

Conclusion. AF use increased significantly over the study period, with changes across agents and classes. Most AF use occurred in the absence of administratively documented infection and was more common among SOT and HM patients.

Disclosures. All Authors: No reported disclosures

145. Comparing Antibiotic Use Across Inpatient Facilities with Different Antibiotic Stewardship Typologies using Machine Learning and Joint Modeling Approach

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Session: P-09. Antimicrobial Stewardship: Trends in Antimicrobial Prescribing

Background. Hospital antibiotic stewardship programs (ASP) aim to promote the appropriate use of antimicrobials (including antibiotics) and play a critical role in controlling antibiotic costs and antibiotic-resistant bacterial infection risk, and improving patient outcomes. However, unlike other health care quality improvement intervention programs, the ASP implementation strategies vary among healthcare facilities, and little is known about whether different types of ASP implementation will lead to the shifting of antibiotic drug use from one class to another.

Methods. We proposed an analytical framework using unsupervised machine learning and joint model approach to 1) develop a typology of ASP strategies in facilities from the Veterans Health Administration, America's largest integrated health care system; and 2) simultaneously evaluate the impacts of different ASP types on the annual antibiotic use rates across multiple drug classes. The unsupervised machine learning method was used to leverage the structural components in the surveys conducted by the Veteran Affairs (VA) Healthcare Analysis and Information group and the Consolidated Framework for Implementation Research experts from Boston University, and reveal the underlying ASP patterns in the VA facilities in 2016.

Results. We identified 4 groups in the VA facilities in terms of enthusiasm and implementation level of antibiotic control in our ASP typology. We found the facilities with high implementation level and high enthusiasm in ASP and those with high implementation level but low enthusiasm had statistically significant 30% (p-value=0.002) and 22% (p-value=0.031) lower antibiotic use rates in broad-spectrum agents used for community infections, respectively than those with low implementation level and low enthusiasm. However, the facilities with high implementation and high enthusiasm also marginally increased antibiotic use rates in beta-lactam antibiotics (p-value=0.096).

Conclusion. The developed analytical framework in the study provided an approach to the granular assessment of the impact of the healthcare intervention programs and might be informative for future health service policy development.

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146. Predictors of Long Duration Antibiotic Therapy for Urinary Tract Infections and Community-Acquired Pneumonia in Pediatric Ambulatory Care Settings

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Session: P-09. Antimicrobial Stewardship: Trends in Antimicrobial Prescribing

Background. Significant variation exists in the duration of antibiotic therapy for children in ambulatory care settings. Understanding drivers of variation for common conditions such as community-acquired pneumonia (CAP) and urinary tract infection (UTI) is important to informing antimicrobial stewardship interventions.

Methods. A retrospective observational study was conducted of patients with CAP and UTI seen in outpatient clinics or discharged from the emergency room (ER) of a tertiary care children's hospital network from 2016 - 2019. Diagnoses CAP and UTI were identified via ICD-10 coding. Only oral medications ordered for ≥ 3 and < 28 days were included. Multivariable logistic regression was performed to identify predictors of long antibiotic duration (defined as ≥ 10 days). Potential non-clinical drivers of longer duration included race, ethnicity, sex, primary language, and insurance status.

Results. A total of 2,104 prescriptions for CAP from 442 prescribers and 1,070 prescriptions for UTI from 314 prescribers were included. Antibiotic durations were ≥ 10 days in 59.9% and 47.6% of prescriptions for CAP and UTI, respectively. Long duration of therapy was more common in children discharged from the ER when compared to clinics for both CAP (OR 1.795, 95% CI: 1.107 - 2.929), and UTI (OR 5.149, 95% CI: 1.933 - 16.373). The proportion of patients with long duration of therapy increased with younger age for both diagnoses and decreased overall in the final year of the study. Race, gender, ethnicity, and primary language were not associated with prolonged duration of therapy. However, patients with Medicaid insurance were more likely to receive long duration of therapy for CAP (OR 1.337, 95% CI: 1.062 - 1.682) and UTI (1.654, 95%, CI: 1.181 - 2.325).

Predictors of Antibiotic Duration ≥ 10 days		
Predictor	UTI OR (95% CI)	CAP OR (95% CI)
Convenient Care vs. Clinic	2.245 (0.765 - 7.657)	0.875 (0.511 - 1.507)
Emergency Medicine vs. Clinic	5.149 (1.933 - 16.373)	1.795 (1.107 - 2.929)
Age: Infant vs. Adolescent	4.997 (2.968 - 8.589)	7.821 (5.122 - 12.104)
Age: Toddler vs. Adolescent	4.334 (2.719 - 7.069)	3.037 (2.181 - 4.257)
Age: Child vs. Adolescent	2.320 (1.460 - 3.769)	1.500 (1.067 - 2.122)
Race: White vs. Asian	2.011 (0.992 - 4.139)	0.995 (0.650 - 1.522)
Race: Black vs. Asian	1.369 (0.660 - 2.866)	1.515 (0.970 - 2.362)
Race: Other vs. Asian	1.449 (0.657 - 3.239)	0.948 (0.583 - 1.536)
Sex: Male vs. Female	1.306 (0.910 - 1.880)	1.049 (0.869 - 1.265)
Language: Non-English vs. English	0.801 (0.588 - 1.090)	1.024 (0.800 - 1.313)
Ethnicity: Non-Hispanic/Latino vs. Hispanic/Latino	1.315 (0.776 - 2.232)	0.838 (0.597 - 1.175)
Insurance Status: Medicaid vs. Non-Medicaid	1.654 (1.181 - 2.325)	1.337 (1.062 - 1.682)
Year: 2017 vs. 2016	0.805 (0.559 - 1.156)	0.893 (0.679 - 1.173)
Year: 2018 vs. 2016	0.579 (0.401 - 0.834)	1.233 (0.94 - 1.620)
Year: 2019 vs. 2016	0.550 (0.377 - 0.801)	0.733 (0.565 - 0.950)

Conclusion. In pediatric patients in ambulatory care settings, younger age, care in the ER, and being insured through Medicaid were independently associated with prolonged duration of therapy for both UTI and CAP.

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147. Antibiotic Prescribing: Shorter is Also Better in the Emergency Department

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appropriate vs inappropriate prescribing

Session: P-09. Antimicrobial Stewardship: Trends in Antimicrobial Prescribing

Background. Published information suggests room for improvement in antibiotics prescribed on discharge from the emergency department (ED). The objective of this study was to evaluate antibiotic prescribing in the ED for uncomplicated infections of the lower respiratory tract (LRTI), urinary tract (UTI), and skin and skin structure (SSTI).

Methods. IRB-approved retrospective cross-sectional study of patients discharged from the ED from January to June 2019 at 6 locations. Inclusion: ≥ 18 years old and uncomplicated LRTI, UTI, or SSTI. Exclusion: hospital admission. Appropriate prescribing was defined having all three of the following correct per local and national guidelines: antibiotic selection, dose, and duration. Correct duration: 5 days for LRTI and SSTI; 3 days for trimethoprim-sulfamethoxazole (TMP-SMX), 5 days for nitrofurantoin (NFT), and 7 days for beta-lactams for UTIs. Endpoints within 7 days: antibiotic escalation, readmission to ED or hospital, any outpatient contact, and report of adverse drug event (ADE). Endpoints within 90 days: *Clostridioides difficile* infection (CDI). Descriptive and bivariable statistics were performed.

Results. Inappropriate prescribing: 77% (304) vs. appropriate 23% (89). Infection type: 47.8% SSTI, 30% UTI, and 22.1% LRTI. SSTI was associated with the greatest proportion of inappropriate prescribing at 89.4% (Figure 1). Comparisons for inappropriate vs. appropriate groups: 15.8% vs. 22.5% for beta-lactam allergy and 23.4% vs. 19.1% for cultures drawn in ED. Most common antibiotics for inappropriate vs. appropriate: first generation cephalosporin at 70.1% vs. 7.3% (p< 0.05), TMP-SMX at 14.3% vs. 12.2% (p=0.75), and NFT at 7.8% vs. 65.9% (p< 0.05). Prescriptions considered inappropriate were primarily driven by excess duration (Figure 2). Endpoints for inappropriate vs. appropriate groups: antibiotic escalation at 6.6% (2.8% were due to cultures drawn in the ED) vs. 1.1% (p=0.06), readmission at 8.6% vs. 9.0% (p=0.9), any outpatient contact at 18.4% vs. 19.1% (p=0.89), and report of ADE at 1.3% vs. 1.1%. No CDI in either group.

Figure 1. Appropriateness of Discharge Prescriptions by Infection Type, N = 393

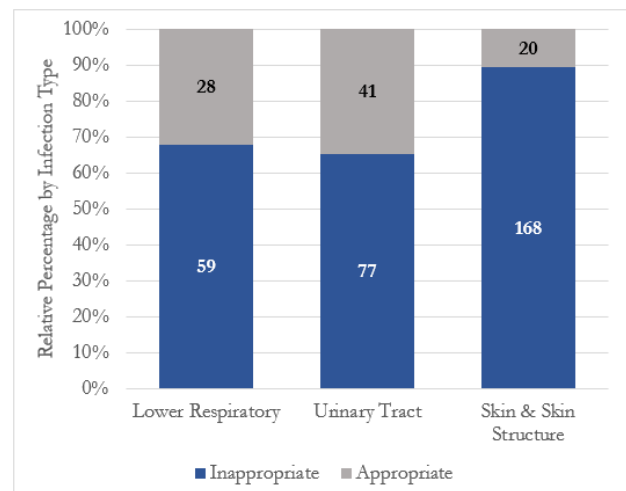
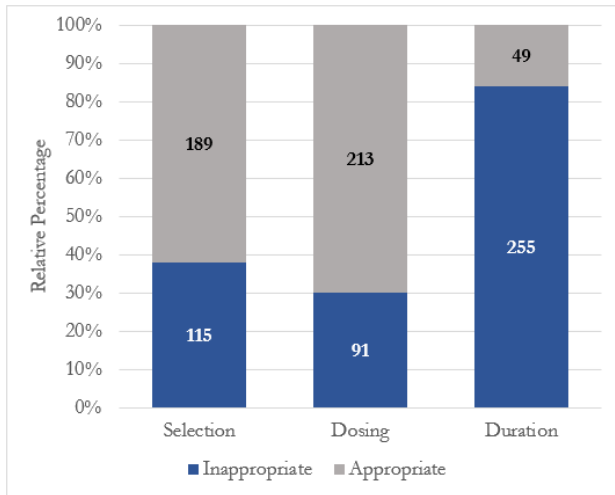


Figure 2. Subset Analysis: Reasons for Inappropriate Prescribing, n = 304



Conclusion. The main reason for inappropriate prescribing in the ED was excess duration of therapy, making this an area of opportunity for future antibiotic stewardship improvement.

Disclosures. Rachel Kenney, PharmD, Medtronic, Inc. (Other Financial or Material Support, spouse is an employee and shareholder) Susan L. Davis, PharmD, Nothing to disclose

148. Implementation of Restriction Criteria within an Electronic Medical Record and Its Impact on Carbapenem Prescribing

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Session: P-09. Antimicrobial Stewardship: Trends in Antimicrobial Prescribing

Background. Carbapenem restriction criteria (CRC) were developed by our health system to conserve the prescribing of these broad-spectrum agents. The purpose of this study was to compare pre and post EMR implementation of adherence to the system-approved CRC and if there was an association with decreased utilization of carbapenems.

Methods. A retrospective cohort review from January 2018 to June 2020 was performed via the Cerner EMR at 3 community hospitals in Arizona (AZ) and California (CA) to determine if CRC was appropriate at time of carbapenem initiation. Admitted patients > 18 years prescribed meropenem or ertapenem and received at least one dose were included. Health System approved CRC are shown in Table 2.

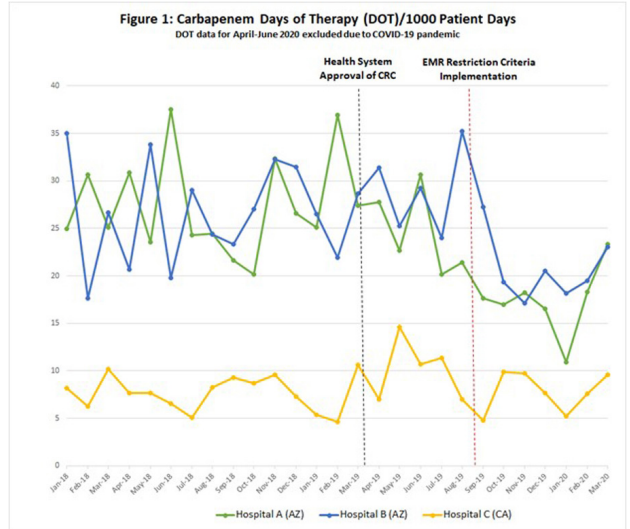
Results. A total of 160 patients were analyzed, including 60 pre-EMR CRC intervention and 100 post intervention. Forty-five patients (28%) had a documented history of ESBL infection as shown in Table 1. Figure 1 shows carbapenem utilization over the study period. An interrupted time series analysis was performed for both AZ and CA. After correcting for pre-intervention trends, AZ days of therapy (DOT) decreased by 6.2 DOT per 1000 patient days within 1 month post intervention (23%, p< 0.0001); the model predicted a further drop of 0.6 DOT per 1000 patient days per month over the 6 months post intervention. The CA DOT decreased by 1.2 DOT per 1000 patient days 1 month post intervention (17%, p= 0.28), with a predicted further drop of 0.28 DOT per 1000 patient days per month over the 6-month period post intervention. Post implementation retrospective review as described in Table 2 aligned with EMR restriction criteria selection for 68% of patients; interfacility differences occurred with 96% of CA reviews supported by criteria and 59% of AZ reviews supported by criteria (p= 0.0025).

Table 1: Patient Characteristics

	Number of Patients (N= 160)
Male gender	79 (49%)
Age (Mean)	67.6 years
Documented history of ESBL infection	45 (28%)
Positive blood culture during admission	33 (21%)

Table 2: Results from Pre and Post Carbapenem Restriction Criteria EMR Implementation

	Pre-Intervention (n= 60)	Post Intervention (n= 100)	P-value
Carbapenem prescribed			
Ertapenem	25 (42%)	21 (21%)	0.0052
Meropenem	35 (58%)	79 (79%)	
Confirmed ESBL infection during admission	17 (45%)	35 (41%)	0.6244
Health system CRC for carbapenem use			
Broad spectrum gram-negative failure at 48 hours	3 (5%)	24 (24%)	0.0025
Empiric treatment with recent history of MDRO	14 (23%)	27 (27%)	
MDRO infections	27 (45%)	44 (44%)	
Not per criteria	15 (25%)	5 (5%)	
Unable to determine	1 (1%)		
EMR CRC matched clinical review (applicable for post intervention only)			
Overall total		68 (68%)	0.0025
AZ		44 (59%)	
CA		24 (96%)	
Infectious diseases consulted at time of carbapenem initiation	45 (75%)	78 (78%)	0.6630



Conclusion. This analysis supports that implementation of an EMR tool is an effective intervention to decrease unnecessary carbapenem use at the time of prescribing. The ESBL rate was similar pre and post intervention which may indicate that decreases in DOT were not due to a difference in MDRO rate. This study also highlights the different baseline antibiotic prescribing practices that may exist between facilities.

Disclosures. All Authors: No reported disclosures

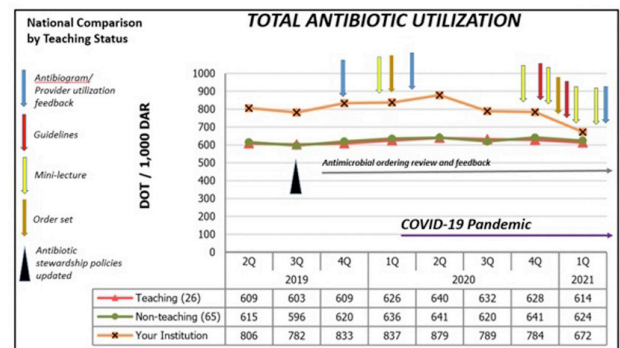
149. Impact of Stewardship on Antibiotic Utilization Rates During the COVID-19 Pandemic: Successes and Challenges in a Regional Hospital

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Session: P-09. Antimicrobial Stewardship: Trends in Antimicrobial Prescribing

Background. Antibiotic stewardship (AS) is at the core of patient safety and prevention of antimicrobial resistance. Healthcare providers prescribe antibiotics for COVID-19 despite low rates of bacterial co-infection. Our regional hospital had antibiotic utilization (AU) rates higher than other health systems even prior to the emergence of SARS-Cov2. We analyzed the effect AS on AU during the pandemic.

Total Antibiotic Utilization Rates Before and During COVID-19 Pandemic



Methods. Total and specific AU rates were benchmarked using BD MedMined's medication analytics system from 2nd quarter 2019 to 1st quarter 2021. The AS team released yearly antibiogram and individual prescriber's AU rates and performed weekly, and as needed, review of antibiotic ordering and feedback. To assist in appropriate prescribing decisions, remote educational sessions or mini-lectures and local