than 20 patients admitted. Level 3 and Level 4 NICU's comprised 51% and 48%, respectively. Delivery units comprised 74%, the rest were referral centers. AS programs were in place in 62% of the hospitals and 47% of the units had NICU specific initiatives. Patients were on average 32.5 weeks gestational age (+/- 5.3 SD), with birth weight of 1976 grams (+/- 1022 SD), and were 32 days (+/- 65 SD) postnatal age at the time of the study.

Antibiotics were the most frequently used medication in 92% of patients with 931 antibiotics prescribed on the assessment day. Hospitals with any NICU AS initiative had significantly lower rates of antibiotic utilization compared to NICUs without AS (21% and 32%; p-value: < 0.01). Of those on antibiotic therapy, ampicillin, gentamicin, and amikacin were prescribed to 41%, 34%, and 21% of patients respectively. When only definitive treatment was evaluated, vancomycin, amikacin, and meropenem were the highest prescribed antibacterial agents at 25%, 19%, and 19% respectively. At the initial assessment, study participants indicated either 3 or 7 days (37% and 26%) for planned duration. Actual treatment duration for empiric and definitive treatment was 7 and 14 days (29% and 19%) When comparing patients who had an established treatment course at the time of the initial assessment, the final length of treatment for culture negative sepsis was 7 (IQR:5–10) and culture positive sepsis was 11 days (IQR:10–14; p-value: 0.07).

Conclusion. Benchmarking global antimicrobial use is crucial for improving NICU–AS practices.

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20. Fluoroquinolone and Overall Outpatient Antibiotic Prescribing Trends in Adults, 2011 to 2018

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Session: O-5. Antimicrobial Stewardship: Population Trends in Antibiotic Use

Background. Fluoroquinolones (FQs) are the third most commonly prescribed antibiotics among U.S. outpatients, and the second most commonly prescribed class among adults ≥ 65 years of age. However, FQ use has been associated with severe adverse events, especially among older adults. As a result, in 2016 the U.S. Food and Drug Administration (FDA) issued warnings against FQ use when other agents may be effective. We assessed changes in outpatient FQ prescribing relative to overall antibiotic prescribing from 2011 to 2018.

Methods. We estimated annual antibiotic prescription rates in adults ≥ 20 years of age for all classes and FQs using national prescription dispensing count data from IQVIA Xponent (enumerator) and census estimates (denominator) for 2011 to 2018. We used Poisson models to estimate prevalence rate ratios (PRR) and 95% confidence intervals (CI) comparing antibiotic prescription rates overall and stratified by age group from 2011 to 2018. The Chi-square test was used to compare the percent decrease in rates between age groups.

Results. From 2011 to 2018, prescription rates in adults for all antibiotics decreased by 2% (PRR 0.98, 95% CI: 0.98–0.98); FQ prescription rates decreased by 30% (PRR 0.70, 95% CI: 0.69–0.70), with the largest decline from 2015–2018 (Figure 1). Adults ≥ 65 years had the highest FQ prescription rates for 2011 to 2018, at a rate of 2.37 (95% CI: 2.32–2.42) times that of adults 20–64 years (Figure 2). The FQ prescribing rate in adults 20–64 experienced a greater decrease from 2011 to 2018 than the rate in adults ≥ 65 years (p < 0.0001), with a 35% decrease (PRR 0.65, 95% CI: 0.65, 0.65) in adults 20–64 years compared to a 29% (PRR 0.71, 95% CI: 0.71–0.71) decrease in adults ≥ 65 years (Figure 2).

Conclusion. Decreases in outpatient fluoroquinolone prescriptions per 1,000 persons by age group in the United States from 2011 to 2018

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21. Association of MRSA Prevalence and Hospital-level Antibiotic Use: A Retrospective Study Across 122 Acute-care Hospitals

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Session: O-5. Antimicrobial Stewardship: Population Trends in Antibiotic Use

Background. The prevalence of methicillin-resistant Staphylococcus aureus (MRSA) varies across geographic regions, which could contribute to regional variation in antibiotic use. In this study, we evaluated whether local MRSA prevalence rates were associated with hospital-level antibiotic use across the Veterans Health Administration (VHA).

Methods. This retrospective cohort included all acute-care patients admitted in VHA hospitals during 2016. Anti-MRSA antibiotics were identified per National Healthcare Safety Network definitions and use was quantified as days-of-therapy (DOT) per 1000 days-present. Hospital-level MRSA prevalence (colonization and/or infection) was determined by calculating the proportion of admissions with a positive MRSA nasal swab and/or a MRSA-positive clinical culture obtained ≤1 day before or ≤2 days after admission. Negative binomial regression models were used to determine the association between a hospital’s MRSA prevalence and its antibiotic use, after accounting for intra-hospital clustering, patient case-mix, month of admission, and use of hospital-based stewardship strategies.

Results. There were 548,476 admissions across 122 hospitals. The median rate of MRSA prevalence at admission was 8.0% (IQR 6.7–9.7%). Hospital level median use of anti-MRSA and total antibiotics was 96.5 (interquartile range [IQR] 81.1–116.9) and 562.1 (IQR 505.9–631.6) DOT per 1000 days-present, respectively. In a hospital-level risk adjusted analysis, a hospital’s MRSA prevalence was significantly associated with its monthly use of both anti-MRSA and total antibiotics (IRR=1.05, 95% 1.02–1.07; IRR=1.02, 95% CI: 1.01–1.03). A 5% increase in the hospital's MRSA prevalence was associated with an increase in the monthly use of anti-MRSA antibiotics and total antibiotics by 23.6 and 8.3 DOT per 1000 days-present, respectively.

Conclusion. Higher hospital-level MRSA prevalence was associated with significantly higher rates of antibiotic utilization, even after adjusting for case-mix and reported antibiotic stewardship strategies. Future benchmarking of anti-MRSA antibiotic use across hospitals may need to risk-adjust using baseline rates of MRSA prevalence.

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22. Patient Satisfaction Remains Unchanged Following Implementation of an Antibiotic Stewardship Intervention in Primary Care

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CDC Prevention Epicenters Program

Session: O-5. Antimicrobial Stewardship: Population Trends in Antibiotic Use

Background. Inappropriate prescription of antibiotics for respiratory tract infections (RTIs) in ambulatory care settings is common, increasing the risk of adverse health outcomes. Behavioral and educational interventions targeting primary
care providers (PCPs) have shown promise in reducing inappropriate antibiotic prescribing for RTIs. While one perceived barrier to such interventions is the concern that these adversely impact patient satisfaction, few data exist in this area. Here, we examine whether a recent PCP-targeted intervention that significantly reduced antibiotic prescribing for RTIs was associated with a change in patient satisfaction.

Methods. The PCP-targeted intervention involved monthly education sessions and peer benchmarking reports delivered to 31 clinics within an academic health system, and was previously shown to reduce antibiotic prescribing. Here, we performed a retrospective, secondary analysis of Press Ganey (PG) surveys associated with the outpatient encounters in the pre- and post-intervention periods. We evaluated the impact on patient perceptions of PCPs based on provider exposure to the intervention using a mixed effects logistic regression model.

Results. There were 17,416 out of 197,744 encounters (8.8%) with associated PG surveys for the study time period (July 2016 to September 2018). In the multivariate model, patient satisfaction with PCPs was most strongly associated with patient-level characteristics (age, race, health status, education status) and survey-level characteristics (survey response time, patient’s usual provider) (Figure 1). Satisfaction with PCPs did not change following delivery of the provider-based intervention even after adjusting for patient- and survey-level characteristics (adjusted odds ratio 95% CI): 1.146 (1.06, 1.244).

Figure 1: Association of a provider-targeted intervention as well as patient, provider, and practice characteristics with patient satisfaction in a multivariable mixed effects logistic regression model

Conclusion. Regional variability in outpatient antibiotic prescribing for Tier 2 and 3 ARTIs remained even after controlling for patient age, comorbidities, and setting of care. It is likely that this variability is in part due to non-clinical factors such as regional differences in clinicians’ prescribing habits and patient expectations. Targeted and enhanced public health stewardship interventions are needed to address cultural factors that affect antibiotic prescribing in outpatient settings.

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24. Antibiotic Use in Hospital Emergency Departments and Observation Settings from 2012–2018 in a Large Cohort of U.S. Hospitals
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Session: O-5. Antimicrobial Stewardship: Population Trends in Antibiotic Use

Background. While discharge antibiotic prescriptions from emergency department (ED) visits have been reported, systemic antibiotic use during ED and hospital observation (OBS) visits have not been well assessed. We conducted a descriptive analysis of antibiotic use in these settings.

Methods. We identified ED and OBS visits not resulting in hospitalization, and systemic antibiotics administration charges during these visits from January 2012–December 2018 using the Premier Healthcare Database, representing at least 600 hospitals annually. Antibiotics prescribed after discharge were excluded. We reported the proportion of visits with antibiotic use, and described antibiotic use by class, agent and route stratified by location. We also examined trends in antibiotic use over time using a multivariable logistic model.

Results. We assessed 161,291,011 ED visits and 15,660,062 OBS visits from 2012–2018. Systemic antibiotics were identified in 9.0% of ED visits and 25.2% of OBS visits. Parenteral (IV) antibiotics were received in a high proportion of ED and OBS visits in which a systemic antibiotic was received (52.6% and 87.6% respectively). In the ED, 39/4th generation cephalosporins were the most commonly identified (32.7%) while in the OBS, 12/3rd generation cephalosporins were most commonly identified (38.9%). Fig. 1. The most common agents in the ED were ceftriaxone, azithromycin, and cephalexin while the most common agents in the OBS were cefazolin, ceftriaxone, and levofloxacin. Any systemic antibiotic use in EDs declined slightly from 2012–2018 (9.2%-8.9%, p < 0.0001) while use in OBS settings saw the largest increase from 2017–2018 (25.4%-30.4%, p< 0.0001). Fig. 2. Fluoroquinolone use decreased in both ED (41.3%) and OBS (31.2%) (both p< 0.0001) beginning in years 2012 and 2016 respectively.

Figure 1: Antibiotic use in emergency departments and observation settings by region and diagnostic tier in urgent care, retail health, emergency department, and office visits, MarketScan® 2017, United States

Conclusion. Regional variability in outpatient antibiotic prescribing for Tier 2 and 3 ARTIs remained even after controlling for patient age, comorbidities, and setting of care. It is likely that this variability is in part due to non-clinical factors such as regional differences in clinicians’ prescribing habits and patient expectations. Targeted and enhanced public health stewardship interventions are needed to address cultural factors that affect antibiotic prescribing in outpatient settings.

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23. Regional Variation in Outpatient Antibiotic Prescribing in a Commercially-Insured Population, United States, 2017
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Session: O-5. Antimicrobial Stewardship: Population Trends in Antibiotic Use

Background. Studies have shown that the Southern United States has higher rates of outpatient antibiotic prescribing compared to other regions in the country, but reasons for this variation are unclear. We aimed to determine whether the regional variability in outpatient antibiotic prescribing for respiratory diagnoses can be explained by differences in patient age, care setting, comorbidities, and diagnosis in a commercially-insured population.

Methods. We analyzed the 2017 IBM® MarketScan® Commercial Database of commercially-insured individuals aged < 65 years. We included visits with acute respiratory tract infection (ARTI) diagnoses from retail clinics, urgent care centers, emergency departments, and physician offices. ARTI diagnoses were categorized as: Tier 1, antibiotics are almost always indicated (pneumonia); Tier 2, antibiotics are sometimes indicated (sinusitis, acute otitis media, pharyngitis); and Tier 3, antibiotics are not indicated (asthma, allergy, bronchitis, bronchiolitis, influenza, nonsuppurative otitis media, viral upper respiratory infections, viral pneumonia). We calculated risk ratios and 95% confidence intervals (CI) stratified by US Census region and ARTI tier using log binomial models controlling for patient age, comorbidities (Elkhassar and Complex Chronic Conditions for Children), and setting of care, with Tier 3 visits in the West, the strata with the lowest antibiotic prescription rate, as the reference for all strata.

Results. A total of 100,104,860 visits were analyzed. In multivariable modeling, ARTI visits in the South and Midwest were highly associated with receiving an antibiotic for Tier 2 conditions vs. patients in other regions (Figure 1).

Figure 1. Multivariable model comparing risk of receiving an antibiotic for an ARTI by region and diagnostic tier in urgent care, retail health, emergency department, and office visits, MarketScan® 2017, United States

Conclusion. Regional variability in outpatient antibiotic prescribing for Tier 2 and 3 ARTIs remained even after controlling for patient age, comorbidities, and setting of care. It is likely that this variability is in part due to non-clinical factors such as regional differences in clinicians’ prescribing habits and patient expectations. Targeted and enhanced public health stewardship interventions are needed to address cultural factors that affect antibiotic prescribing in outpatient settings.

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