Brief report

Knowledge, beliefs, and confidence regarding infections and antimicrobial stewardship: A survey of Veterans Affairs providers who care for older adults

Robin L.P. Jump MD, PhD a,b,*, Barbara Heath MSN a, Christopher J. Crnich MD, PhD c, Rebekah Moehring MD, MPH d, Kenneth E. Schmader MD d, Danielle Olds RN, PhD e, Patricia A. Higgins PhD, RN a,b

a Geriatric Research Education and Clinical Center, Louis Stokes Cleveland Veterans Affairs Medical Center, Cleveland, OH
b Division of Infectious Diseases and HIV Medicine, Department of Medicine, Case Western Reserve University, Cleveland, OH
c Geriatric Research Education and Clinical Center, William Middleton Memorial Veterans Hospital and Division of Infectious Disease, Department of Medicine, University of Wisconsin School of Medicine and Public Health, Madison, WI
d Geriatric Research Education and Clinical Center, Durham Veterans Affairs Medical Center and Division of Geriatrics, Department of Medicine, Duke University, Durham, NC
e Quality Scholars Program, Louis Stokes Cleveland Veterans Affairs Medical Center, Cleveland, OH
f Frances Payne Bolton School of Nursing, Case Western Reserve University, Cleveland, OH

Key Words:
Antibiotic resistance
Long-term care
Nursing homes
VA Community Living Center

We conducted an anonymous survey of providers who care for older adults from 10 Veterans Affairs long-term-care facilities to assess their knowledge, beliefs, and confidence toward treating infections and antimicrobial stewardship. The average score on 5 questions assessing knowledge was 3.6 out of 5.0 (95% confidence interval, 3.3-3.9), which supports a need for education regarding the care of older adults with infections.

Despite guidelines for implementing antimicrobial stewardship practices in acute care hospitals, there is not yet sufficient evidence to support similar recommendations in long-term-care facilities (LTCFs). 1 Antimicrobial agents are among the most frequently prescribed medications in LTCFs; between 25% and 75% of these prescriptions are inappropriate. 2 At a single Veterans Affairs (VA) LTCF that identifies itself as a Community Living Center (CLC), expert review deemed 40% of antibiotic courses as unnecessary. 

METHODS

We developed an Internet-accessible survey that assessed knowledge, beliefs, and confidence about antibiotic stewardship and caring for older adults with potential infections (Qualtrics, Provo, Utah). Knowledge questions were based on 5 clinical vignettes of infections common to older adults. Beliefs and confidence questions used a slider bar with a range of 1-100 to assess agreement with statements.

Previous studies found that factors other than resident characteristics generate a significant amount of the variation in antimicrobial use in LTCFs. 4,5 Differences in how LTCF providers perceive antibiotic stewardship as well as clinical experience and knowledge may account for this variation.

We conducted a survey of providers from 10 VA facilities with CLCs to better understand their knowledge, beliefs, and confidence in caring for older adults with potential infections and toward antimicrobial stewardship.

METHODS

We developed an Internet-accessible survey that assessed knowledge, beliefs, and confidence about antibiotic stewardship and caring for older adults with potential infections (Qualtrics, Provo, Utah). Knowledge questions were based on 5 clinical vignettes of infections common to older adults. Beliefs and confidence questions used a slider bar with a range of 1-100 to assess agreement with statements.

Between January and October 2013 we recruited staff from 10 VA centers to participate in an educational intervention addressing the evaluation and treatment of older adults with infections.

* Address correspondence to Robin L.P. Jump, MD, PhD, Geriatric Research Education and Clinical Center 111C(W), Louis Stokes Cleveland VA Medical Center, 10701 East Blvd, Cleveland, OH 44106.
E-mail address: robin.jump@va.gov (R.L.P. Jump).

Financial support: This work was supported by the Veterans Affairs healthcare system (T-21 Non-Institutional Alternative to Long-Term Care Grant (G541-3) to RJ, BH, CC, KS, RM and PH), the National Institutes of Health (R03-AG040722 to RJ) and Geriatric Research Education and Clinical Centers (GRECC) in Veterans Integrated Service Networks (VISNs) 10 (RJ, BH, PH), 6 (KS, RM) and 12 (CC). RJ gratefully acknowledges the T. Franklin Williams Scholarship with funding provided by Atlantic Philanthropies, Inc., the John A. Hartford Foundation, the Association of Specialty Professors, the Infectious Diseases Society of America and the National Foundation for Infectious Diseases.

Conflicts of interest: None to report.
target audience for the education was CLC providers, but any interested provider was included. Before the intervention we invited but did not require participants to take the survey. Completed surveys from physicians, nurse practitioners, or physician assistants were analyzed. Characteristics of those who achieved higher (4 or 5 correct answers out of 5 questions) versus lower (3 or fewer correct answers) knowledge scores were compared using Mann-Whitney U test for continuous data or Pearson $\chi^2$ test for categorical data using R (version 3.0.1, R Foundation for Statistical Computing, Vienna, Austria).

### RESULTS

Of 111 respondents, 89 (80%) completed the survey. Among these, 71 were providers (ie, physicians, nurse practitioners, and physician assistants) who cared for older adults. Providers were stratified into those with higher versus lower knowledge scores: 47 (66%) scored 4 or 5 on the 5-question knowledge section and 24 (34%) scored 3 or less. Providers with higher knowledge scores indicated greater confidence to use diagnostic tests or microbiologic results to narrow or stop antimicrobial therapy compared with providers with lower knowledge scores (81 out of 100 [95% CI, 75-87] versus 71 out of 100 [95% CI, 62-80], respectively; $P < .05$). We found no statistically significant differences between those with higher versus lower knowledge scores based on demographic characteristics or beliefs.

### DISCUSSION

To our knowledge, this is the first survey that asks providers who care for older adults specifically about antimicrobial stewardship and care of people with potential infections. Although each of the questions was based on current guidelines and accepted practice patterns, 32 out of 71 providers (45%) answered 4 questions correctly and just 15 out of 71 providers (21%) answered all 5 questions correctly. This finding indicates a clear need for improvement in the knowledge base for the proper use of antimicrobial agents in the care of older adults.

These findings validate similar outcomes from LTCFs in Nebraska that identified physician practice and compliance as the greatest perceived barrier to antimicrobial stewardship. Our results indicate that nurse practitioners and physician assistants should also be included when developing antimicrobial...
stewardship initiatives in LTCF settings. An educational intervention that included physicians and nurses in Swedish LTCFs showed a decrease in total antimicrobial use over 2 years, suggesting that all clinical staff may contribute to antimicrobial stewardship initiatives. CLC providers, the intended target for the survey, comprised about one-half of respondents. Comparison of those who do and do not practice at CLCs yielded no statistically significant differences for any measured outcomes. This suggests that survey results are applicable to providers who care for older adults across inpatient, outpatient, and long-term care settings.

Providers with higher knowledge scores indicated significantly more confidence to use diagnostic tests to narrow or stop antimicrobial therapy. Modifying antimicrobial therapy based on both the patient’s clinical course and results of diagnostic tests is a key component of the antibiotic time-out developed and endorsed by the Centers for Disease Control and Prevention. Our results suggest that helping providers gain confidence in using and responding to diagnostic tests may improve overall use of antimicrobial agents and in turn advance the practice of antimicrobial stewardship.

Our study has limitations. First, respondents came from a group of providers who agreed to participate in an educational intervention and thus represent a convenience sample. A nonresponse bias may influence our outcomes. Second, survey responses do not assess actual practice patterns as they relate to the care of older adults with infections or to antimicrobial stewardship. Higher scores on the knowledge portion of the survey may not correlate with antimicrobial prescribing patterns. Third, the professionals surveyed were all VA employees who practice within a health care system with substantial infrastructure that serves a patient population different than those seen in non-VA settings. For example, VA CLCs have mostly full-time providers and the support of a full-time infection control professional (ICP). This is considerably different than the model of care in most community settings where physicians spend an average of 12 hours each week at nursing homes and where paid time for ICPs is ≤ 10 hours per month.

CONCLUSIONS

The average score of ~70% on the knowledge questions indicates a need for education regarding the care of older adults with infections; these efforts should include antimicrobial stewardship principles as a means to reduce unnecessary antimicrobial agent use. Specifically, encouragement and reassurance for providers to tailor or stop therapy in response to diagnostic tests may help promote practice change.

References