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Improving Patient Safety Through Antibiotic Stewardship: The Veterans Health Administration Leads the Way, Again

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The Veterans Health Administration (VHA) has demonstrated national leadership in infection control, achieving impressive reductions in methicillin-resistant *Staphylococcus aureus*[1] and *Clostridium difficile* infection.[2] Now the VHA has done it again, this time for antibiotic stewardship.

The critical importance of improving antibiotic use is not a subject of debate. The United Nations discussed antibiotic use and resistance during its General Assembly meeting in September 2015; it was only the fourth time that the full General Assembly has discussed a health issue.[3] In 2014, the United States issued a National Strategy and National Action Plan for Combating Antibiotic Resistant Bacteria. These documents lay out aggressive efforts to stem the tide of antibiotic resistance, and they feature improved antibiotic use as a core approach.[4]

For too long, however, antibiotic stewardship has been viewed as a means to promote a societal good—the reduction of resistance. While the societal good from reducing antibiotic resistance is both real and important, the discussion loses sight of the fact that improving antibiotic use through stewardship has benefits to individual patients at the point of care. Published studies demonstrate that hospital-based antibiotic stewardship programs protect patients from *Clostridium difficile* infections, adverse drug events, and antibiotic-resistant superinfections during a hospital stay.[5] Most importantly, in an era of antibiotic resistance and a patient population that is sicker and more complex than ever, antibiotic stewardship programs can help providers choose the optimal treatments to improve the chance of a cure.[6]

To support improvements in hospital antibiotic use, the US Action Plan[6] calls for all acute-care hospitals to have antibiotic stewardship programs by 2020. With the current level of implementation at ~50%,[7] there is clearly much to be done. This issue of *Infection Control and Healthcare Epidemiology* features an article by Kelly et al[8] that summarizes the VHA's efforts to expand and improve antibiotic stewardship and that offers several important lessons.

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The VHA journey began in 2010 with an Antimicrobial Stewardship Initiative and creation of a task force to help drive implementation. Although several hospitals already had programs, the VHA recognized that the safe and effective use of antibiotics was critical in all hospitals, irrespective of size or patient mix. In subsequent years, VHA took additional policy actions, beginning with a statement encouraging creation of stewardship programs from the VA Under Secretary for Health Information in 2012. Within 2 years, antibiotic stewardship was escalated to a directive requiring all VHA hospitals to have local stewardship champions and policies and to evaluate the performance of their programs by January 2015.

Recognizing that policies must be paired with implementation support, the task force provided training and resources that drew heavily from existing expertise and documents, like policies and order sets. Because improvements cannot be effected or assessed without measurement, the VHA established systemwide measures of stewardship program implementation and antibiotic use, paired with "balancing measures" of readmissions and mortality.

The results of their efforts are impressive. In 2015, 89% of VHA hospitals had a defined stewardship team, up from 41% in 2011, and 92% of VHA hospitals had a written stewardship policy, up from just 17% in 2011. Implementation of proven stewardship practices increased significantly. For example, between 2011 and 2015, the percentage of hospitals with prior approval procedures increased from 56% to 87% and the percentage of hospitals using postprescription review procedures increased dramatically from 8% to 71%. Overall antibiotic use, measured in days of therapy per 1,000 bed days of care, dropped by 12% between 2008 and 2015. This decrease occurred despite an increase in the number of total hospital discharges related to infectious diseases as measured by diagnosis-related groups. Rates of *C. difficile* infection also dropped significantly during this time, although, as the authors point out, this finding is confounded by a concomitant VHA *C. difficile* prevention program, of which stewardship was an important intervention. Most importantly, the interventions appeared to be safe: readmission and mortality rates since the start of the stewardship initiative have declined in the VHA.

The VHA experience offers important lessons. First, it demonstrates the importance of leadership commitment in effecting change. The authors emphasize that support for antibiotic stewardship came from the very highest levels of leadership, and in various forms, from open letters to practice directives. The importance of leadership support is highlighted as the first of the CDC's 7 "Core Elements of Hospital Antibiotic Stewardship Programs."[9] An assessment of implementation of the core elements demonstrated that hospitals with leadership support were significantly more likely to report implementation of the other 6 elements,[10] a finding supported by the VHA experience.

The VHA report also demonstrates the importance of clinical pharmacists to the success of stewardship programs, as clinical pharmacists were often the "stewardship champions." The CDC core elements also emphasize the importance of pharmacy leadership. Also, like the CDC core elements, the VHA made education, reporting, and action key parts of their stewardship initiative. The alignment between the VHA initiative and the CDC's Core

Elements is not a coincidence; VHA stewardship experts provided advice based on their experiences as the CDC was developing the Core Elements.

For a measurement strategy, the VHA chose days of therapy measured by doses administered, which is the same metric the CDC is using in the Antimicrobial Use Option of the National Healthcare Network (NHSN). This metric is the most accurate measure of antibiotic use because it reflects what is actually given to patients, and it has the added advantage of being applicable to pediatric populations. A key test of any outcome measure is whether it moves in the expected direction following implementation of process improvements. Days of therapy administered per 1,000 patient days has now passed this test in a large, multicenter evaluation.

Finally, this article demonstrates the power of combining centralized support with local implementation experience. This approach efficiently uses expertise as it does not have to be replicated in all locations, and it permits flexibility for hospitals to design programs that best meet their needs. This model has direct applicability to the ever-growing number of hospital systems in the United States and is already being used by some of the largest systems: Ascension Healthcare, The Hospital Corporation of America, Intermountain Healthcare and Carolinas HealthCare System. For example, at Carolinas HealthCare System (CHS), a stewardship network in 6 hospitals was formed in 2013. Supported by systemwide stewardship goals endorsed by leadership, a centralized stewardship team provides support, education, and data to each facility. CHS uses a system of shared stewardship pharmacists across facilities, linked by a common EMR, to provide daily stewardship activities at each facility. This system of centralized support with local implementation allowed for rapid expansion to 12 facilities by 2015, which otherwise would not have been able to support stewardship programs. CHS has reduced antibiotic utilization by 25% over 3 years, with a clinician recommendation acceptance rate of 87%. Variations of the centralized support models are being replicated in states like Alaska, Colorado, and Nevada, where programs supported by state hospital associations, engagement and quality improvement networks, and health departments are providing centralized stewardship expertise and support to any hospital that wishes to participate. As CDC support for state health department efforts to improve antibiotic use expands, these types of statewide efforts are likely to grow.

Some of the challenges encountered by the VHA are shared by all hospitals working to improve stewardship programs. While centralized support is clearly critical, the authors show that data, information technology (IT) tools, and limited support from infectious disease physicians remain ongoing hurdles in many facilities. Obtaining antibiotic use “data for action” remains a challenge. The VHA overcame this by using a centralized data warehouse. Other hospitals might be able to address this by enrolling in the Antibiotic Use Option of the NHSN, which provides real-time data on antibiotic use, along with benchmarking capabilities, even though some IT barriers must be addressed prior to enrollment. Finally, one assumes that the improvements in antibiotic use were not uniform across all VHA hospitals. A better understanding of variations in stewardship implementation will be important in making programs more effective.

Supporting optimal antibiotic use improves patient outcomes and protects patients from harm. Thus, antibiotic stewardship must be thought of as a patient safety endeavor, focused on individual patients with ancillary benefits to the larger population. The article by Kelly et al[8] provides an excellent example of how we can implement stewardship programs, and it supports the approaches outlined in the CDC core elements. But the VHA's work in this area is far from done. They are now working with the CDC to advance the science of using antibiotic use data to guide action. VHA hospitals are already the largest group reporting antibiotic use data to the NHSN, and the VHA has committed to bringing all hospitals online for antibiotic use reporting and to reporting antibiotic resistance data. The VHA is blazing a trail to improve patient safety through better antibiotic use. It's time for us to follow their lead.

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REFERENCES

1. Jain R, Kralovic SM, Evans ME, et al. Veterans Affairs initiative to prevent methicillin-resistant *Staphylococcus aureus* infections. N Engl J Med 2011;364:1419–1430. [PubMed: 21488764]
2. Evans ME, Kralovic SM, Simbartl LA, et al. Effect of a Clostridium difficile infection prevention initiative in Veterans Affairs acute care facilities. Infect Control Hosp Epidemiol 2016;37:720–722. [PubMed: 26864803]
3. UN meeting tackles the 'fundamental threat' of antibiotic-resistant superbugs. The Guardian website. https://www.theguardian.com/society/2016/sep/20/un-declaration-antibiotic-drug-resistance. Published September 20, 2016. Accessed December 27, 2016.
4. Presidential Advisory Council on Combating Antibiotic-Resistant Bacteria (PACCARB). US Health and Human Services website. https://www.hhs.gov/ash/advisory-committees/paccarb/index.html?language=es#. Updated 2016. Accessed December 27, 2016.
5. Dellit TH, Owens RC, McGowan JE Jr, et al. Infectious Diseases Society of America and the Society for Healthcare Epidemiology of America guidelines for developing an institutional program to enhance antimicrobial stewardship. Clin Infect Dis 2007;44:159–177. [PubMed: 17173212]
6. Gross R, Morgan AS, Kinky DE, et al. Impact of a hospital-based antimicrobial management program on clinical and economic outcomes. Clin Infect Dis 2001;33:289–295. [PubMed: 11438891]
7. Patient safety atlas. Centers for Disease Control and Prevention website. https://www.cdc.gov/hai/surveillance/ar-patient-safety-atlas.html. Updated 2016. Accessed December 27, 2016.
8. Kelly AA, Jones MM, Echevarria KL, et al. A report of the efforts of the Veterans Health Administration National Antimicrobial Stewardship Initiative. Infect Control Hosp Epidemiol 2017;38:513–520. [PubMed: 28118861]
9. Core elements of hospital antibiotic stewardship programs. Centers for Disease Control and Prevention website. https://www.cdc.gov/getsmart/healthcare/implementation/core-elements.html. Updated 2016. Accessed December 27, 2016.
10. Pollack LA, van Santen KL, Weiner LM, et al. Antibiotic stewardship programs in US acute care hospitals: findings from the 2014 National Healthcare Safety Network Annual Hospital Survey. Clin Infect Dis 2016;63:443–449. [PubMed: 27199462]