

Antimicrobial Stewardship in Long-term Care Facilities

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KEYWORDS

- Long-term care • Antimicrobial stewardship • Antimicrobial resistance • Elderly
- Infection prevention

KEY POINTS

- Long-term care facilities (LTCF) house a unique patient population, who are often elderly with several preexisting medical conditions.
- Residents of LTCF are often colonized with multidrug-resistant organisms, and antibiotic stewardship is essential to limit the further emergence of resistance.
- Antimicrobial stewardship is a new but necessary concept in LTCFs.
- Stewardship strategies from acute care settings may be adapted to function with the available resources utilized in LTCFs.

INTRODUCTION

Antimicrobial resistance has been identified as a major public health crisis. National summary data from the Centers for Disease Control and Prevention (CDC) estimate that more than 2 million illnesses are attributable to resistant infections.¹ As a result of increasing prevalence of virulent and drug-resistant organisms, including *Clostridium difficile*, methicillin-resistant *Staphylococcus aureus* (MRSA), and drug-resistant gram-negative organisms, there has been a call for the implementation of antimicrobial stewardship programs (ASPs) across the health care spectrum.² ASP refers to the development of programs that addresses the “appropriate selection, dosing, route, and duration of antimicrobial therapy”. Guidelines for the development of stewardship programs generally target stewardship activities in the acute care setting.³ The success of stewardship programs in the hospital setting has been described, with reductions in the rate of *C. difficile* infection, antibiotic usage, and improved pharmacy expenditures.^{4–6} Implementation of similar programs in

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long-term care facilities (LTCF) has been limited, despite the heavy use of antibiotics and high prevalence of resistant organisms in these settings.⁷ To add to an already complicated picture, the population in the United States continues to age, with an estimated 21% of the population in 2040 consisting of adults 65 years of age and older.⁸ As increased usage of LTCFs looms, the burden of inappropriate usage of antimicrobials in this health care setting will also increase in the absence of appropriate guidance.

THE BURDEN OF INFECTION IN LTCF

There are more than 15,000 nursing homes in the United States, with an estimated 1.5 million residents.⁹ Previous epidemiologic studies have reported an infection prevalence rate of 5.3%, based on a single-day survey, and infection incidence rates ranging from 3.6 to 5.2/1000 resident days.^{10–12} The most commonly reported infections in nursing homes are urinary tract infections (UTIs), lower respiratory tract infections, including pneumonia, skin and soft tissue infections, and gastroenteritis. Infections are among the most frequent causes of transfer to acute care hospitals, and 30-day hospital readmissions from LTCF are associated with increased mortality in this population.^{13–16}

The burden of multidrug-resistant organisms has also been identified as a key issue in this population, often a consequence of the overuse of antibiotics.¹⁷ There is a higher incidence of invasive MRSA in adults greater than or equal to 65 years old, as compared with their younger counterparts.¹⁸ Surveillance of various facilities has shown high prevalence of both colonization and infection with resistant organisms such as MRSA and multidrug-resistant gram-negative pathogens.^{19–21} Among LTCF residents, infections with antibiotic-resistant organisms are associated with more severe infection, hospitalization, increased risk of death, and increased cost of care.^{22–24} With a growing population of residents transferring between hospitals and LTCFs, the risk for resistance to emerge and spread within LTCFs has increased. In a study assessing movement of patients between health care settings, more than 50% of individuals identified with a carbapenem-resistant organism during a hospitalization were discharged to post-acute care facilities such as LTCFs.²⁵ Failure to control spread of resistance in LTCFs can also affect surrounding hospitals. An MRSA outbreak in one LTCF led to increasing prevalence of this organism in several adjacent California hospitals.²⁶

The antimicrobial overuse in LTCF exposes residents to the potential and realized harm that is caused by antibiotics, such as *C. difficile* infection.^{27–29} In a study of nursing homes in Rhode Island, 72% of patients received an antibiotic that was inappropriate according to established guidelines, with 67% receiving antibiotic therapy longer than the recommended duration, with a resultant increased incidence of *C. difficile* infection. In the geriatric population, it has already been shown that antimicrobials are one of the most commonly prescribed medications, with a significant associated adverse drug event risk.²⁹

CHALLENGES WITH ANTIMICROBIAL USE IN LTCF

ASPs in LTCFs have to address the unique challenges in identifying and managing infections in this population. The prevalence of asymptomatic bacteriuria (ASB) ranges from 23% to 50% in noncatheterized LTCF residents, to 100% among those with long-term urinary catheters, and ASB in the older adult is accompanied by pyuria in more than 90% of cases.³⁰ However, symptomatic UTIs in LTCF residents may present atypically. A study assessing the clinical signs and symptoms of older adults (older than 75 years) with bacteremic UTIs found that 10/37 (27%) did not mount a fever greater than 37.9°C, and 48.6% failed to report any localizing urinary tract symptoms (eg,

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