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Results of a Veterans Affairs Employee Education Program on Antimicrobial Stewardship for Older Adults

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Abstract

We describe a course in the Veterans Affairs (VA) Employee Education System designed to engage nursing staff working in VA long-term care facilities as partners in antimicrobial stewardship. We found that the course addressed an important knowledge gap. Our outcomes suggest opportunities to engage nursing staff in advancing antimicrobial stewardship, particularly in the long-term care setting.

Keywords

Antimicrobial stewardship; professional education; nursing home; registered nurses; asymptomatic bacteriuria; aged

Antibiotics represent 40% of all prescriptions in nursing homes [1]. In community facilities, between 25 and 75% of these prescriptions are unnecessary or prescribed inappropriately [2]. A study in a Veterans Affairs (VA) nursing home, termed a Community Living Center

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Transparency Declaration

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(CLC), demonstrated that 40% of antimicrobial days of therapy were unnecessary [3]. Inappropriate antimicrobial use unnecessarily puts long-term care residents at risk for adverse drug events and increases their vulnerability to colonization and infection with healthcare-associated pathogens, including *Clostridium difficile* and other drug-resistant bacteria. Antimicrobial stewardship seeks to minimize unnecessary and inappropriate antimicrobial use in order to curtail these negative consequences and ultimately, improve patient outcomes. To date, most antimicrobial stewardship efforts focus on acute care settings and on prescribers, not on nursing homes and nurses.

Physicians who work at nursing homes report spending an average of 12 hours a week providing primary care at a median of 3 facilities [4]. Accordingly, the events leading to an antibiotic prescription rely heavily upon the assessments of the nurses and their subsequent communication of the resident's condition, often by telephone, with providers [5]. In acute care, education of bedside nurses led to an increase in antimicrobial stewardship knowledge and the potential to influence antibiotic management [6]. Given their central role in evaluating residents, nurses who work in nursing homes have the capacity to serve as key collaborators in support of antimicrobial stewardship. To engage nurses at VA CLCs in antimicrobial stewardship efforts, we developed an on-line course that focuses on infections in older adults and emphasizes antimicrobial stewardship principles.

The course was presented as 6 interactive modules (30 minutes each) for a total of 3 continuing educational credits through the VA's national Employee Education System (course #18842). The modules addressed the following topics: signs and symptoms of infection in older adults; differentiating urinary tract infections from asymptomatic bacteriuria; recognition and evaluation of upper respiratory tract infections, bronchitis and pneumonia; appropriate application of transmission-based precautions; proper collection of samples for microbiological culture; and improving communication with providers. The communication module taught the principles of SBAR, which stands for Situation, Background, Assessment and Recommendation. The rationale for including this as a specific topic was to teach nursing staff to include their reason for communication with providers (*i.e.* a change in status or a new laboratory result) as well as their assessment of the resident. This communication style fostered enhanced team communication in other healthcare settings [7]. All clinical content was developed using published guidelines. Outcomes were measured using the same 12 multiple-choice questions administered before and after the 1st and 6th modules, respectively. Participants had up to 5 attempts to achieve a post-test passing score of 80%.

Between January 2014 and June 2015, 1960 out of 2240 participants (88%) who started the course passed it and earned educational credits. Registered nurses, the group for whom we developed the course, represented the majority of participants who passed (1268; 65%). Advanced practice nurses and physicians comprised <5% (85) of participants who passed. An additional 607 (31%) participants who passed worked in other clinical roles; the majority were nurse aides. The average pre-test score was 69.9%. A total of 2058 participants took the post-test, with 1347 (65%) passing on the first attempt. The remaining 613 people needed an additional 1938 test attempts (3.2 attempts/person), resulting in an average post-test score of 79.3% for all participants and a final passing rate of 95% (1960/2058). Overall,

85% of the participants indicated satisfaction with the course and 90% agreed that it met the learning objectives. The major criticism was that the course was too long (81 of 203 comments; 40%).

Table 1 compares the proportion of correct answers on the pre- and post-tests. Respondents showed the greatest increase for questions focused on recognition of fever in older adults (27%), appropriate urine sample collection technique (22%) and preventing catheter-associated urinary tract infections (15%).

To our knowledge, this is the first description of an on-line educational course designed for nursing staff who work with older adults that specifically addresses infections and antimicrobial stewardship. While a variety of healthcare workers viewed the modules, the majority of participants were registered nurses, who were the intended audience. Based on the outcomes reported in Table 1, ongoing education should focus on collecting samples for microbiological culture as well as signs and symptoms of infection in older adults. Lim *et al.* previously identified the importance of educating nurses regarding asymptomatic bacteriuria to improve antimicrobial stewardship efforts at nursing homes [8]. Conversely, on the pre-test, the proportion of correct answers for questions relating to isolation precautions ranged from 84 to 94%, suggesting good baseline knowledge on this topic. Both the previous literature and comments from participants in this course stressed the need to incorporate antimicrobial stewardship into nurses' workflow and education [8,9]. For example, as indicated by Naughton *et al.*, compared to education for only physicians and nurse practitioners, providing training session for nurses improved overall adherence to treating nursing home-acquired pneumonia in accordance with therapy recommended by guidelines [10].

Our study has limitations. Restrictions in the data available from the VA Employee Education System precluded robust statistical tests and did not permit evaluating outcomes based on participants' roles. Second, the outcomes measures do not assess knowledge retention or practice change as a result of the course. The course reached VA employees working at 118 medical centers across 47 states, rendering assessment of individual- or even facility-level changes impracticable. Third, none of the test questions addressed content from the respiratory tract infections module. Finally, the course did not assess participants' perceptions of their role as antimicrobial stewards. Despite these limitations, these outcomes suggest an effective strategy for engaging nursing staff in ongoing efforts to improve the care of older adults with infections and to advance antimicrobial stewardship principles and practices in VA CLCs. By addressing an important knowledge gap, this course will inform development of future educational content targeted toward nursing staff. We intend to make it available to health care workers outside of the VA system.

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Highlights:

- On-line course geared towards nurses working in VA Community Living Centers (CLCs)
- Six independent modules address infections common to older adults
- Content stresses principles of antimicrobial stewardship
- Over 1500 VA employees have completed the course and earned educational credits

Table 1:

Proportion of Correct Answers on the Pre- and Post-Tests

Module / Question No. ^a	Topic	Pre-Test (n = 2240)	Post-Test (n = 2058)
Signs & Symptoms of Infection in Older Adults			
1	Fever in older adults	53%	80%
2	Atypical signs & symptoms of infection	86%	90%
Urinary tract infection vs. Asymptomatic Bacteriuria			
3	Urinary tract infection symptoms	88%	92%
4	Preventing catheter-associated urinary tract infection	73%	88%
5	Indications to place, change and remove urinary catheters	86%	89%
Isolation Precautions			
6	Rational for using personal protective equipment for residents colonized with methicillin-resistant <i>Staphylococcus aureus</i>	94%	93%
7	Reducing transmission of <i>Clostridium difficile</i>	90%	91%
8	Contact precautions for drug-resistant Gram-negatives	84%	85%
Collecting Samples for Microbiological Culture			
9	Urine	42%	64%
10	Sputum	69%	76%
Communication with Providers using SBAR ^b			
11	Definition of SBAR ^b	92%	95%
12	Purpose of SBAR ^b	71%	80%

^aThere were no questions specific to one module: Upper respiratory tract infections, bronchitis and pneumonia.

^bSBAR; Situation, Background, Assessment, Recommendations