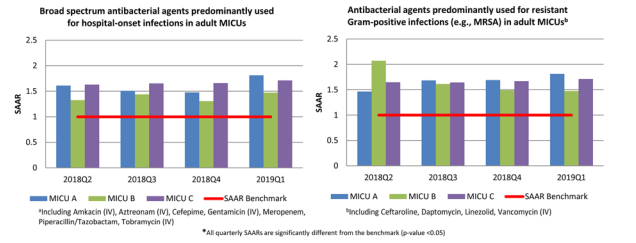
and 3 days for P/T (Figure 2). Approximately half of initiations occurred in the emergency department (ED) (50% Van, 47% P/T); most common indications were "respiratory tract infection" and "severe sepsis/septic shock" for both P/T (77%) and Van (74%) (Figure 2). HO *C. difficile* in MICUs accounted for 6%, 13%, and 16% of total HO *C. difficile* cases in campuses A, B, and C, respectively during the time frame (Figure 1).

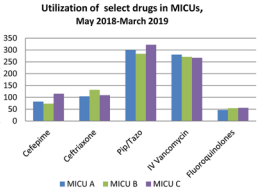
Conclusion. We feel that NHSN data scratches the surface of the deep-rooted challenges of ICU stewardship. However, it can identify AU trends and most frequently prescribed antibiotics in the context of unit-specific *C. difficile* rates. Intensive stewardship audit can further uncover areas for intervention, such as ED Van and P/T overprescribing. We suggest presenting clinical stakeholders with a quarterly "stewardship dashboard" combining AU rates, patient-level data, and *C. difficile* rates to maximize the impact of stewardship endeavors.

Figure 1: AU/*C. difficile* MICU Dashboard



Hospital Onset *C difficile (HO-CDI)* counts

MICU	2018Q2 HO-CDI count	2018Q2 % of campus HO-CDI	2018Q3 HO-CDI count	2018Q3 % of campus HO-CDI	2018Q4 HO-CDI count	2018Q4 % of campus HO-CDI	2019Q1 HO-CDI count	2019Q1 % of campus HO-CDI	Total HO-CDI count	Total % of campus HO-CDI
A	1	3%	3	7%	3	6%	5	8%	12	6%
B	2	20%	2	17%	1	11%	0	0%	5	13%
C	6	29%	3	10%	5	17%	2	12%	16	16%

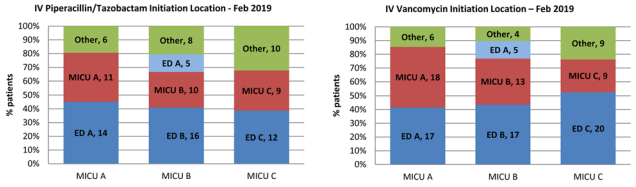


All data inclusive of May 2018 and onward. 2018Q2 includes only May and June data

Figure 2: MICU AU "Deeper Dive" Dashboard
(Initiations, Duration, Location)

Duration of Intravenous Vancomycin and Piperacillin/Tazobactam in three MICUs during February 2019

	Location	Median Duration, days (Interquartile Range)	Duration range, days	Patients on antibiotic (n)	Unit bed count
Vancomycin	MICU A	2 (1-4)	1-10	41	12
	MICU B	2 (1.5-4.5)	1-9	39	16
	MICU C	2 (1-3)	1-10	38	14
Piperacillin/ Tazobactam	MICU A	3 (2-4.25)	1-8	31	12
	MICU B	3 (2.5-4.5)	1-9	39	16
	MICU C	3 (2-6)	1-14	31	14



Indications Selected for IV Piperacillin/Tazobactam and Vancomycin in three MICUs during February 2019

Indication	IV Piperacillin/Tazobactam (% of administrations)	IV Vancomycin (% of administrations)
Bloodstream Infection	12%	13%
Intra-abdominal Infection	6%	0%
Respiratory Tract Infection	45%	38%
Severe Sepsis/Septic Shock	32%	36%
Other	12%	13%

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

1018. Using prediction modeling to inform risk-adjustment strategy for hospital antimicrobial use: Can we predict who gets an inpatient antimicrobial?

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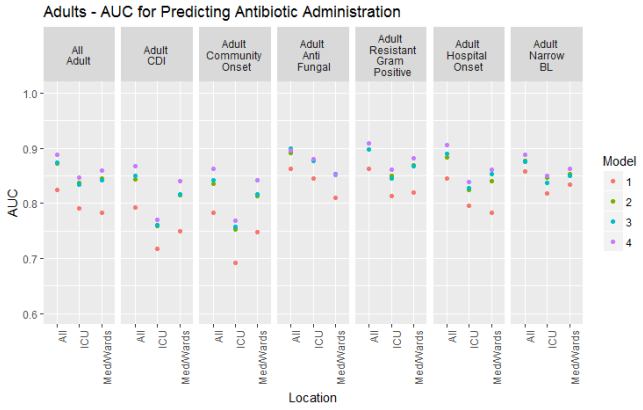
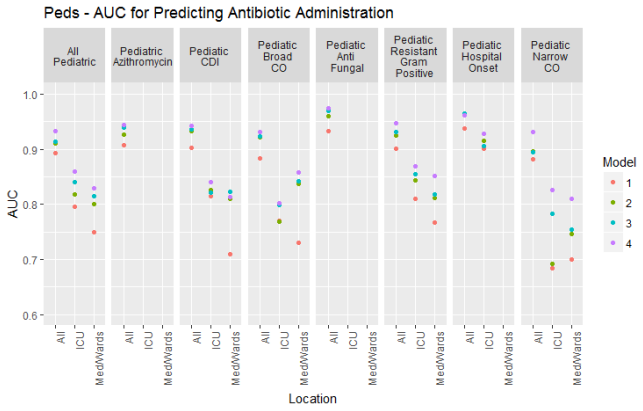
Background. Hospital antimicrobial stewardship program (ASP) assessments based on comparisons of antimicrobial use (AU) among multiple hospitals are difficult to interpret without risk-adjustment for patient case-mix. We aimed to determine whether variables of varying complexity, derived retrospectively from the electronic health record (EHR), were predictive of inpatient antimicrobial exposures.

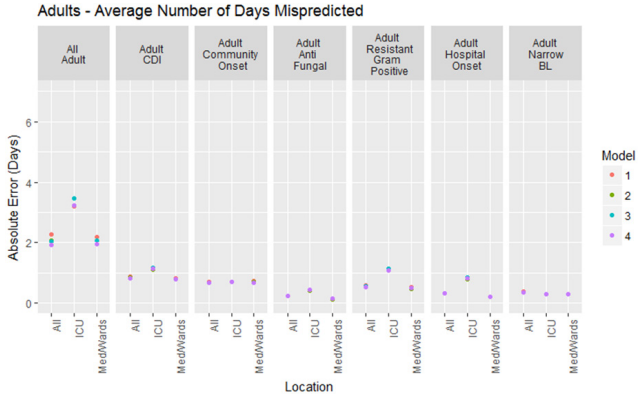
Methods. We performed a retrospective study of EHR-derived data from adult and pediatric inpatients within the Duke University Health System from October 2015 to September 2017. We used Random Forests machine learning models on two antimicrobial exposure outcomes at the encounter level: binary (ever/never) exposure and days of therapy (DOT). Antimicrobial groups were defined by the NHSN AU Option 2017 baseline. Analyses were stratified by pediatric/adult, location type (ICU/ward), and antimicrobial group. Candidate variables were categorized into four tiers based on feasibility of measurement from the EHR. Tier 1 (easy) included demographics, season, location, while Tier 4 (hard) included all variables from Tier 1–3 and laboratory results, vital signs, and culture data. Data were split into 80/20 training and testing sets to measure model performance using area under the curve (AUC) for the binary outcomes and absolute error for DOT.

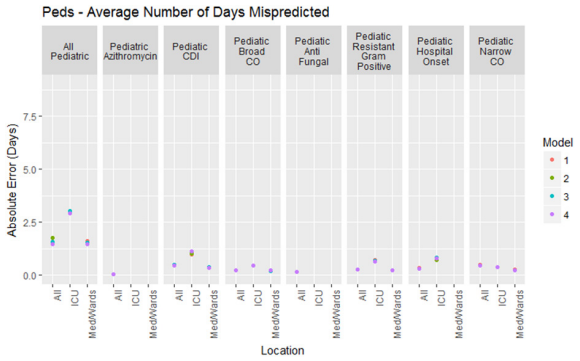
Results. The analysis dataset included 170,294 encounters and 204 candidate variables from three hospitals. A total of 80,190 (47%) encounters had antimicrobial exposure; 64,998 (38%) had 1–6 DOT, and 15,192 (9%) had 7 or greater DOT. Models strongly predicted the binary outcome, with AUCs ranging from 0.70 to 0.95 depending on the stratum (Figure A, B). The addition of more complex variables increased accuracy (Figure Model Tiers 1–4). Model performance varied based on location and antimicrobial group. Models for infrequently used groups performed better (Figure C, D). Models underestimated DOTs of encounters with extremely long lengths of stay.

Conclusion. Models utilizing EHR-derived variables strongly predicted antimicrobial exposure. Risk-adjustment strategies incorporating measures of patient mix may provide more informative benchmark comparisons for use in Antimicrobial Stewardship Program assessments.









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

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

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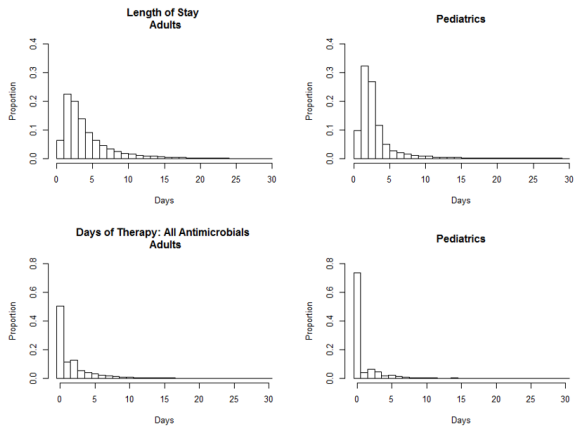
Background. Comparison of antimicrobial use (AU) rates among hospitals can identify areas to intervene for antimicrobial stewardship. Hospital AU interpretation is difficult without risk-adjustment for patient mix. Identifying high- or low-risk patient characteristics, or "electronic phenotypes," for 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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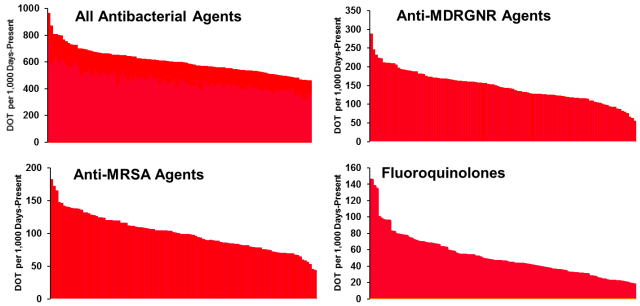
Background. Participation in the Antibiotic Use (AU) option of the National Health Safety Network (NHSN), provides medical facilities with the Standardized Antibiotic Administration Ratio (SAAR), a normalized ratio of facility antibiotic use. However, the range of antibiotic use by similar facilities 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.