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 Affair (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.

Disclosures. **Matthew B. Goetz, MD**, Nothing to disclose

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		
	UTI	CAP
Predictor	OR (95% CI)	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.

Disclosures. **All Authors**: No reported disclosures

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