can easily increase its accuracy. **Methods:** Biofilm formation was examined by the method with CRA test. On CRA, slime-producing strains formed black colonies, whereas nonproducing strains developed red colonies in 6 kinds of colors, from very red to very black: very red, red, burgundy, almost black, black, and very black. Antimicrobial susceptibility testing was performed by disc diffusion or the E-test method according to the current guidelines of the EUCAST. The MRSA, and MLSB phenotypes were detected. Polymerase chain reaction (PCR) was used to detect the *mec*A, and *mup*A genes. Erythromycin resistance genes (*erm*A, *erm*B, *erm*C, and msr) were detected by multiplex PCR. **Results:** A positive result of the CRA test was accomplished in 66.2% cases; significantly more often in hospital strains (73.4% vs 45.4%; OR, 3.3; 55% CI, 1.2–9.3). Moreover, 73.4% isolates were fully susceptible. In hospitalized patients, the level of resistance to at least 1 antimicrobial category has been identified as 40.9%, and this rate was 27.2% in outpatients. Among the tested strains, 5 (6.0%) had the resistance phenotype MRSA and 22 (26.5%) the resistance phenotype MLSB; 4 strains manifested both mechanisms; erythromycin resistance was 25.3% in those resistant to fluoroquinolones. Resistance to fluoroquinolones was 5 times more often found in ambulatory patients. All of the tested isolates were vancomycin sensitive. **Conclusions:** Biofilm formation is an important risk factor for developmental staphylococcal hospital-acquired ocular infections. Our results prove that hospital strains have demonstrated much greater biofilm-forming ability than nonhospital strains. Studies indicate the high efficacy of chloramphenicol and fluoroquinolones treatments, as well as the need to implement new solutions due to the aforementioned bacteria's high resistance to neomycin and anatomic barriers difficulties.

Antimicrobial-Resistant Organism Outbreak in a Skilled Nursing Facility in Pennsylvania, 2019
Julie Paoline, Pennsylvania Department of Health; Michel Masters, Montgomery County Office of Public Health; Feba Cheriyan, Montgomery County Office of Public Health; Cara Bicking Kinsey, Pennsylvania Department of Health

Background: In April 2019, the Montgomery County Office of Public Health (MCOPH) was notified by the Pennsylvania Department of Health (PADOH) of a tier 2 carbapenemase mechanism in a resident of a Pennsylvania skilled nursing facility that was detected through targeted surveillance. Production of the New Delhi metallo-β-lactamase (NDM) carbapenemase was detected using polymerase chain reaction (PCR). The initial follow-up revealed that the patient resided at a 148-bed skilled nursing facility that specializes in spinal cord injury, neurological diseases, ventilator dependence, and pulmonary diseases. MCOPH and PADOH initiated an investigation to identify additional cases and prevent transmission. **Methods:** Over a series of 9 point-prevalence surveys, we collected 518 specimens for colonization screening. Screening was conducted on the wing of the index case and was later expanded to include the entire unit (n = 90), after evidence of transmission was noted. Perirectal swabs were submitted to the regional antibiotic resistance laboratory for testing using the Cepheid GeneXpert Carba-R assay. Together with screening, MCOPH and PADOH conducted a series of on-site visits involving the completion of the CDC infection control assessment and response (ICAR) tool and direct care observations, including 409 hand hygiene observations. **Results:** In addition to NDM, *Klebsiella pneumoniae* carbapenemase (KPC) and Verona integron-encoded metallo-β-lactamase (VIM) were also detected. ICAR results and direct care observations revealed numerous deficiencies in the domains of hand hygiene, personal protective equipment, and environmental cleaning. In addition to 2 cases of carbapenemase-producing organisms (CPO) being detected through clinical specimens, an additional 27 CPO cases were identified through screening coordinated by public health. This large, multimechanism outbreak is attributed to a combination of intrafacility transmission and imported cases. Based on these findings, recommendations for infection prevention and control were provided on site and in writing. Our continued work with this facility lead to improvements in infection control, including a HH success rate improvement of 53%. **Conclusions:** Novel or targeted multidrug-resistant organisms are effectively contained when healthcare facilities and state and local public health work together to reduce transmission to baseline and to improve infection control practices.

Antimicrobial Stewardship Approach: Strategy to Enhance Antimicrobial Stewardship Programs in Arizona Long-Term Care
Juan Villanueva, Arizona Department of Health Services; David Nix, University of Arizona College of Pharmacy; Rachana Bhattarai, Arizona Department of Health Services; Kenneth Komatsu, Arizona Department of Health Services; Elizabeth Kim, Arizona Department of Health Services

Background: Implementing robust antimicrobial stewardship programs within long-term care facilities (LTCFs) presents unique challenges not typically seen in other healthcare settings. These facilities tend to care for older adults, rely on limited on-site clinician availability and experience higher-than-normal staff turnover. Many LTCFs lack the resources and expertise to track and analyze antibiotics usage. Through a collaborative effort between the Arizona Department of Health Services and the University of Arizona College of Pharmacy, support for carrying out stewardship activities was provided to these healthcare facilities. Our objective was to assess the viability of using pharmacy prescribing data to evaluate antibiotics usage among LTCFs throughout Arizona to assist in development of antimicrobial stewardship interventions. **Methods:** We invited interested LTCFs to participate in the development and enhancement of antimicrobial stewardship programs. We analyzed antibiotic prescribing data from November 2017 through November 2018 to assess the types and quantities of antibiotics prescribed. We worked with pharmacies to obtain a deidentified dataset that included unique patient identifiers, transaction (start) date, agent name, directions for use, route of administration, quantity dispensed, and stop dates. We estimated duration of treatment by assessing antibiotic starts using the number of transaction dates and unique patient identifiers for repeat prescriptions. Each agent was evaluated individually and assigned to an antibiotic category to better assess cumulative prescribing. **Results:** Through assistance from our community
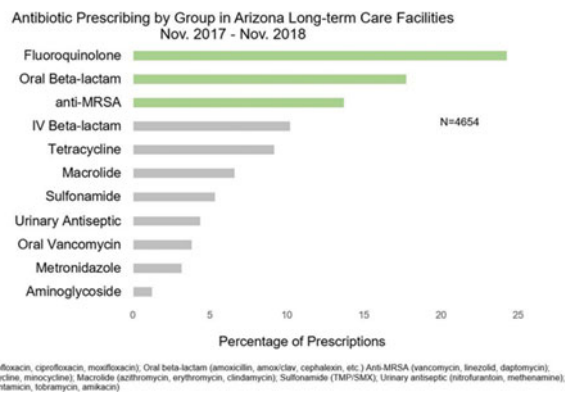
Antibiotic Prescribing by Group in Arizona Long-term Care Facilities Nov. 2017 - Nov. 2018

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 fluroquinolones (24.3% of prescriptions) and oral β-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 fluroquinolone 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.

Presentation Type:
Poster Presentation
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 fluroquinolone 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.

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] Mean (SD)			
		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)		0.02	0.0003	0.14	0.49