

Strategies and challenges of antimicrobial stewardship in long-term care facilities

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Abstract

As people are living longer the demand for long-term care facilities (LTCFs) continues to rise. For many reasons, antimicrobials are used intensively in LTCFs, with up to a half of this use considered inappropriate or unnecessary. Over-use of antimicrobials can have direct adverse consequences for LTCF residents and promotes the development and spread of resistant bacteria. It is therefore critical that LTCFs are able to engage in antimicrobial stewardship programmes, which have the potential to minimize the antibiotic selective pressure, while improving the quality of care received by LTCF residents. To date, no antimicrobial stewardship guidelines specific to LTCF settings have been published. Here we outline the scale of antimicrobial use in LTCFs and the underlying drivers for antibiotic over-use. We further describe the particular challenges of antimicrobial stewardship in LTCFs, and review the interventional studies that have aimed to improve antibiotic use in these settings. Practical recommendations are then drawn from this research to help guide the development and implementation of antimicrobial stewardship programmes.

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Introduction

There were 3.7 million residents of long-term care facilities (LTCFs) in the European Union (EU) in 2010, according to the European Centre for Disease Prevention and Control (ECDC), and this number will certainly increase in the coming decades [1]. The same is true beyond Europe: by 2030, 70 million people in the USA will be aged 65 years or more; given that nearly 4% of people aged 65 or older are nursing home residents, the need for LTCFs will increase [2].

Residents of LTCFs are at particular risk for healthcare-associated infections [3]. Antibiotics are among the most

commonly prescribed classes of medications for LTCF residents [4]. Between 3% and 15% of LTCF residents are given antibiotics at any time according to point prevalence studies in Europe, USA and Australia [5–7]. The incidence of antibiotic use varies considerably, with 50–80% of residents receiving at least an antibiotic course per year [4,7,8]. There is substantial facility-level variation in antibiotic-prescribing incidence (at least five- to ten-fold) [7,9,10], which may partly explain the differences seen in the European-wide study of nursing homes—between six defined daily doses per 1000 residents per day in Germany to 136 defined daily doses per 1000 residents per day in Northern Ireland [11]. A recent systematic review showed that antibiotics are most frequently prescribed for urinary tract infections (32–66%), respiratory tract infections (15–36%) and skin and soft tissue infections (13–18%) [7].

In elderly persons, diagnosis of infection is often difficult, which may easily lead to the inappropriate prescription and increased use of antimicrobials, with the potential for the development of multi-resistant bacteria [3,4]. Estimates suggest

that around half of antimicrobial use is either unnecessary or inappropriate in LTCFs [4,7,9,12–14]. As a consequence, prevalence of resistant bacteria is higher in LTCFs than in the community [15,16].

Antimicrobial stewardship is therefore a pressing need in LTCFs and this has recently become a ‘hot topic’ [16–19]. Compared with the acute-care setting, antimicrobial stewardship programmes (ASPs) in LTCFs have tended to be less well-organized and less resourced [20–24]. Specific evidence-based guidelines regarding prudent antibiotic use in LTCFs are also lacking.

We will review here the specific challenges faced by ASPs in LTCFs, and will suggest strategies to improve antimicrobial use in this setting.

Specific challenges in optimizing use of antimicrobials in LTCFs

Diagnosis

Diagnosing and treating infections in LTCF residents challenge even experienced practitioners [4]. Diagnosis of infections in LTCFs can be further confounded by a lack of on-site diagnostic testing equipment [4,25]. Loeb *et al.* noted a high frequency (90%) of inappropriate diagnostic work-up in LTCFs [13]. Older residents may have obscuring co-morbidities, blunted febrile responses, and predominance of vague systemic symptoms (such as delirium or falls) over localizing symptoms [3,4,7]. Moreover, a clinical history is often difficult to obtain, as many residents are cognitively impaired and may also have hearing or speech difficulties [7,13,26].

D’Agata *et al.* illustrated the difficulties associated with diagnosing urinary tract infections (UTIs) in LTCF residents with advanced dementia. Despite 84% of suspected UTIs not fulfilling the minimum clinical criteria to support antimicrobial initiation, 75% of these episodes were treated with antibiotics [26,27]. The usefulness of urinary specimens in diagnosing UTIs in these residents was also questionable, because urinalyses and urine cultures were positive in the vast majority of episodes regardless of whether minimum signs or symptoms were present. Because dysuria and adjunctive symptoms and signs are hard to discern, the authors suggested that fever alone may be adequate evidence to justify antimicrobial initiation for a suspected UTI, so long as there are no additional symptoms (e.g. new cough) to suggest an alternative source of infection. Such an approach also requires reassessment of antibiotic therapy, with its discontinuation if the urine culture is negative. If the test results are positive, the physician must still apply clinical judgement to assess whether the combination of signs or

symptoms and positive urine tests reflect a true UTI rather than another aetiology for the fever in the presence of asymptomatic bacteriuria [26].

Medical and nursing staff

The European Surveillance of Antimicrobial Consumption (ESAC) 2008 survey in 21 European countries highlighted that there can be many different types of care providers active in delivering medical care in LTCFs [22]. Care to residents can be delivered by the resident’s personal general practitioner (GP) or a physician from the same medical group practice, or by medical doctors directly employed by the LTCF [22]. In the 2009 ESAC point-prevalence survey, GPs prescribed about three-quarters of all antimicrobials in LTCFs, with wide variations between countries [21]. The existence of more than one type of prescriber in LTCFs, as is seen in many countries, can raise questions about the harmonization of antimicrobial prescriptions between prescribers, and may complicate overall responsibility for antimicrobial stewardship [22].

Previous research has shown that in the long-term care environment, nursing staff can be the driving force behind antibiotic prescribing [6,7,10,25,28,29]. Physicians often rely on the nursing staff’s assessment of the resident and may not visit a patient in an LTCF to confirm diagnosis. Indeed, many prescriptions may be called by telephone order, often by on-call physicians, without a preceding physical examination [6,25]. McClean *et al.* reported the results of two point-prevalence surveys conducted in residential homes in Northern Ireland, where only 58–70% and 40–44% of systemic and topical antimicrobials respectively were initiated following GP visits [6]. In an American study, physicians reported that they often prescribed treatment for UTIs without seeing the patients and depended on the nursing staff to provide information regarding symptoms and signs of a UTI [29]. A Canadian study also showed that only 44% of the antibiotic recipients had an associated claim for a physician bedside visit within 1 day of their index prescription [10].

Despite this reliance on nursing staff, nurses are frequently not trained to evaluate residents with a possible infection, and educational efforts are hampered by high employee turnover and sometimes lack of resources/staffing [25,30].

High prevalence of resistant bacteria with lack of local resistance data

Most antibiotics are prescribed empirically in LTCFs [7,21]. Given the high prevalence of multi-resistant bacteria in these settings [7], local resistance data are necessary to choose the appropriate antibiotic treatment. Such data about local antimicrobial resistance profiles are, however, rarely available (<20% of the cases in Europe, Table 1).

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