOT be collected on residents with bronchitis or chronic obstructive pulmonary disease exacerbations. These are often caused by viral infections, and the sputum culture will likely represent colonizing bacteria rather than an underlying infection. 	<p>Slide 17</p> <p>Remember That Clinical Context Is Important!</p> <p>AHRQ Safety Program for Improving Antibiotic Use – Long-Term Care</p> <p>Collection of Specimens 27</p>

Slide Title and Commentary

Summary

SAY:

Here are some general take-home messages from this culture collection module.

- A resident should be symptomatic before we start collecting samples to send to the microbiology laboratory.
- Bacterial colonization does not necessarily represent infection.
- A good microbiologic specimen can help to make the correct diagnosis and direct treatment. Following the correct procedures and using sterile technique are very important for the well-being of the residents in your facility!

Activities To Complete

SAY:

These are the activities you may want to pair with this presentation, which are intended to help your team stay on track with the overall program.

Frontline clinicians may want to review sample collection processes for urine at your facility and use the supporting materials to help guide this process.

The Antibiotic Stewardship Team should collect or continue to collect and analyze data using the [Monthly Data Collection Form](#) and frontline staff should continue to apply the [Four Moments of Antibiotic Decision Making Form](#) to 5–10 residents each month.

Supporting materials for the activities are listed on the slide and are available on the AHRQ Safety Program Web site.

Slide Number and Slide

Slide 18

Summary

- Bacterial cultures should only be collected from residents with abnormal and concerning clinical symptoms.
- Bacterial colonization does not necessarily represent infection.
- A good microbiologic specimen can help to make the correct diagnosis and direct treatment—and protect your residents from unnecessary antibiotic use.

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Collection of Specimens 18

Slide 19

Activities To Complete

Activity, Stewardship Team	Activity, Frontline Providers
Continue to meet monthly as a team and review interventions.	Share feedback about the intervention with the Antibiotic Stewardship Team.
Continue to collect and analyze data using the Monthly Data Collection Form.	Review the Appropriate Collection of Microbiological Specimens and Appropriate Collection of Urine Specimens Posters and display them in common areas, such as break rooms and work stations. Review sample collection processes for urine at your facility. Apply the Four Moments of Antibiotic Decision Making Review Form to 5–10 residents each month.

Supporting Materials

- Collecting Microbiological Samples One Pager
- Appropriate Collection of Microbiological Specimens Poster
- Appropriate Collection of Urine Specimens Poster
- Four Moments of Antibiotic Stewardship Decision Making Review Form
- Monthly Data Collection Form

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Collection of Specimens 19

Slide Title and Commentary	Slide Number and Slide
<p>Disclaimer</p> <p>SAY:</p> <p>The findings and recommendations in this presentation are those of the authors, who are responsible for its content, and do not necessarily represent the views of AHRQ. No statement in this presentation should be construed as an official position of AHRQ or of the U.S. Department of Health and Human Services.</p> <p>Any practice described in this presentation must be applied by health care practitioners in accordance with professional judgment and standards of care in regard to the unique circumstances that may apply in each situation they encounter. These practices are offered as helpful options for consideration by health care practitioners, not as guidelines.</p>	<p>Slide 20</p> <p style="text-align: center;">Disclaimer</p> <ul style="list-style-type: none"> • The findings and recommendations in this presentation are those of the authors, who are responsible for its content, and do not necessarily represent the views of AHRQ. No statement in this presentation should be construed as an official position of AHRQ or of the U.S. Department of Health and Human Services. • Any practice described in this presentation must be applied by health care practitioners in accordance with professional judgment and standards of care in regard to the unique circumstances that may apply in each situation they encounter. These practices are offered as helpful options for consideration by health care practitioners, not as guidelines. <p><small>AHRQ Safety Program for Improving Antibiotic Use – Long-Term Care</small></p> <p style="text-align: right;"><small>Collection of Specimens 21</small></p>
<p>References</p>	<p>Slide 21</p> <p style="text-align: center;">References</p> <ol style="list-style-type: none"> 1. Centers for Disease Control and Prevention. Public Health Image Library (PHIL). Office of the Associate Director for Communications, Division of Public Affairs. https://phil.cdc.gov/phil/details.asp. Accessed July 25, 2017. 2. Hooton TM, Bradley SF, Cardenas DD, et al. Diagnosis, Prevention, and Treatment of Catheter-Associated Urinary Tract Infection in Adults: 2009 International Clinical Practice Guidelines from the Infectious Diseases Society of America. Clin Infect Dis. 2010 Mar 1;50(5):625-63. PMID: 21075247. https://www.idsociety.org/uploadedFiles/IDSA/Guidelines-Patient_Care/PDF_Library/Comp%20UTI.pdf <p><small>AHRQ Safety Program for Improving Antibiotic Use – Long-Term Care</small></p> <p style="text-align: right;"><small>Collection of Specimens 22</small></p>



Nursing Home Antimicrobial Stewardship Guide

Help Clinicians Choose the Right Antibiotic

Toolkit 1. Working With a Lab To Improve Antibiotic Prescribing

Tool 2. Step-by-Step Guide to Working With a Laboratory To Obtain an Antibigram

1. Contact the nursing home's lab to inquire about creating an antibiogram

Identify the correct contact at the laboratory to determine if it is able to create an antibiogram report. Most labs have this capability and producing the report requires little additional effort for lab staff. As a result, many labs are able to provide an annual antibiogram report at little or no additional charge. If your lab cannot provide an antibiogram, the Concise Antibiogram Toolkit and the Comprehensive Antibiogram Toolkit explain ways that nursing home staff can create their own antibiogram.

At least 12 months of culture data are typically needed, so the lab must have been under contract to the nursing home for at least that many months. In rare circumstances, nursing homes may use more than one lab. In that case, use the lab with the most data.

Talk with the appropriate lab personnel, typically the lab's medical staff (e.g., microbiologist or medical director), the business office, or the marketing office. These discussions should cover the lab's capacity to produce antibiograms that meet the nursing home's needs, the time needed for the lab to create or update the antibiogram, and the costs involved, if any.

2. Make an agreement with the lab to create an antibiogram, if needed

Most labs will provide an antibiogram as a routine part of their service to their customers and may not require any additional paperwork or payment. If an agreement is needed, the medical director, together with nursing home management, must review the standing agreement or contract that the nursing home has with the laboratory and modify the contract as necessary.

The contract should explicitly request an antibiogram report created in accordance with the criteria outlined below. Ask if the lab can produce a report that is already formatted for printing in an acceptable style.

If modifying the contract is not feasible, then the nursing home can request a Letter of Agreement requesting the antibiogram report. Nursing home management should review and approve the Letter of Agreement before it is sent to the lab. A sample Letter of Agreement is provided in tool 3.



3. Establish the specifications for the antibiogram

The lab should create the antibiogram in accordance with quality standards as established by the Clinical and Laboratory Standards Institute (CLSI) guideline number M39 (see www.clsi.org). The lab will likely already be familiar with these standards, but it may be helpful to refer to the guideline and use a copy of the specifications outlined below during talks with the lab. These specifications provide a summary of the key requirements of the CLSI guideline.

These standards are updated periodically. Every few years, ask the laboratory about whether the standards have been changed.

The current 2014 CLSI standards specify that the antibiogram:

- Cumulates and analyzes one year of data and is updated at least annually
- Includes only final, verified test results
- Includes only diagnostic isolates, not surveillance isolates
- Includes only the first isolate of each species for each resident within the time period
- Includes only organisms with at least 30 isolates tested; when fewer than 30 isolates are obtained in the course of the year, it is permissible to include isolates collected over a longer period and to clearly indicate this in a footnote to the antibiogram
- Presents susceptibility results only for antimicrobial agents that are routinely tested and are clinically useful
- Presents data as the percentage of isolates that are susceptible to each antibiotic agent (%S) and does not include percentage with intermediate susceptibility (%I)
- Follows current CLSI specifications for micro-organism-specific recommendations

The requirement for a minimum of 30 isolates of each organism may be very difficult for nursing homes to meet even when more than one year's data is used. If this is the case, you may want to consider including an even longer period of time or lowering the threshold to 20 isolates. The antibiogram should always clearly indicate any changes from the CLSI standards and include a note that these results should be used with caution as they are less reliable.

4. Specify the format of the antibiogram

Talk with lab staff about the possible formats for the antibiogram report and decide which format works best for the nursing home. Tool 4 provides examples of antibiogram reports. The lab may be able to provide a spreadsheet or word processing file, which allows the nursing home to adapt the format for its own uses, or a formatted PDF file, which cannot accidentally be altered. It may also be able to provide the antibiogram in multiple formats.

The lab may be able to produce a report formatted to your exact specifications, including warnings about organisms with less than 30 isolates. However, they may charge a fee for the work required to reformat the standard report produced by the lab's software. The medical director should work with nursing home leadership to determine whether it is best for the lab to do this or whether this could be done by staff at the nursing home.



AHRQ Safety Program for Improving Antibiotic Use

Guide to Sustainability Planning: Long-Term Care Facilities



Introduction

Johns Hopkins Medicine and NORC at the University of Chicago partnered with the Agency for Healthcare Research and Quality to improve antibiotic prescribing practices in long-term care facilities through the AHRQ Safety Program for Improving Antibiotic Use. The AHRQ Safety Program aims to foster team-based relationships and assist facilities with attaining the necessary skills to implement effective antibiotic stewardship programs.

Goal of This Guide

The goal of this guide is to help your facility continue to apply what health care providers have learned through the AHRQ Safety Program. The guide is both a tool for discussion and a template for action. It is designed to help your organization create your own effective and lasting sustainability plan tailored to the specific needs of your facility, manage competing priorities, and identify communication strategies to facilitate efforts in sustaining change. The plan will provide you with strategies to help incorporate the changes you have made in antibiotic prescribing practices through the AHRQ Safety Program into everyday practice.

The intended audience for this plan is the Antibiotic Stewardship Team and frontline health care providers.

The plan describes six components to consider when you are addressing sustainability of the Safety Program.¹⁻¹⁰

These are:

1. Leadership
2. Culture of Improvement
3. Hardwiring Change
4. Data Collection and Feedback
5. Assessment
6. Resources

1. Leadership

Sustainability requires ongoing supportive leadership. The facility's leadership needs to prioritize quality of care initiatives as a high priority, providing support and recognizing successes. A senior executive partner should work with the Antibiotic Stewardship Team to provide direct support and to assist in obtaining resources, as needed. This person should also remain involved with the Antibiotic Stewardship Team during the sustainment period, providing support as needs change moving forward. He or she should support and attend antibiotic stewardship committee meetings and be given at least a quarterly, brief update on ongoing activities of the stewardship program. Frontline staff need to work closely with the Antibiotic Stewardship Team and become "self-stewards" by recognizing antibiotic-related adverse events, understanding how to analyze the causes of these events, and finding multidisciplinary solutions. Administrators should be familiar with antibiotic stewardship-related regulatory requirements and with criteria in checklists for agencies ranking long-term care facilities such as the Centers for

Medicare & Medicaid Services and the National Quality Forum, and they should assure that the facility is in compliance with all requirements.

Best outcomes are most likely to occur when the Antibiotic Stewardship Team shares common goals and is motivated to reach them. It is up to clinical or thought leaders in each facility to ensure their frontline staff (e.g., physicians, pharmacists, nurses, nurse practitioners, physician assistants, technicians, certified nurse assistants) understand the importance of appropriate antibiotic prescribing and the potential harm caused by inappropriate antibiotic prescribing. With clear aims, leaders of the Antibiotic Stewardship Team can continue ongoing and new initiatives in the sustainability stage to establish change into the organizational structure. The Antibiotic Stewardship Team should check in with frontline staff regularly (e.g., monthly, every other month) and provide antibiotic usage data, education as needed, and assistance in designing solutions to perceived problems. Clinical staff should feel comfortable reaching out to the Antibiotic Stewardship Team directly when needing additional input related to the diagnosis and treatment of infections. Frontline clinicians are encouraged to continue to implement an antibiotic time out on a regular basis for all residents receiving antibiotics to ensure that a discussion happens for the ongoing need for antibiotics.

Leaders of the Antibiotic Stewardship Team should also be open to input and feedback and to help problem solve if strategies don't turn out to be a good fit.⁷ Antibiotic Stewardship Team leaders should be able to motivate staff when deviations from the Safety Program occur—for example, not using the Four Moments of Antibiotic Decision Making construct. Finally, Antibiotic Stewardship Team leaders should ensure new personnel have access to the educational toolkit and learn how to incorporate the principles learned into their daily practice.

2. Culture of Improvement and a Deeply Engaged Staff

The root of improvement lies in the safety culture within the facility.¹⁰

The Comprehensive Unit-based Safety Program (CUSP) helps facilities *adapt* their culture to recognize opportunities to improve patient safety. The AHRQ Safety Program for Improving Antibiotic Use includes several important elements of CUSP. This adaptive portion of the AHRQ Safety Program has been designed to improve both patient safety and the culture of safety around antibiotic decision-making. There are five Webinars discussing key adaptive concepts:

- Partnering with a senior executive
- Improving antibiotic use is a patient safety issue
- Improving communication and teamwork around antibiotic prescribing
- Identifying targets to improve antibiotic use
- Changing the system to improve patient safety

As with all presentations related to the AHRQ Safety Program, these presentations are available on the project Web site. It is encouraged that existing staff periodically review these presentations to remind themselves of the five key adaptive concepts. New hires, particularly those with leadership and

management roles, are strongly encouraged to view or listen to the presentations and/or narrated presentations and implement the adaptive concepts in daily activities.

3. Hardwiring Change

The changes in practice made during the implementation period need to become embedded in the daily routine so they are no longer perceived as new. This assures the changes will be sustained.

Focusing on the Safety Program's toolkit, specifically the Four Moments of Antibiotic Decision Making, will give teams the structure needed both during the implementation period and later during the sustainability period of the Safety Program. Syndrome-specific topics (e.g., urinary tract infections, respiratory infections) that comprise the majority of antibiotic prescribing in long-term care facilities are addressed in the Safety Program's educational toolkit. Each of these topics addresses clinical cases that are commonly encountered in the long-term care setting. Incorporation of material from the Webinars into daily practice will ensure the use of best practices in guiding decision making. Make sure that interventions your facility chooses to focus on align with state requirements or mandates and with published guidelines, such as the revised McGeer's criteria,¹¹ which provides specific criteria for infection surveillance in long-term care. By doing this, facilities can ensure staff members are not confused about specific requirements or required to perform extra work to meet two separate criteria.

Communication is key to both implementing and sustaining change. Techniques to improve communication, both among staff members and between staff members and residents and their families are covered in the course materials. These techniques also should be practiced, maintained, and periodically reviewed.

Sustaining teamwork and culture change around antibiotic prescribing are both essential to hardwiring change. The Antibiotic Stewardship Team acting on its own is not sufficient to change prescribing practices. Everyone in the facility who is involved in prescribing antibiotics and caring for residents receiving antibiotics should become familiar with the educational toolkit. The Antibiotic Stewardship Team should continue to meet with frontline staff (at least quarterly) to discuss opportunities to improve antibiotic prescribing. The Web site includes a [Four Moments of Antibiotic Decision Making Form](#); it is encouraged to complete 5–10 of these forms each month as a point of dialogue to discuss issues related to residents actively receiving antibiotic therapy.

4. Data Collection and Feedback

Collecting and sharing data on outcomes is also important to implementation and sustainability. The Antibiotic Stewardship Team should monitor the use of antibiotics and *Clostridioides difficile* rates. Monthly data collection on days of antibiotic therapy per 1,000 resident days (or 1,000 days present if the ability to submit to the National Health and Safety Network Antibiotic Use and Resistance program exists), data on *C. difficile* laboratory events per 10,000 resident-days, and number of urine cultures sent, and continued use of Four Moments of Antibiotic Decision Making Review Form is encouraged.

As you think of evaluating your antibiotic stewardship program, you may want to consider process measures and clinical measures. Process measures demonstrate that your facility is doing activities related to antibiotic stewardship. They answer the question, "What does your organization do to support antibiotic stewardship?" Examples of process measures include antibiotic usage data (e.g., days

of therapy, number of starts), the number of urine cultures ordered or positive *C. difficile* tests, completing 5–10 Four Moments of Antibiotic Decision Making Review Forms each month and using the Staff Safety Assessment tool to get feedback from frontline staff 1–2 times each year. Share process measures with frontline staff and administrators to let them know that their ongoing efforts are meaningful and making a difference to resident care.

Clinical measures assess how antibiotic stewardship efforts influence resident care. They answer the question, “How does your antibiotic stewardship program improve the care and safety of our residents?” Some clinical measures relate to individual prescribers, such as the number of antibiotics prescribed, the number of broad-spectrum agents used, or the number of residents given an antibiotic for a urinary tract infection without a concomitant urine culture being ordered or without a record that the prescriber reviewed the results of urine cultures. If possible, try to give individualized feedback to providers responsible for prescribing antibiotics. This feedback can help providers identify successes and recognize ways to improve their antibiotic prescribing practices. It can also help change misconceptions and opinions about antibiotic prescribing and demonstrates to them that their clinical decisions are noticed and meaningful. Other outcomes measures reflect on the facility as a whole, such as rates of *C. difficile* infection (CDI), adverse events associated with antibiotic use, infection recurrence, hospital readmission rates or the number of residents given antibiotics for asymptomatic bacteriuria. Depending on the intervention, you should pick realistic and feasible clinical outcomes of interest to both clinicians and senior executives. It is important to understand and communicate the limitations with certain measures. For example, changes in rates of CDI and hospital readmissions often take time to show significant change.

Interventions aimed at feasible targets, such as focusing on one particular syndrome, are more likely to have sustainable and significant results. It is challenging to address everything at once. Starting small and celebrating successes is a good way to build a program over time.

For example, you may choose to select CDI as an outcome. *C. difficile* infections are a result of both antibiotic practices and infection control lapses. Even with changes in antibiotic prescribing, it may be difficult to see changes in CDI rates. They are strongly associated with certain antibiotics like fluoroquinolones, third- and fourth-generation cephalosporins (e.g., ceftriaxone and cefepime), and clindamycin. If your intervention is targeting other types of antibiotics, you may not see a change in CDI rates. Additionally, *C. difficile* tests are occasionally inappropriately ordered for patients who do not have symptoms of CDI in which a positive test indicates colonization rather than infection. As you think more about possible clinical measures, keep in mind potential limitations. It is important to remember that most stewardship interventions will not include enough residents to show changes in most or all of these outcome measures over a short time frame. Pick a realistic outcome. Even if you do not find a significant improvement, if you can show no worsening of outcomes with your intervention, that is often sufficient. An example of this would be an intervention that decreases the use of fluoroquinolones and does not lead to increased mortality or hospital readmissions. Ask your clinicians what data they want to see; this way you are both giving and receiving feedback.

5. Assessment

It is not enough to simply collect data. Integrating regular and routine review of your data into facility workflow is crucial to implementation and sustainability success. It is important to emphasize maintaining early gains through continued administrative support of the program.

The Antibiotic Stewardship Team should periodically review antibiotic use data (and associated costs if feasible) with facility administration. When reviewing antibiotic use, it is anticipated that antibiotic use may initially decrease and eventually (after several years) remain stable. It is important to ensure that “broad-spectrum” antibiotics (e.g., fluoroquinolones) are stable or decreasing and anticipate that more “narrow-spectrum” antibiotics (e.g., amoxicillin, cephalexin) may increase or stay the same. An increase in broad-spectrum antibiotic use may be appropriate, but should trigger a deeper dive (likely by the Antibiotic Stewardship Team in conjunction with frontline staff) to better understand why the increase was observed and if changes need to be made to prescribing practices. It is equally important to celebrate and share your successes! This can help the team garner support for the program.

6. Resources

Look back at your opportunities and successes for change and growth. Why and how did they take place? What happened with efforts that were not successful or took a long time to make successful? How did your team overcome barriers? Did you encounter unexpected pitfalls? How can you continue best practices or make necessary adjustments? What inputs to your processes are required? Some examples of inputs are: team involvement, time, leadership support, and financing.

Questions to consider:

- What did it take to accomplish change? (Examples: formation of a stewardship team, time, clinician and staff buy-in and support, etc.)
- What are you lacking? (Examples: time, money, training, etc.)
- Whose involvement was necessary to accomplish changes? (Examples: facility leadership, medical directors, clinicians, staff, etc.)

Summary

This table summarizes the key sustainability components presented throughout this guide. This table can help to guide your discussions and remind you of questions you need to consider and components to include when planning your sustainability efforts.

Sustainability Component	Questions To Ask	Components
Leadership	<ul style="list-style-type: none"> • Has an Antibiotic Stewardship Team been identified to continue stewardship activities? • Do you have an engaged senior executive with whom the Antibiotic Stewardship Team meets quarterly (or more often) to discuss progress and needs? • Does the Antibiotic Stewardship Team have adequate resources from leadership to assist frontline staff with improving their antibiotic use? 	<ul style="list-style-type: none"> • Antibiotic Stewardship Teams need the necessary resources to sustain activities, particularly as more units in the facility are exposed to the AHRQ Safety Program and will require guidance by the Stewardship Team.
Culture of Improvement and Deeply Engaged Staff	<ul style="list-style-type: none"> • Do clinical staff understand and know their role in the program? • Does the Antibiotic Stewardship Team understand their role in the program? • Does staff feel concerns related to antibiotic use have been addressed? 	<ul style="list-style-type: none"> • The leader needs to assure that everyone is clear on performance activities and their role in the project. • Opportunities for all stakeholders to express their views about the program and planned activities need to be facilitated.
Hardwiring Change	<ul style="list-style-type: none"> • Is your team multidisciplinary? • Does your team understand the importance of periodically reviewing the educational toolkit to refresh the concepts learned from the Safety Program? 	<ul style="list-style-type: none"> • Use the Four Moments of Antibiotic Decision Making Review Form to practice the Four Moments of antibiotic prescribing on 5–10 residents each month to understand what changes may need to occur in guiding the treatment of future residents.
Data Collection and Feedback	<ul style="list-style-type: none"> • What processes are in place for the Antibiotic Stewardship Team to continue collecting antibiotic use data (and CDI rates)? • How is the Antibiotic Stewardship Team sharing data with administration and frontline staff? 	<ul style="list-style-type: none"> • To maintain your focus on the changes you have made and others you could make in the future, continue data collection processes. • Continue to share data with providers and staff to help them retain focus.
Assessment	<ul style="list-style-type: none"> • Do your process measures provide useful information? • Is there a plan in place if outcome data worsens? • Is there a plan in place if outcome data improves? 	<ul style="list-style-type: none"> • Celebrate and share successes! • Examine practices during the times of change— what went well and what did not (and why).
Resources	<ul style="list-style-type: none"> • What did it take to accomplish change? • Whose involvement was necessary to accomplish changes? 	<ul style="list-style-type: none"> • Determine what resources you need to have to accomplish the changes you want (e.g., time, clinician and staff involvement, money, etc.). • Assure people who have helped move the project forward remain involved in the project.

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