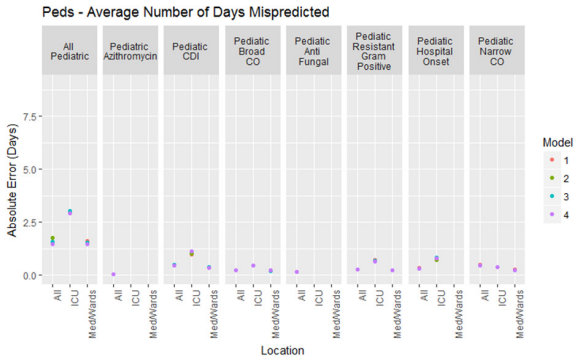

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1019. Defining electronic patient phenotypes to inform risk-adjustment strategies in hospital antimicrobial use comparisons

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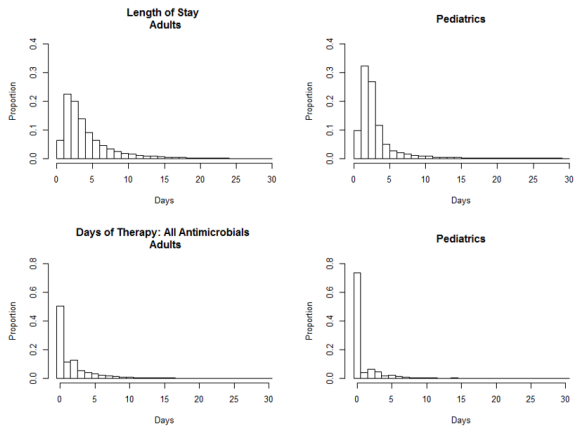
Background. Comparison of antimicrobial use (AU) rates among hospitals can identify areas to intervene for antimicrobial stewardship. Hospital AU interpretation is difficult without risk-adjustment for patient mix. Identifying high- or low-risk patient characteristics, or "electronic phenotypes," for receipt of antimicrobials using data from electronic health records (EHR) could help define risk-adjustment factors AU comparisons.

Methods. We performed a retrospective study of EHR-derived data from adult and pediatric inpatients within the Duke University Health System from October 2015 to September 2017. Encounters were included if the patient spent time in an inpatient location. The analysis aimed to identify subpopulations that were high- or low-risk for antimicrobial exposure based on EHR data summarized on the encounter level. Antimicrobial days of therapy (DOT) and days present, representing the length of stay (LOS), were defined as in the 2018 NHSN AU Option. Location exposures were defined in binary variables if patients were housed at least 1 day on a hospital unit type. We compared antimicrobial-exposed to unexposed patients as well as DOT among various factors including demographics, location, nonantimicrobial medications, labs, ICD-10 codes, and diagnosis-related groups (DRG).

Results. The EHR-derived dataset included 170,294 encounters and 204 variables in one academic and two community hospitals; 80,192 (47%) received at least one antimicrobial. Distributions of both LOS and DOT were zero-inflated and skewed by long outliers (figure). Encounters with >=7 DOT made up 63% of total DOT, but only 9% of inpatient encounters. Electronic phenotypes with highest DOT included those with long lengths of stay, older age, exposures to stem cell transplant, pulmonary, and critical care units, and DRG that included transplant, respiratory, or infectious diagnoses. Zero DOT phenotypes included those with short lengths of stay, exposure to labor and delivery wards, medical wards, and DRG that included birth and pregnancy.

Conclusion. Future work in defining risk-adjustment factors for hospital AU data comparisons should determine if factors associated with low- or high-risk electronic phenotypes assist in prediction of antibiotic use.

Figure. Length of stay and antimicrobial days of therapy per inpatient encounter



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

1020. Variations in inpatient and outpatient antibiotic use – opportunities for improvement and facility-level feedback

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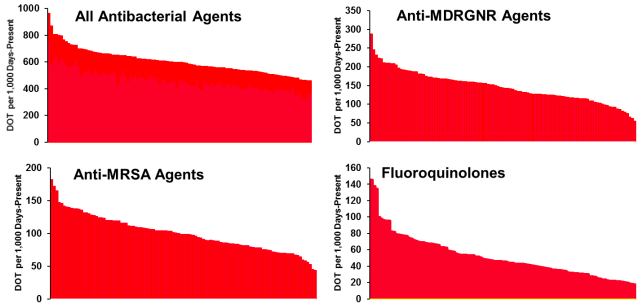
Background. Participation in the Antibiotic Use (AU) option of the National Health Safety Network (NHSN), provides medical facilities with the Standardized Antibiotic Administration Ratio (SAAR), a normalized ratio of facility antibiotic use. However, the range of antibiotic use by similar facilities is not provided and thus the opportunity to "nudge" behavior by comparing use with "best facilities" is lost. We developed reports of variations of antibiotic use that allow comparisons of local antibiotic use with that of 107 other VA facilities.

Methods. Data for 2018 were extracted from the VA Corporate Data Warehouse. Antibiotic use in CY2018 on acute inpatient care units was assessed as days of therapy (using CDC-defined drug classes) per 1000 days-present. In addition, we assessed the proportion of patients with pneumonia, urinary tract infections or skin-soft-tissue infections (collectively, PUS) who received anti-MRSA therapy or ß-lactam therapy directed against multi-drug-resistant and hospital GNR (anti-MDRGNR) during hospital days 0–2 (CHOICE, a timeframe representing empiric therapy).

Results. Rates of total antibiotic use by VA facility varied over two-fold from 460 to 965 days of therapy (DOT)/1000 days-present (DP); anti-MRSA and anti-MDRGNR varied over four-fold, from 44 to 184 and, 55 to 262, respectively. Fluoroquinolone variation was even higher, ranging over 8-fold, from 17 to 145 DOT/1000 DP (Figure 1). Substantial variations were also observed in the frequency of administration of anti-MRSA and anti-MDRGNR therapy for PUS during CHOICE (14 to 49% and 15 to 65%, respectively; Figure 2).

Conclusion. The large variations in the use of total antibiotic therapy, anti-MRSA, anti-MDRGNR and fluoroquinolone therapies are greater than can be readily explained by known variations in antibiotic resistance or differences in case-mix within the VA. Efforts are underway in the VA to strengthen antimicrobial stewardship programs. In other work, we have shown improvements in antimicrobial use among sites that have access to reports that provide the data described herein and that participate in group collaboratives. Our group is now making these data available to all VA facilities.



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

1021. Accuracy of Provider-Selected Antibiotic Indications at Point of Order Entry Compared with Electronic Health Record Documentation

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Background. The Centers for Medicaid and Medicare Services (CMS) state that hospital antimicrobial stewardship (AMS) policies require indications be documented for all orders. This may be included in the electronic medical record (EMR) or during order entry per CMS. Reliance solely on EMR documentation may be inconsistent or absent at times. In an effort to optimize compliance to this new measure and improve antibiotic use tracking, the University of Colorado AMS committee implemented required indications for all systemic antimicrobial orders. To follow up on this intervention we sought to determine the accuracy of ordered indication based on EMR documentation.

Methods. Retrospective review of antibiotics ordered between May 2, 2017 and December 1, 2017 among hospitalized patients aged 18–89 years. The primary objective was the accuracy of provider-selected indications (PSI) compared with EMR documented-clinical indication (DCI). Secondary objectives included accuracy comparison between check-box and free-text PSI format, and adherence to institutional antibiotic use guidelines. Differences between proportions of antibiotic orders with certain variables were assessed with Pearson's chi-square and Fisher's exact as appropriate.

Results. A total of 304 patients were evaluated with a median age of 56 years, 49% male, and 31% identified as immunocompromised. Check-box was most utilized in 81%, with 93% having a single indication selected. Most orders were classified as empiric (63%), followed by prophylaxis (23%) and definitive (15%). Frequent indications chosen were pneumonia (17%), bacteremia (13%), skin and soft tissue (10%), urinary tract infection (9%), and intra-abdominal infections (5%). Accuracy by PSI/DCI match was 78%, which was not different by a method of indication entry. Only indication type ($P = 0.023$) and care team specialty ($P = 0.009$) were shown to significantly impact accuracy. Nonadherence to institutional guidelines was 19%.

Conclusion. Antibiotic indications on order entry are an effective strategy to improve documentation and meet compliance around new CMS standards. Ordering by surgical services and prophylactic indications had lower PSI/DCI match, mostly resulting from absent EMR indication documentation.

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1022. Is it Time to Re-Evaluate Oral B-Lactam Antibiotics for Step-Down Therapy of Uncomplicated Gram-Negative Bacteremia?

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Background. Bloodstream infections (BSI) due to Enterobacteriaceae often require empiric intravenous (IV) antibiotics. Oral antibiotics for the definitive treatment of these infections have been reserved to antibiotics with "high" oral bioavailability, mainly fluoroquinolones (FQ). Safety concerns and increasing resistance associated with FQ has modified clinical practice to identify alternative oral therapies. Select β-lactam (BL) antibiotics are well-tolerated, have moderately high bioavailability, and possess in-vitro activity against *Escherichia coli (E. coli), Klebsiella pneumoniae (K. pneumoniae),* and *Proteus mirabilis (P. mirabilis).* Limited evidence exists for oral BL step-down therapy for definitive treatment of BSI due to these organisms.

Methods. This retrospective cohort study compares clinical outcomes of patients treated with oral BL antibiotics to those who received oral FQ or trimethoprim/sulfamethoxazole (TS) for the treatment of BSI due to *E. coli, K. pneumoniae, and P. mirabilis*. The primary outcome is a composite of 30-day all-cause mortality, 30-day readmission due to recurrence, and/or change in oral antibiotic therapy. Secondary endpoints include 90-day development of *Clostridium difficile* infection, 90-day all-cause readmission, hospital length of stay (LOS), and 90-day recovery of a multi-drug-resistant organism.

Results. Nine hundred eighty-one patients were screened and 397 adult patients were included. Excluded patients: IV only ($n = 291$), polymicrobial blood culture ($n = 112$), immunocompromised ($n = 61$), other ($n = 120$). Two-hundred patients received oral step-down therapy with a BL, and 197 with either an FQ or TS. *E. coli* was the causative organism for most patients in both groups, and urinary tract was the most common source of BSI. The median total duration of therapy was 14 days in both groups. There was no significant difference in the primary composite endpoint (7% vs. 5.6%, P = 0.561). There was no mortality or differences in secondary outcomes, except LOS (6 vs. 5 days, P = 0.043).

Conclusion. Utilization of oral BL for the step-down therapy of uncomplicated BSI due to *E. coli, K. pneumoniae, and P. mirabilis* did not result in worse outcomes compared with those receiving oral FQ or TS.

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

1023. Isavuconazonium Use at an Academic Transplant Center

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Background. Isavuconazonium is an appealing anti-fungal due to its broad spectrum of activity, predictable pharmacokinetics, oral bioavailability, and lack of QTc prolongation, but real-world experience with it is limited. At our academic medical center, isavuconazonium is restricted to the infectious diseases (ID) service for treatment of invasive fungal infections, including endemic mycoses due to high prevalence, and is recommended for patients intolerant of first-line agents. The purpose of this study was to describe isavuconazonium use at our institution and assess adherence to its formulary guidelines.

Methods. Inpatients with an order for isavuconazonium between June 2016 and November 2018 were analyzed via retrospective chart review. Prescribing team, indication, and rationale for use were evaluated.

Results. There were 97 inpatient encounters with an isavuconazonium order among 57 patients. Of those, 30 were solid-organ transplants and 9 had bone marrow transplants. Indications for isavuconazonium were: histoplasmosis 25%, high-risk fungal prophylaxis 21%, invasive aspergillosis 9%, candidiasis 2%, and other 44% (Table 1). Preceding anti-fungal therapy included: voriconazole 49%, posaconazole 12%, fluconazole 9%, micafungin 7%, amphotericin B 5%, itraconazole 4%, and none 35%. The rationale for the use of isavuconazonium is described in Table 2. ID consultation occurred in 79% of patients. Those without a consult had an indication of prophylaxis or were continuation of therapy started outpatient or at an outside hospital (OSH).

Conclusion. Histoplasmosis was the most common infection treated with isavuconazonium, despite limited data for that indication. Further investigation of the clinical course for these patients is warranted. Reasons for use most commonly centered on concern for QTc prolongation, clinical failure, and drug interactions. Over one-third of patients received no anti-fungal therapy prior to initiation. Adherence to required ID consultation was high. Patients on isavuconazonium for prophylaxis or as continuation therapy without a consult may still benefit from ID review to assess the appropriateness of therapy.

Table 1: Other Indications for Isavuconazonium

	Patients n=25
Pneumonia of Unknown Cause, n	18
Sepsis, n	3
Fungal Sinusitis, Unknown Organism, n	1
Penicillium, n	1
Neutropenia, n	1
Possible Fungal Endocarditis, n	1

Table 2: Rationale for Use of Isavuconazonium

Rationale for Use	Patients N=57
Intolerance, n (%)	29 (51)
QTc Prolongation, n	11
On Levofloxacin (QTc Prolongation Concern), n	4
Underlying Arrhythmia (QTc Prolongation Concern), n	3
Elevated LFTs, n	3
Renal Dysfunction, n	3
Hallucinations, n	2
Vision Changes and GI Intolerance, n	1
Rash, n	1
Hyperbilirubinemia, n	1
Failure of First Line Therapy, n (%)	13 (23)
Progression of Disease, n	8
Sub-therapeutic Levels, n	5
Other, n (%)	16 (28)
Drug Interaction, n	5
Empiric Broad Spectrum Desired, n	4
Unknown, Inadequate Description, n	3
Unknown, Continuation of Therapy Started at OSH, n	2
Insurance Coverage, n	2

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1024. Evaluation of Atovaquone Prescribing for *Pneumocystis jiroveci* Pneumonia (PJP) Prophylaxis

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Background. Trimethoprim-sulfamethoxazole (TMP-SMX) use for PJP prophylaxis has been associated with a variety of adverse reactions including myelosuppression, hypersensitivity reactions, acute kidney injury, and hyperkalemia. Atovaquone is used as an alternative drug, but it has several disadvantages, such as breakthrough PJP risk, dysgeusia, and higher cost compared with TMP-SMX. Indications for atovaquone prophylaxis at our institutions include severe cytopenias, hypersensitivity, renal impairment, or hyperkalemia. We evaluated atovaquone use and compliance with institutional PJP prophylaxis guidelines.

Methods. This was a retrospective study of inpatient atovaquone prescribing for PJP prophylaxis at Brigham and Women's Hospital and Dana-Farber Cancer Institute from 7/1/18 to 9/30/18. We included adult patients who received ≥1 dose of atovaquone