2019. Are Changes in Antimicrobial Use Associated with a Decline in Hospital Pathogen Rates in Veterans Affairs Medical Centers?

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**Session:** 240. Antibiotic Stewardship: Regional
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**Background.** The relationship between antimicrobial use and resistance is complex, making it difficult to understand and predict the impact of antimicrobial policies. Here, we examine trends of antimicrobial pressure and pathogen rates using novel metrics.

**Methods.** Data were extracted from 2007 through 2016. Generalized estimating equation (GEE) negative binomial regression modeled incident (within a year) hospital-onset (HO) pathogen rates, defined as the number of unique positive isolates between hospital day 3 and discharge, offset by patient-days at risk (eliminating the first 2 hospital days from the denominator, etc.). As predictors, we used pathogen-specific AM pressure metrics, summing the selection pressure of each AM regimen, given to a patient in a day, for and against the pathogen by each facility and year (e.g., if a regimen was 70% active by antibiogram then 0.7 was counted as selection against and 0.3 for the pathogen; different regimens would contribute differently). We also adjusted for facility complexity index and pathogen admission prevalence. Significant negative associations with AM pressure trends against pathogens suggest that (a) AM resistance among pathogens is decreasing, (b) it causes a decrease in infection rates, or (c) both. While residual confounding and endogeneity still exist, our findings highlight the possibility that new metrics might better predict AM effects, including potential protective effects of some patterns of AM use. It is also notable that the measured associations were not large enough nor AM pressure trends consistent enough to explain the decreases in HO-pathogen rates. This suggests that other factors not measured in this analysis, including infection prevention, likely played a large role in observed trends. Interpretation of these results should be nuanced; we are not advocating broad-spectrum AM use.

**Results.** There was a broad decrease in adjusted hospital pathogen rates. The negative association with selection pressure against pathogens suggests that (a) AM resistance among pathogens is decreasing, (b) it causes a decrease in infection rates, or (c) both. AM pressure trends were variable (Table 1 and Figure 2). Figure 3 demonstrates the trend of the log ratio of AM pressure for and against pathogens. Significant negative associations with AM pressure against 5 pathogens and for 1 were observed (Table 1).

**Conclusion.** There was a broad decrease in adjusted hospital pathogen rates. The negative association with selection pressure against pathogens suggests that (a) AM resistance among pathogens is decreasing, (b) it causes a decrease in infection rates, or (c) both. While residual confounding and endogeneity still exist, our findings highlight the possibility that new metrics might better predict AM effects, including potential protective effects of some patterns of AM use. It is also notable that the measured associations were not large enough nor AM pressure trends consistent enough to explain the decreases in HO-pathogen rates. This suggests that other factors not measured in this analysis, including infection prevention, likely played a large role in observed trends. Interpretation of these results should be nuanced; we are not advocating broad-spectrum AM use.

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to 59% (2017). By the end of 2017, TASP CAH also succeeded in implementing individual CES to a greater degree than did non-TASP CAH (Table 1).

**Conclusion.** TASP CAH reported more successful implementation of CES than did non-TASP CAH. Improved CES implementation in TASP CAH may in part be due to differences in baseline hospital characteristics; however, expertise and support provided by UW TASP likely contributed. The use of telehealth mentoring increased antimicrobial stewardship in this resource-limited setting.

| Table 1: Percent of Washington Critical Access Hospitals Reporting CDC Core Elements of Stewardship by Year and Participation in Tele-Antimicrobial Stewardship Program (TASP) |
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| Core Elements of Stewardship | Total Overall Percent Increase | Total Percent of CES Implementing | 2015 | 2016 | 2017 |
| TASP CAH (n=17) | 60% | 59% | 76% | 94% |
| Leadership | 89% | 53% | 88% | 100% |
| Accountability | 42% | 73% | 94% | 94% |
| Drug Utilization | 14% | 82% | 82% | 94% |
| Action | 45% | 65% | 88% | 94% |
| Track | 25% | 71% | 88% | 86% |
| Report | 114% | 45% | 73% | 88% |
| Educate | 0% | 26% | 59% | 76% |
| Non-TASP CAH (n=22) | 64% | 50% | 68% | 82% |
| Leadership | 58% | 55% | 82% | 86% |
| Accountability | 5% | 91% | 91% | 95% |
| Drug Utilization | 5% | 86% | 91% | 91% |
| Action | 31% | 73% | 91% | 95% |
| Track | 0% | 91% | 95% | 99% |
| Report | 55% | 50% | 64% | 77% |
| Educate | 0% | 26% | 42% | 59% |

**Figure 1: Percent of Washington Critical Access Hospitals Reporting Implementation of All 7 Core Elements of Stewardship by Participation in Tele-Antimicrobial Stewardship Program 2015-2017**

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2009. Prescribing of Antibiotics by Provider Type Across the Veterans Health Administration (VHA), 2015–2017

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**Background.** Antibiotic stewardship frequently targets high prescribing providers. Our objective was to determine differences by provider type in antibiotic prescribing rates, high prescribing and trends over time.

**Methods.** Cross-sectional study in 2015–2017 of non-trainee dental and medical providers actively practicing (defined as ≥20 VHA visits). Medical providers included all physicians and advanced practice providers (APP). Antibiotics prescribed within 7 days of a visit were included. "High prescribing" was defined as providers with visit-based rates ≥75th percentile. Chi square assessed differences in the frequency of high prescribing. Poisson and logistic regression were applied; models were clustered within the facility.

**Results.** At 130 VHA facilities, there were 32,000 unique medical providers and 1,300 dentists actively practicing/year. From 2015–2017, overall antibiotic prescribing rates decreased by 6.4% (P < 0.001 for trend); decreasing by 1.8% for dentists (P < 0.001) and 6.6% for all medical providers (P < 0.001). More antibiotics were prescribed/visit among dentists vs. medical providers (6.7 vs. 4.3/100 visits; IRR = 1.7). Among medical providers, APP had higher rates (5.0 vs. 4.1/100 visits; P < 0.001). Among dentists, specialty dentists had higher rates compared with general dentists (7.6 vs. 6.5/100 visits; P < 0.001), increasing by 1.9% for specialty dentists and decreasing by 3.1% for general dentists. At the facility-level, dentists who were high prescribers (< 75th percentile) of antibiotics were at different facilities as medical providers who were high prescribers (P < 0.001). However, there was no difference in the odds of being a high antibiotic prescriber for dentists when compared with medical providers. Specialty dentists (OR = 1.7; 95% CI: 1.4–2.1) had higher odds of being high prescribers when compared with general dentists. There was no difference among the type of medical provider.

**Conclusion.** As compared with physicians, dentists and APP have higher antibiotic prescribing rates, though antibiotic prescribing may differ based on the frequency of infection-related visits. Facility-level interventions to curb the high use of antibiotics may not be reaching high prescribing dentists. Stewardship should be targeted to non-physician providers.

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