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Template for an Antibiotic Stewardship Policy for Post-Acute and Long-Term Care Settings

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Conflict of Interest

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Abstract

In response to a rising concern for multi-drug resistance and *Clostridium difficile* infections, the Centers for Medicare & Medicaid services (CMS) will require all long-term care facilities to establish an antibiotic stewardship program by November 2017. Thus far, limited evidence describes implementation of antibiotic stewardship in long-term care facilities, mostly in academic- or hospital-affiliated settings. To support compliance with CMS requirements and aid facilities in establishing a stewardship program, the Infection Advisory Committee at AMDA—The Society for Post-Acute and Long-Term Care Medicine, has developed an antibiotic stewardship policy template tailored to the long-term care setting. The intent of this policy, which can be adapted by individual facilities, is to help long-term care facilities implement an antibiotic stewardship policy that will meet or exceed CMS requirements. We also briefly discuss implementation of an antibiotic stewardship program in long-term care settings, including a list of free resources to support those efforts.

Keywords

antimicrobial stewardship; policy; Centers for Medicare and Medicaid Services; nursing homes; infection prevention and control

Background

As part of the revised Requirements for Participation, the Centers for Medicare & Medicaid Services (CMS) will require all long-term care (LTC) facilities to have an antibiotic stewardship program by November 28th 2017 [1,2]. The impetus for this new federal requirement arose in part from the recognition of the over 2 million infections caused each year by multi-drug resistant organisms (MDROs) and *Clostridium difficile* [3,4]. Being a resident in a nursing home is one of the most notable risk factors for colonization with an MDRO [5]. Some estimates indicate that the rate of methicillin-resistant *Staphylococcus aureus* (MRSA) colonization among nursing home residents may exceed 50% [6,7], surpassing the estimated rate of 5–10% among hospitalized patients [8,9]. Alarming, recent studies reported that colonization with multidrug-resistant Gram-negative bacilli among nursing home residents ranges from 20–30% [10–12]. Additionally, the proportion of nursing home residents colonized with *C. difficile* ranges from 4 to 50% [13–15].

Antibiotic exposure drives selection for MDROs and *C. difficile* infection. In LTC residents, antibiotics are often prescribed inappropriately (*i.e.*, inappropriate choice, dose, route or duration) and unnecessarily (*e.g.*, treatment of asymptomatic bacteriuria or viral upper respiratory tract infection). In 1987, Jones *et al.* found that 50% of antibiotics prescribed in 2 community nursing homes were inappropriate or unjustified [16]. Twenty-five years later, Peron *et al.* reported similar results, deeming 40% of antibiotic days of therapy at a Veterans Affairs nursing home as inappropriate or unnecessary [17]. Antibiotic use leads to adverse effects for LTC residents [6,18–20], including those who do not actually receive the antibiotics [21] and populations accessing healthcare facilities in the same community [22,23].

Antibiotic stewardship, which seeks to minimize inappropriate and unnecessary antibiotic use, is a critical part of combating antibiotic-resistant bacteria. In acute care settings, antibiotic stewardship programs show efficacy in improving patient outcomes, reducing the incidence of *C. difficile* infections and, in some cases, decreasing the prevalence of some strains of antibiotic-resistant bacteria [24–28]. The evidence and experience describing successful antibiotic stewardship is sufficient to support guidelines for developing and implementing antimicrobial stewardship programs in acute care settings [29,30]. In comparison, relatively few studies describe effective antibiotic stewardship implementation in LTC settings, the majority of which occur in academic- or hospital-affiliated nursing homes [31–33]. For most community LTC settings, lack of knowledge, evidence and experience are notable barriers to implementing antibiotic stewardship programs. Nonetheless, the CMS requirements for participation state that LTC facilities must establish an *antibiotic stewardship program that includes antibiotic use protocols and a system to monitor antibiotic use* (Section §483.80 Infection Control) [1].

AMDA—The Society for Post-Acute and Long-Term Care Medicine (The Society) received numerous requests for assistance with an antibiotic stewardship policy and also strongly endorses antibiotic stewardship in the care of LTC residents. To support compliance with the impending CMS requirements for participation, The Society’s Infection Advisory Committee (IAC) convened a panel of experts to review the requirements for participation, focusing on antibiotic stewardship. Here, we share a template of an antibiotic stewardship policy tailored to LTC settings (**Box 1**) and briefly discuss implementation. To develop the antibiotic stewardship policy template, the authors drew upon resources from academic and authoritative institutions including the Centers for Disease Control and Prevention (CDC), the Agency for Healthcare Research and Quality (AHRQ), the Society for Healthcare Epidemiology of America (SHEA) and the Infectious Disease Society of America (IDSA). Appendix 1 provides a crosswalk between the antibiotic stewardship policy template and the explanatory text included in the CMS State Operations Manual, which provides guidance to surveyors for LTCF [2]. Appendix 2 contains antibiotic use protocols developed with funding from AHRQ for urinary tract infections, skin and soft tissue infections and lower respiratory tract infections [34]. Table 1 contains links to these and other resources relevant to antibiotic stewardship in the LTC setting; these tools are also available at The Society’s website.

Antibiotic Stewardship Policy Template

The policy template calls for the formation of a multidisciplinary antibiotic stewardship committee at each LTC facility. Ideally, the committee should include, at a minimum, the director or assistant director of nursing, the medical director or designee, the infection preventionist and the consultant or dispensing pharmacist. The committee chair should be an individual with leadership skills who is dedicated to quality improvement. When possible, the LTC facility should support and facilitate advanced training in antibiotic stewardship for the committee chair. In most settings, the medical director, or a designated physician, is a reasonable choice for this role.

Infection preventionists, who are responsible for the infection prevention and control program, will also be important member of the antibiotic stewardship committee. The policy template specifies dedicated time and effort for an infection preventionist to carry out antibiotic stewardship activities, as these are distinct from the work involved with leading the infection prevention and control program. CMS anticipates that a licensed pharmacist will support assessment, monitoring and communication about antibiotic use as part of the medication regimen review [2]. Other potential members include frontline staff (*i.e.*, nurses, nursing assistants), an administrator, a board member or designee and a representative from the resident and family council. Finally, some LTC settings may need to look outside of their facility to identify people with expertise in antibiotic stewardship. These individuals may have the knowledge and skillsets that permit LTC facilities to develop a facility-specific prescribing guideline or a facility-specific antibiogram.

The functions of the antibiotic stewardship committee include reviewing antibiotic use data, identifying targets for stewardship, tracking outcomes data in order to assess change and sharing an annual written report with facility personnel, the Quality Assessment and Assurance committee and, where applicable, the resident and family council. Additionally, the antibiotic stewardship committee should communicate antibiotic stewardship activities and protocols to the prescribing practitioners, medical and nursing staff and provide education related to antibiotic stewardship, including appropriate antibiotic use, to prescribing practitioners, medical and nursing staff as well as to residents and families. The antibiotic stewardship committee may have some reasonable overlap with the infection prevention and control committee but must also have distinct responsibilities and activities.

Antibiotic Use Protocols

Antibiotic use protocols should take into account diagnostic criteria for common infections, appropriate diagnostic tests, and length of treatment along with choosing appropriate empiric therapy. The antibiotic stewardship committee may choose to develop their own antibiotic use protocols or adapt them from standardized tools and criteria, some of which CMS suggests in the State Operations Manual [2]. The antibiotic stewardship policy should specify the document(s) detailing the antibiotic use protocols.

A consensus guideline published in 2001 by Loeb *et al.* describes the minimum diagnostic criteria for starting antibiotics in nursing home residents [35]. These criteria, which are prospective and account for residents' clinical status, include recommendations for a focused assessment and diagnostic tests accessible in most nursing home settings. The 2012 revised McGeer (Stone) criteria specify surveillance definitions to measure rates of infections for epidemiological purposes [36]. Familiar to many nurses, the definitions offer a concise list of criteria for several infections common to LTC residents. While central to surveillance of common infections in long-term care settings, the revised McGeer (Stone) criteria do not supplant the Loeb minimum criteria for initiating antibiotics in a nursing home resident with clinical signs and symptoms suggestive of infection.

Antibiotic use protocols can also provide guidance on appropriate indications for ordering diagnostic tests. For example, in LTC settings, the results of urine cultures, rather than

clinical symptoms, often spurs unnecessary antibiotic use [37]. Educating and coaching LTC clinical staff about appropriate indications for ordering urine studies, reduces unnecessary antibiotic use for catheterized residents [38]. Incorporating the revised McGeer (Stone) criteria into an antibiotic use protocol that describes indications for ordering diagnostic studies may help support overall antibiotic stewardship efforts.

Antibiotic use protocols may use evidence-based guidelines to support recommendations for length of therapy. Most infections common to LTC residents, including urinary tract infections, pneumonia, and cellulitis, require no more than 7 days of antibiotics [39–42]. For situations when it is unclear if clinical changes are due to infection, implementing an order set for active monitoring (formerly watchful waiting) of residents' clinical status provides a tool that would help avoid unnecessary antibiotic therapy [43]. Appropriate use of such order sets, which includes documentation in the medical record, would demonstrate strong facility-level commitment to antibiotic stewardship.

Selecting appropriate empiric antibiotic therapy is a more challenging area to suggest specific policies, as they must account for local patterns of antibiotic resistance and clinical practice. For all guidelines, policies and order sets, clinical judgment is paramount; decisions to treat outside of standard protocols require additional, albeit brief, documentation.

Antibiotic Resistance Data and Antibiograms

The CMS State Operations Manual suggests tracking *C. difficile*, MRSA and carbapenemase-resistant *Enterobacteriaceae* (CRE) as a means to monitor resistance data, activities that may already be carried out under the purview of the Infection Prevention and Control Program [2]. Many factors influence the prevalence of these and other MDROs in the LTC setting, including the prevailing rate in the community, the types of care and services provided (e.g., residents with feeding tubes or chronic wounds) and local adherence to infection prevention and control measures [44,45]. Accordingly, fluctuations in the rates of MDROs within an individual LTC setting may occur independently of even the most stringent IPCP and antibiotic stewardship programs.

Antibiograms present an additional means to measure antibiotic resistance data. When feasible, we encourage LTC facilities to work with their laboratory to develop a facility-specific antibiogram. These typically accrue antibiotic susceptibility patterns of bacterial isolates collected over the previous year. The Clinical and Laboratory Standards Institute (CLSI) requires at least 30 isolates collected from diagnostic (not surveillance) specimens for inclusion of a bacterial species in an antibiogram [46]. Recognizing that the most frequently cultured substance is urine, some laboratories may only have sufficient data to develop an antibiogram specific to urine. Some smaller LTC facilities send so few cultures that there are insufficient numbers of bacterial isolates to generate even a urine antibiogram. Should this occur, we suggest documenting regular efforts to develop an antibiogram, perhaps every 1–2 years, into records kept by the Antibiotic Stewardship Committee.

Measuring and Monitoring Antibiotic Use

A system to monitor antibiotic use requires measuring and reporting antibiotic use. This in turn permits identification of potential goals for the antibiotic stewardship program and tracking progress towards those goals. Several metrics capture antibiotic use including days of therapy, defined daily doses and antibiotic starts, all reported as rates per 1000 resident days of care (Table 2). Days of therapy/1000 resident days provides the most accurate information on antibiotic use [47,48]. Unfortunately, routine and reasonably accurate collection of these data may not be feasible for programs without a dedicated long-term care pharmacy staff and information technology (IT) support. The World Health Organization (WHO) established defined daily doses (DDD) for antibiotics, based on the average dose used to treat most infections in most adults [49]. In addition to notable concerns regarding inaccurate estimates of antibiotic use, measuring DDD is also labor intensive. For long-term care facilities lacking access to data that captures days of therapy/1000 resident days, we suggest counting antibiotic starts (*i.e.*, the number of new antibiotic prescriptions) each month or per 1000 resident days [50]. When used consistently, the metrics chosen should indicate the effect of interventions to reduce antibiotic use over time and may therefore be helpful for evaluating compliance with initiating antibiotics in the LTC setting and thus in meeting regulatory requirements. Regardless of the metrics used, we recommend that the IP and the consulting or dispensing pharmacist work together to collect, analyze and share these data with the Antibiotic Stewardship Committee.

Antibiotic use data, particularly when coupled with the indications for prescribing, can help identify and monitor a target for improvement. In addition to overall rates of antibiotic use, considering specific classes of antibiotics or length of therapy may suggest additional interventions. For example, LTC facilities struggling with *C. difficile* infections may wish to assess use of high-risk antibiotics, namely clindamycin, fluoroquinolones, cephalosporins, monobactams and carbapenems [51]. Regarding length of therapy, given that most common infections require no more than 7 days of antibiotic therapy [39–42], examining antibiotic prescriptions for length of therapy may also reveal targets for intervention. Finally, LTC facilities may consider assessing antibiotic prescribing practices of individual prescribing practitioners in order to identify potential outliers for number of prescriptions, spectrum of agents used or length of therapy. These data must be interpreted judiciously, however, because in LTC settings, attribution of prescriptions to a specific prescriber may be inaccurate. For example, medications initiated by an on-call prescribing practitioner may be attributed to the primary care provider and Ebox medications to the medical director.

CMS specifies that feedback to providers is an additional facet of monitoring antibiotic use [2]. To that end, the antibiotic stewardship template describes sharing aggregate antibiotic use data with all staff as well as providing individualized feedback to prescribing practitioners. The individualized feedback should include a written report, provided at least annually, that encompasses overall antibiotic use as well as compliance with antibiotic use protocols, such as including dose, duration and indication with each prescription or documenting the receipt and, when applicable, response to the results of diagnostic tests and laboratory studies.

Implementation

To begin, we suggest that LTC settings conduct a focused assessment of their ongoing antibiotic use. In most cases, the infection preventionist, consultant pharmacist, dispensing pharmacist, director of nursing or medical director likely already has some awareness of opportunities for improvement. As emphasized by the CDC in their Core Elements for Antibiotic Stewardship in Nursing Homes, antibiotic stewardship programs should start small and identify targets that are readily measured and amenable to change [52]. Possible targets include process measures, such as requiring that every antibiotic prescription includes the dose, duration and indication. Readily quantified, efforts to improve these specific measures should be feasible in most settings and are readily shared with staff members as an important feature of regulatory compliance. Additional targets include unnecessary antibiotic use, such as prescriptions written for asymptomatic bacteriuria, chronic suppression of urinary tract infections (UTI), dental prophylaxis or “prophylactic” antibiotics during respiratory viral outbreaks. Other potential targets are to improve antibiotic utilization by reducing excessive length of therapy, use of agents associated with a high risk for *C. difficile* infection (e.g., clindamycin, quinolones) or use of broad-spectrum agents (e.g., carbapenems, extended-spectrum cephalosporins). For each of the potential targets mentioned, documentation of the measures at baseline and after implementing a change, along with a concise description of the time and nature of the change implemented, will help demonstrate an active antibiotic stewardship program.

Antibiotic Time-Out

A key component to antibiotic stewardship is to reassess the need for and appropriateness of antibiotics 2 to 3 days after initiation [53]. Dubbed an “antibiotic time-out,” this is an opportunity for staff to consider results of diagnostic tests, assess the resident for clinical changes and consider alternative diagnoses. Subsequently, the prescribers may choose to narrow, shorten or stop antibiotic therapy altogether. Consistent implementation of antibiotic time-outs may not be feasible for LTC settings that are implementing antibiotic stewardship for the first time. It should, however, be incorporated into programs as they mature.

Education

Multidisciplinary education is an important aspect of implementing a successful antibiotic stewardship program in LTCFs [33]. Specific topics include the appropriate indications for prescribing antibiotics, length of therapy, the potential risk and benefits of antibiotics as well as adjusting antibiotics in response to the results of diagnostics tests and laboratory data. As the protocols for antibiotic use address these same topics, introducing those protocols is an opportunity to educate prescribing practitioners, nurses and other clinical staff. Presenting the facility’s antibiotic use and resistance data in the context of general antibiotic stewardship principles presents a further opportunity for education that might include all staff members. Finally, educational efforts should also embrace residents, their families and concerned loved ones. Incorporating information about antibiotic stewardship into the admission packet, prominently displaying a commitment letter and making pamphlets and other reading material about antibiotic stewardship available in common areas through the facility are all feasible strategies; Table 1 contains links to several free resources [54].

Additional Considerations

LTC facilities seeking to use this template should adapt and tailor it to suit the needs of their individual building, which will have a wide array of resources, time and expertise available to support antibiotic stewardship. Similarly, antibiotic use protocols must also account for the setting into which they are introduced and should not override clinical judgment.

The intent of the antibiotic stewardship policy template provided here is to help LTC settings institute quality antibiotic stewardship programs as they seek to comply with impending regulatory changes in the context of limited evidence to describe antibiotic stewardship implementation in these settings. Recognition of ongoing efforts, such as infection prevention and control protocols, communication tools, educational materials for resident and families as well as feedback to prescribing practitioners, may be incorporated into the policy. Through the accumulation of both evidence and experience, antibiotic stewardship in LTC settings will help reduce the prevalence of MDROs and *C. difficile* as well as the risk of adverse drug events and ultimately, improve resident safety.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Table 1

Resources for Antibiotic Stewardship in Long-Term Care

Category	Institution	Resource (type of link)
General Antibiotic Stewardship Principles		
	CDC ^a	The Core Elements of Antibiotic Stewardship for Nursing Homes (website) Core Elements of Antibiotic Stewardship for Nursing Homes (pdf) Checklist for the Core Elements of Antibiotic Stewardship for Nursing Homes (pdf)
	AHRQ	Nursing Home Antimicrobial Stewardship Guide (website)
	AHS and BC CDC	Do Bugs Need Drugs? (website)
	Rochester Patient Safety <i>C. difficile</i> Prevention Collaborative	Rochester Nursing Home Collaborative (website)
	Minnesota Dept. of Health	Minnesota Antimicrobial Stewardship Program Toolkit for Long-term Care Facilities (website) Antimicrobial Stewardship in Long-Term Care (pdf)
	Massachusetts Coalition	Evaluation & Treatment –UTI in Elderly (website)
	University of North Carolina	Promoting Wise Antibiotic Use in Nursing Homes (pdf)
Policy & Implementation		
	CDC	Policy and Practice Actions to Improve Antibiotic Use (pdf) Leading Antibiotic Stewardship in Nursing Homes (pdf) Creating a Culture to Improve Antibiotic Use in Nursing Homes (pdf)
	AHRQ	Starting an Antimicrobial Stewardship Program (website) Monitor and Sustain Stewardship (website)
	Minnesota Dept. of Health	Action Steps and Strategies for Implementing Antimicrobial Stewardship in Long-term Care Facilities (pdf) Antimicrobial Stewardship Gap Analysis Tool (pdf)
	New York Dept. of Health	The Core Elements of Antibiotic Stewardship with CMS and QAPI Updates (pdf)
Antibiotic Use Protocols		
	AHRQ	Common Suspected Infections: Communication and Decision Making for Four Infections (website) Suspected UTI SBAR Toolkit (website) Minimum Criteria for Common Infections Toolkit (website) Protocol for Three Common Infections (word document; also included as Appendix 2)
	Rochester Patient Safety <i>C. difficile</i> Prevention Collaborative	Managing Common Infections in Older Adults (pdf) Guidelines for Treatment of Urinary Tract Infections (pdf)
	Minnesota Dept. of Health	Minimum Criteria for Initiation of Antibiotics in Long-Term Care Residents (pdf)
	Massachusetts Coalition	ABCs for Diagnosing Urinary Tract Infection in Long Term Care (pdf)
Measuring and Monitoring Antibiotic Use		
	CDC	Measures of Antibiotic Prescribing, Use and Outcomes (pdf)
	AHRQ	Working With Your Lab to Improve Antibiotic Prescribing (website)

Category	Institution	Resource (type of link)
		Using Nursing Homes Antibiotics to Choose the Right Antibiotic (website)
	Rochester Patient Safety <i>C. difficile</i> Prevention Collaborative	Antibiotic Tracking Worksheet (excel file) Antibiotic Tracking Sheet Instructions for Use (word document) Antibiotic Order Sheet Template (pdf)
	Minnesota Dept. of Health	Antimicrobial Use Assessment for Long-term Care Facilities (pdf) About Antibiotics (pdf)
	World Health Organization	WHONET Collaborating Centre for Surveillance of Antimicrobial Resistance (Website)
Family and Resident Education		
	CDC	What to Ask Your Healthcare Provider about Antibiotics (pdf) What You Need to Know About Antibiotics in a Nursing Home (pdf)
	AHRQ	Toolkit to Education and Engage Residents and Family Members (website) Be Smart About Antibiotics (pdf) Talking With Residents (pdf) Talking With Residents' Family Members (pdf) Resident Information Sheet: Antibiotic-Resistant Bacteria (pdf)
	ABIM	AMDA Choosing Wisely List (pdf) AGS Choosing Wisely List (website with pdfs) Tests & treatments for UTIs in older people – When you need them and when you don't (website with pdfs)
	AHS and BC CDC	FAQ for Families, Guardians and Health Care Aides-UTI in LTCF (pdf) FAQ for Families, Guardians and Health Care Aides-NHAP in LTCF (pdf)
	Rochester Patient Safety <i>C. difficile</i> Prevention Collaborative	Antibiotics for Urinary Tract Infections in Older Adults (pdf) Asymptomatic Bacteriuria Family Letter Template (pdf)
	University of North Carolina	Why Not Antibiotics? (pdf)

CDC; Centers for Disease Control and Prevention.

AHRQ; Agency for Healthcare Research and Quality

ABIM; American Board of Internal Medicine. AGS; American Geriatrics Society. AHS; Alberta Health Services. BC CDC; British Columbia Centre for Disease Control

Table 2**Comparison of Antibiotic Use Metrics**

Metric	Definition	Pros	Cons
Days of Therapy (DOT)	Any dose of antibiotic given on a single day per 100 (or 1000) resident days	Used by the National Healthcare Safety Network. Tracks efforts to lower antibiotic use rates. Estimates total burden of antibiotic use.	Does not measure length of treatment. May be labor intensive. Skewed by long-term prophylactic antibiotics
Defined Daily Dose (DDD)	Standardized doses of antibiotics per 100 (or 1000) resident days	World Health Organization standardized measures of antibiotics	Labor intensive. Definitions change with time. Does not readily accommodate dose adjustments made based on age, weight or creatinine clearance.
Antibiotic Starts	Number of new antibiotic prescriptions per month or per 100 (or 1000) resident days	Measures frequency of prescribing. Tracks efforts to lower antibiotic prescriptions rates. Tracks prescribing for specific indications (<i>e.g.</i> , urinary tract infection)	Does not measure total antibiotic burden. Does not measure length of treatment. May overestimate antibiotic use if antibiotics are changed (<i>i.e.</i> , based on results of laboratory tests)
Number of Antibiotic Courses >7 days	Number of antibiotic prescriptions for duration >7 days per month	Tracks efforts to reduce excessive length of prescriptions.	Does not measure the frequency of overall antibiotic prescriptions.