



Fig. 1.

partners, we recruited 11 facilities to participate and worked with 5 servicing pharmacies to obtain a complete dataset for 6 LTCFs. For the facilities evaluated, there were a total of 4,654 antibiotic prescriptions. The most commonly prescribed antibiotic categories were fluoroquinolones (24.3% of prescriptions) and oral  $\beta$ -lactams (17.8% of prescriptions). The third most commonly prescribed antibiotics were agents utilized against methicillin-resistant *Staphylococcus aureus* (MRSA) (13.7% of prescriptions). Antibiotic duration ranged from 1 to 304 days of therapy. **Conclusions:** Working directly with servicing pharmacies is an efficient way to obtain antibiotic prescribing data for LTCFs. During the 1-year period evaluated, antibiotic prescription rates varied between LTCFs. Despite numerous warnings, the fluoroquinolone class continue to be among the most commonly prescribed antibiotics. Visualizing trends in LTCFs antibiotic data is an optimal way to develop and enhance antimicrobial stewardship programs in LTCFs. This fundamental information can help identify areas in which a facility can focus their stewardship efforts and provide a baseline for monitoring progress over time.

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#### Antimicrobial Stewardship Programs and Antibiotic Usage and Resistance in Department of Veterans' Affairs Medical Centers

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**Background:** Implementation of antimicrobial stewardship programs (ASPs) in acute-care facilities may optimize antibiotic use and decrease antibiotic resistance. To explore the relationship between ASPs and clinical outcomes, we reviewed bivariate relationships between VA Medical Center (VAMC) complexity level and presence of an ASP, presence of an ASP and inpatient antibiotic use, and antibiotic use and antibiotic resistance or *Clostridioides difficile* infection (CDI). **Methods:** We conducted a cross-sectional study of national data using the following elements: a detailed survey of antimicrobial stewardship practices at VAMCs in 2012 which included facility complexity designations; data from the VA national Electronic Health Record (EHR) for inpatient antibiotic use (2009–2012 in days of therapy per 1,000 bed days of care); EHR laboratory data in 2013 for antibiotic resistance in *E. coli* isolates; and 2013 CDI rate data from the VA Inpatient Evaluation Center. These data were reviewed for assessment of the presence of ASPs and for antibiotic use and resistance. We assessed 4 groups of antibiotics for use and resistance: total antibiotics, fluoroquinolones, cephalosporins, and carbapenems. Categorical, *t* test, or nonparametric analyses were performed, as appropriate. **Results:** 120 VAMCs were evaluated; 71% had ASPs. Proportions of VAMCs with ASPs were not significantly different by facility complexity level. Differences were observed between presence or absence of ASP and some antibiotic use groups (Table). Presence or absence of an ASP was not statistically associated with a difference in *E. coli* resistance (any antibiotic group examined) or CDI rates. In addition, antibiotic use (any group) did not statistically associate with *E. coli* resistance rates, and this result remained unchanged when stratified by presence or absence of an ASP. **Conclusions:** Total antibiotic use and fluoroquinolone use were lower among facilities with ASPs than without, a finding consistent with ASP implementation reducing the amount of antibiotics prescribed. Although we did not find an association between facilities with an ASP and antibiotic resistance or CDI rates in this preliminary review, it sets the stage for future multivariate analyses. Furthermore, given the years of antibiotic use needed for development of resistance, the limited years evaluated may not have been sufficient to determine an impact, highlighting the need for further research into understanding clinical outcomes.

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Table 1.

Association of presence or absence of an Antimicrobial Stewardship Program (ASP) with inpatient antibiotic use in VA facilities from 2009–2012

ASP	Number of Facilities (N=120)	Antibiotic Use [Days of Therapy/1000 Bed Days of Care]			
		Total Antibiotics	Fluoroquinolone	Cephalosporin	Carbapenem
Yes	85	616.7 (86.9)	98.9 (42.5)	108.6 (29.7)	21.7 (13.2)
No	35	662.1 (107.4)	131.8 (48.0)	117.3 (27.0)	23.6 (16.7)
P-value (t-test)		<b>0.02</b>	<b>0.0003</b>	0.14	0.49