

# Putting a “LID” on Antibiotic Use in Long-Term Care Facilities: A Novel Paradigm in Health Care Delivery

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The Long-Term Care Facility Infectious Disease (LID) Consult Service began in July 2009 as a clinical demonstration project to address the needs of long-term care facility residents with infectious diseases. It has since evolved into a model for delivery of specialty health care to older adults that is directed at patients too sick to return to the community but well enough to remain out of the hospital.

**A**s life expectancy increases, our population is aging rapidly. In 2012, those who are alive and aged 65 years can expect to live until 2030.<sup>1</sup> Of people currently > 65 years, 3.6% reside in nursing homes, occupying 86% of the 1.7 million available beds.<sup>1,2</sup> By 2030, an additional 1 million long-term care facility (LTCF) beds to accommodate older adults will be needed. Beyond age-related conditions, veterans who require long-term care may also need treatment for neurocognitive illnesses and social problems. Based on data from 2000, about 200,000 veterans require long-term care each day.<sup>3</sup>

Delivering quality medical care to LTCF residents, who are among our most ill and frail, is challenging. Cus-

tomarily, physicians who provide care for residents in community LTCFs do so in addition to their primary office-based practice. Medical directors of community nursing homes report spending 8 to 12 hours each week in LTCFs. This time includes both their administrative responsibilities as the clinical leader of, on average, 2 nursing homes and medical care provided to, on average, 4 nursing homes.<sup>4</sup> In contrast, Community Living Centers (CLCs), LTCFs within the VA, employ full-time geriatricians as well as nurse practitioners and physician assistants, assuring veterans have

regular contact with medical providers. Furthermore, when community LTCF residents need to see a specialist, several weeks may pass before an appointment is available. LTCF residents may not be aware of the reason for the referral, be unable to offer a cogent medical history, and even struggle to answer simple questions about their current symptoms. If present, an aide accompanying the resident may be able to supply some relevant history. Unfortunately, medical records sent by nursing homes often consist of a list of diagnoses and medications, including numer-

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The VHA's Geriatric Research, Education and Clinical Centers (GRECCs) are designed for the advancement and integration of research, education, and clinical achievements in geriatrics and gerontology throughout the VA health care system. Each GRECC focuses on particular aspects of the care of aging veterans and is at the forefront of geriatric research and clinical care. For more information on the GRECC program, visit the website (<http://www1.va.gov/grecc/>). This column, which is contributed by GRECC staff members, is coordinated and edited by Kenneth Shay, DDS, MS, director of geriatric programs for the VA Office of Geriatrics and Extended Care, VA Central Office, Washington, DC. Please send suggestions for future columns to [Kenneth.Shay@va.gov](mailto:Kenneth.Shay@va.gov).



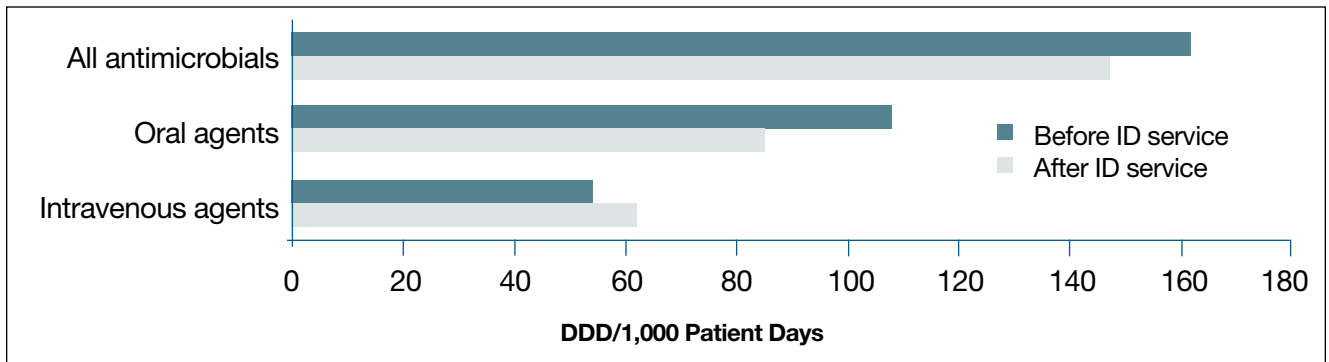


Figure 1. Defined daily dose (DDD) per 1,000 patients-days for all antimicrobials administered orally or through intravenous or intramuscular routes compared with the same 6 calendar months (October-March) in the year before and the year following the implementation of the LID consult service.

<sup>a</sup> $P < .0001$ .

ID = infectious disease.

ous “as needed” prescriptions with little to no information that conveys the reason for the visit. Subsequent communication from the specialist back to the LTCF staff, when it occurs, is typically brief and may never reach the referring provider. Within the VA system, however, the computerized patient record system (CPRS) assures that consultants have full access to a patient’s VA medical record and facilitates communication to the referring providers from the CLC.

How is the VA, one of the largest health care systems in the world, able to improve the quality of care received by LTCF residents? We describe our experience with a Geriatric Research Education and Clinical Center (GRECC)-sponsored clinical demonstration project at a single urban VA CLC affiliated with a tertiary care VA hospital. The GRECC at the Louis Stokes Cleveland VAMC (LSCVAMC) has developed a LTCF Infectious Disease (LID) team that provides on-site infectious disease consultations to CLC residents. The LID service embodies patient-centered care by bringing specialty expertise to CLC residents while facilitating collaborative relationships with the CLC staff.

### INCREASED RISKS FOR INFECTION AMONG LTCF RESIDENTS

A brief discussion of infections and antimicrobial use among LTCF residents will help clarify the need for and impact of the LID team. The reasons for increased risk of infection among older adults living in LTCFs are multifactorial. With aging comes immune senescence, which includes reduced innate and adaptive immune responses.<sup>5</sup> Immune senescence in older adults diminishes not only their responsiveness to immunizations, but also their ability to mount inflammatory symptoms typically associated with acute infection (ie, fever, pain).<sup>5</sup> Additionally, many older adults have comorbid conditions, such as diabetes mellitus, peripheral vascular disease, congestive heart failure, chronic obstructive pulmonary disease, and genitourinary disorders, which also increase risk of infection.<sup>5</sup> Last, dementia and malnutrition combine to severely impair the healing process.

Those residing in LTCFs face additional risk factors. The 2004 National Nursing Home Survey (NNHS) conducted by the Centers for Disease Control and Prevention (CDC) found that > 75% of community LTCF resi-

dents need help with at least 4, if not all 5, activities of daily living.<sup>2</sup> The LTCF environment also possesses unique characteristics. Residents share dining, bathing, bathroom, and recreational facilities, all of which increase the potential for the spread of pathogens. They also receive care by the same health care workers who, particularly when understaffed, also contribute to the transmission of infectious diseases through poor infection control practices.<sup>6,7</sup>

The risk of acquisition of antimicrobial-resistant pathogens is ever present. The 2004 NNHS also reports that within a 90-day period, nearly 7% of community nursing home residents had at least an overnight hospital admission, which may facilitate the transfer of drug-resistant organisms between acute- and long-term care institutions.<sup>2</sup> On admission to community nursing facilities, 25% of patients are colonized with methicillin-resistant *Staphylococcus aureus* (MRSA), 25% to 67% with vancomycin-resistant enterococci (VRE), and 12% to 25% with an extended-spectrum beta-lactamase (ESBL)-producing gram-negative bacillus.<sup>6,8</sup> Finally, the Ohio Department of Public Health reported that in

2006, > 50% of new cases of the 75% of recurrent episodes of *Clostridium difficile* infection afflicted residents of community LTCF.<sup>9</sup>

These findings support estimates that LTCF residents experience 3 to 7 infections per 1,000 patient-days.<sup>10</sup> Lower respiratory tract infections are most common followed by symptomatic urinary tract infections (UTIs), skin and soft tissue infections, and acute gastroenteritis.<sup>10</sup>

**OVERUSE OF ANTIMICROBIALS AMONG LTCF RESIDENTS**

Unfortunately, the number of antimicrobial prescriptions outstrips the incidence of true infections. At the LSCVAMC, GRECC clinicians evaluated 100 randomly selected antimicrobial prescriptions written by CLC providers between October 1, 2008, and March 31, 2009, using established Infectious Disease Society of America (IDSA) guidelines.<sup>11</sup> Peron and colleagues determined that 42% of antibiotic prescriptions were wholly unnecessary, and an additional 22% of antibiotic courses were too long as determined by published guidelines and expert review.<sup>11</sup> Other studies describe similar results, indicating that 25% to 75% of antibiotic prescriptions written for community LTCF residents were inappropriate.<sup>12</sup> The frequency of infections and prevalence of nosocomial pathogens coupled with the often inappropriate use of antimicrobials underscores the critical need for LTCF residents to have improved access to providers with expertise in infectious diseases.

**LONG-TERM CARE FACILITY INFECTIOUS DISEASE (LID) CONSULT SERVICE FOR CLC RESIDENTS**

The Cleveland GRECC's LID service began in July 2009 as a clinical demonstration project. Each week, an in-

**Table 1. Frequency of diagnoses among LTCF residents seen by the LID team**

Diagnosis	Frequency (%)
<i>C difficile</i> infection	14.8
No infection	14.1
Urinary tract infection	10.6
Wound/pressure ulcer	9.2
Skin/soft tissue infection	8.5
Diabetic foot infection	7.7
Endocarditis	6.3
Septic arthritis/prosthetic joint infection	5.6
Pneumonia	4.9
Bacteremia	3.5
Latent tuberculosis	3.5
Other <sup>a</sup>	11.3

<sup>a</sup>Includes bursitis, HIV, lung abscess, osteomyelitis, rash, spontaneous bacterial peritonitis, active tuberculosis, endophthalmitis, and epidural abscess.

fectious disease physician and nurse practitioner visit patients at the 160-bed CLC affiliated with the tertiary-care VA hospital. This specialized service was formed with the intent to provide continuity of care for veterans that transition from the acute to the LTCF, specifically to address some of the needs described earlier and to facilitate appropriate management of infections in the elderly. These patients comprise about 25% of the consultations.

The remaining 75% of the LID service consults come from the CLC staff, a reflection of their appreciation of advice on the management of infectious syndromes. A distinct advantage of the CLC is the familiarity of the staff with the residents. Particularly for veterans who are poor historians due to dementia or psychiatric illness, the CLC staff readily offer detailed and objective information about recent behavior, activity, appetite, and elimination patterns. The history and physical examinations performed by the LID service emphasize changes over time (eg, chronic

wounds) and function (eg, has urinary incontinence returned to baseline). Goals of therapy may include palliation rather than treatment for a cure. Residents have expressed their appreciation at being seen in their rooms and avoiding the inconvenience associated with transportation to outpatient appointments. Privacy is seldom an issue; veterans can be brought back to their rooms or will ask those nearby to step away for a few moments.

The GRECC LID service sees a wide array of clinical syndromes (Table 1).<sup>13</sup> Some of the questions are straightforward, such as recommendations for alternative preventive therapy for latent tuberculosis in a resident intolerant of isoniazid. Other queries, however, require careful clinical evaluation of the patient to determine whether antibiotics are indicated and if so, to select the appropriate agent and course. For example, the LID service often helps clinicians discern asymptomatic bacteriuria from UTIs. The patient history and physical examination,

particularly in those without urinary catheters, will usually provide sufficient information for the LID team to determine whether an infection is present. Physicians acknowledge that pyuria is common among patients with catheters. A lack of signs and symptoms localizing to the genitourinary tract and absence of pain on palpation of the bladder or the costovertebral angle supports a diagnosis of asymptomatic bacteriuria. For those with urinary catheters, information regarding the reason for and duration of the catheter also guides physicians in their evaluation. In particular, urine obtained from a collection bag or from a catheter present for more than 1 week does not represent a suitable specimen for evaluation. Finally, the LID team ascertains the initial reason for placement of the urinalysis and culture orders. Changes in urine color or odor are not appropriate reasons to suspect a UTI. In the absence of other symptoms specific to the genitourinary tract, the experience of the LID team is that neither a recent fall nor delirium supports the diagnosis of a UTI.

The most common recommendations the LID service makes to CLC providers are to reduce antimicrobial use through de-escalation, cessation of therapy, or not starting antimicrobials. The providers welcomed these recommendations and have become proponents of the prudent use of antibiotics. With the support of the LID service, the CLC staff is much more willing to engage in watchful waiting without starting antimicrobials. When antibiotic treatment seems appropriate, the LID team recommends narrow-spectrum agents, such as trimethoprim/sulfamethoxazole, nitrofurantoin, or amoxicillin rather than broad-spectrum agents, such as ciprofloxacin or piperacillin/tazobactam. Further-

more, the LID service also advocates for shorter courses of antimicrobials, including 8 days or fewer for most health care-associated pneumonias and for men with uncomplicated UTIs. The combined efforts of the LID team and the CLC staff successfully reduced total antimicrobial administration (9%;  $P < .001$ ), particularly for oral agents (21%;  $P < .001$ ) (Figure 1).<sup>14</sup> The increase in intravenous antibiotics (15%;  $P < .001$ ) likely reflects the proclivity of the LID team to treat some infections, such as osteomyelitis in foot infections from diabetes, with intravenous agents.

### CONCLUSION

The GRECC's LID team brings significant benefits to the LSCVAMC's

actively engaged in exploring telehealth as a means to share ID expertise with VA facilities without staff ID physicians.

Finally, this practice model of bringing the specialist expertise into the LTCF has the potential to be applied to other disciplines, including podiatric, heart failure, and diabetes management. However, several barriers exist to exporting the LID model to community LTCFs. At present, the most significant of these is lack of reimbursement for subspecialty care at LTCFs. As the number of people living in LTCFs rises over the next 20 years, we may see far-reaching changes in the delivery of specialty care to older adults.

In conclusion, we present a new model of subacute patient-centered

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CLC residents and medical center, epitomizing patient-centered medical care. The LID service takes advantage of resources available within its medical center to bring infectious disease (ID) expertise directly to patients. The teamwork between the LID service and the CLC staff improves resident care. Future directions for the LID service include drawing on the skills of an ID pharmacist to help review antimicrobial prescriptions at the CLC for appropriateness of treatment, using published clinical guidelines, and making recommendations to providers regarding the choice of antimicrobial agent, dose, and duration of treatment. Furthermore, the team is

care, providing close follow-up for patients too sick to return to the community but well enough to remain out of the hospital. The LID service is another demonstration that the VA's GRECC demonstrates medical leadership and develops innovations that have the potential to improve the health care system for all Americans. ●

### Acknowledgement

The authors gratefully acknowledge 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. This work was supported by the Veterans Affairs Merit Review Program, the National Institutes of Health, and the Veterans Integrated Service Network 10 Geriatric Research Education and Clinical Center.

**Author disclosures**

The authors report no actual or potential conflicts of interest with regard to this article.

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**REFERENCES**

1. National Center for Health Statistics. *Health, United States, 2010: With Special Feature on Death and Dying*. Hyattsville, MD: National Center for Health Statistics; 2011.
2. Jones AL, Dwyer LL, Bercovitz AR, Strahan GW. The National Nursing Home Survey: 2004 overview. *Vital Health Stat*. 2009;13(167):1-155.
3. U.S. Department of Veterans Affairs. Long-term care needs increase as veteran population ages. VA HSR&D Management Brief. 2000;17. Health Services Research & Development Service website. [http://www.hsrd.research.va.gov/publications/management\\_briefs](http://www.hsrd.research.va.gov/publications/management_briefs). Accessed December 16, 2011.
4. Caprio TV, Karuza J, Katz PR. Profile of physicians in the nursing home: Time perception and barriers to optimal medical practice. *J Am Med Dir Assoc*. 2009;10(2):93-97.
5. High KP, Bradley SF, Gravenstein S, et al. Clinical practice guideline for the evaluation of fever and infection in older adult residents of long-term care facilities: 2008 update by the Infectious Diseases Society of America. *Clin Infect Dis*. 2009;48(2):149-171.
6. Trick WE, Weinstein RA, DeMarais PL, et al. Comparison of routine glove use and contact-isolation precautions to prevent transmission of multidrug-resistant bacteria in a long-term care facility. *J Am Geriatr Soc*. 2004;52(12):2003-2009.
7. Loeb MB, Craven S, McGeer AJ, et al. Risk factors for resistance to antimicrobial agents among nursing home residents. *Am J Epidemiol*. 2003;157(1):40-47.
8. Bradley SF. Issues in the management of resistant bacteria in long-term-care facilities. *Infect Control Hosp Epidemiol*. 1999;20(5):362-366.
9. Campbell RJ, Giljahn L, Machesky K, et al. Clostridium difficile infection in Ohio hospitals and nursing homes during 2006. *Infect Control Hosp Epidemiol*. 2009;30(6):526-533.
10. Strausbaugh LJ, Joseph CL. The burden of infection in long-term care. *Infect Control Hosp Epidemiol*. 2000;21(10):674-679.
11. Peron EP, Hirsch AA, Jump RLP, Donskey CJ. Don't let the steward sail without us: High rate of unnecessary antimicrobial use in long-term care facility. In: Proceedings from the 50th Interscience Conference on Antimicrobial Agents and Chemotherapy (ICAAC); September 12-15, 2010; Boston, MA. Abstract K-943.
12. Nicolle LE, Bentley DW, Garibaldi R, Neuhaus EG, Smith PW. Antimicrobial use in long-term-care facilities. The Society for Healthcare Epidemiology of America Long-Term Care Committee. *Infect Control Hosp Epidemiol*. 2000;21(8):537-545.
13. Jump RLP, Jury LA, Donskey CJ, Gerardo P, Bonomo RA. On-site infectious disease consultation service at a VA community living center: Answering an unanticipated need with unexpected cost savings. In: Proceedings from The Society for Healthcare Epidemiology of America Fifth Decennial International Conference on Healthcare-Associated Infections; March 18-22, 2010; Atlanta, GA. Abstract 477.
14. Jump RLP, Jury LA, Peron EP, et al. Steering the stewardShip: Reducing antibiotic use in a VA long-term care facility through an on-site infectious disease consultation service. In: Proceedings from The Society for Healthcare Epidemiology of America 21st Annual Scientific Meeting; April 1-4, 2011; Dallas, TX. Abstract 399.

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