***Results.*** A total of 36,828 DOT were included for 56 physicians at two hospitals. Prescriber rank changed for all top five prescribers at each hospital after incorporating physician-specific denominator metrics as compared with DOT alone (Table 1). The largest change in rank observed was 19 spots using admissions as a denominator.

***Conclusion.*** Incorporating physician-specific denominator metrics to account for differences in patient volume enhances peer comparison and results in significant changes in prescriber rank. Choice of meaningful denominator is highly dependent on staffing model for hospital physicians.

**Table 1:** Comparison of AU Metrics for Prescriber-specific Feedback Reports (Top 5 Prescribers (by DOT) per Metric)

| Denominators: Shifts Worked and Total Patients Seen | | | | | | |
|---|---|---|---|---|---|---|
| Prescriber | DOT (%) | Rank ($N$ = 21) | DOT/ Shift | Rank ($N$ = 21) | DOT/Total Patients Seen | Rank ($N$ = 21) |
| A | 1323 (8.2) | 21 | 11.9 | 21 | 1.0 | 19 |
| B | 1106 (6.9) | 20 | 8.6 | 15 | 0.93 | 16 |
| C | 981 (6.1) | 19 | 7.4 | 10 | 1.2 | 20 |
| D | 891 (5.5) | 18 | 7.4 | 9 | 0.94 | 15 |
| E | 828 (5.1) | 17 | 8.2 | 14 | 0.7 | 7 |
| **Denominators: Admissions and 1,000 Prescriber Patient Days (PD)** | | | | | | |
| Prescriber | DOT (%) | Rank ($N$ = 35) | DOT/ admission | Rank ($N$ = 35) | DOT/1,000 PD | Rank ($N$ = 35) |
| F | 3,208 (15.5) | 35 | 7.32 | 28 | 1,161.9 | 25 |
| G | 2,731 (13.2) | 34 | 4.76 | 23 | 956.2 | 20 |
| H | 1,796 (8.7) | 33 | 9.71 | 30 | 1,322.5 | 27 |
| I | 1,297 (6.3) | 32 | 3.38 | 13 | 1,035.9 | 22 |
| J | 1,034 (5.0) | 31 | 4.79 | 24 | 1,007.8 | 21 |

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

### 1820. Indirect Standardization: A Convenient Benchmarking Approach to Antibiotic Utilization Based on Patient Mix

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***Background.*** Antimicrobial stewardship programs are recommended to risk-adjust antimicrobial use in order to support intra- and inter-hospital comparisons. The purpose of our investigation was to evaluate a benchmarking strategy for its ability to accurately identify changes in risk-adjusted utilization as a result of known stewardship interventions.

***Methods.*** Antimicrobial drug use was measured as days of therapy (DOT) from billing records. Based on diagnosis-related group (DRG) assignment, we calculated expected (E) use determined by indirect standardization and compared with observed (O) use for three targeted groups of antimicrobials: anti-pseudomonals β-lactams; ceftriaxone; and fluoroquinolones. As a stewardship strategy, a clinical pharmacist-driven, individualized pseudomonal risk assessment based antibiotic prior authorization process was implemented in the third quarter of 2016, focusing on commonly encountered community-onset infections.

***Results.*** The 10-month time period prior to implementing the intervention was used to establish the benchmark with over 10,000 billing records. Utilization assigned to DRGs from this time period was used to predict expected utilization. As a result of the intervention, a decrease in anti-pseudomonal agent utilization at the cost of an increase in ceftriaxone utilization was observed (Figure 1), with the lack of a significant impact toward change in the utilization of the fluoroquinolones. Variability in use is explained by the treated patients within each DRG.

***Conclusion.*** Antibiotic utilization was benchmarked to expected use adjusted for patient mix based on DRGs, and trends in changing antibiotic consumption were correctly identified. Differences between expected and observed use reflect usage patterns that take into consideration type of patients treated and provides the basis of evaluation of outcome measures for our stewardship interventions.

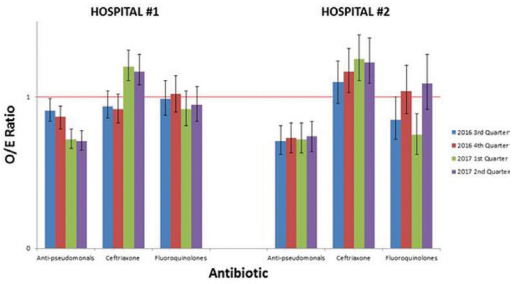


**Figure 1.** O/E Ratios (95% CI) Calculated for the 12 Month Time Period Following Implementation of the Intervention.

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

### 1821. Understanding the Components and Calculation of the SAAR, Illustrative Data

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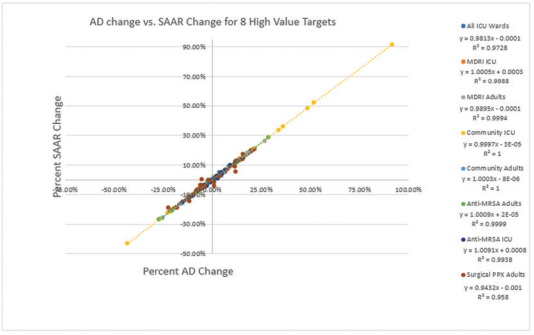
***Background.*** The standardized antimicrobial administration ratio (SAAR) compares each hospital's observed to predicted days of antimicrobial therapy. However, confusion exists about how hospital-level, seasonal, and hospital-peer-based variations in antibiotic use might impact an institution's SAAR. We characterized the impact of each of these three types of variation on predicted SAARs utilizing local NHSN data.

***Methods.*** Analysis of antibiotic consumption data from an academic medical center in Chicago, IL was conducted. SAAR and antimicrobial days per 1,000 days present (AD/1,000DP) were compiled in monthly increments from 2014 to 2016. Antimicrobial consumption was aggregated and classified into agent categories according to NHSN criteria. Month-to-month changes in both the SAAR and AD/1,000DP were evaluated. Azithromycin AD/1,000DP from 2012 through 2017 were explored for seasonal variation as defined as >20% increase in AD/1,000DP from each quarter to the overall mean AD/1,000DP for all months. A simulation was performed to explore the potential effect of seasonality on the SAAR. Demographic covariates within the SAAR model were altered while holding constant observed antibiotic use; thus we were able to observe the potential impact of demographics. Finally, a simulation explored the effect of altered consumption at other hospitals on a local institution's SAAR.

***Results.*** Across all antibiotic agent categories for both ICU ($n$ = 4) and general wards ($n$ = 4), the average matched-month percent change in AD/1,000DP was highly predicted and correlated with the corresponding change in SAAR (Figure 1, Pearson's $r$ = 0.99). The monthly mean ± SD AD/1,000DP was 235.0 (range 47.2–661.5), and the mean ± SD SAAR was 1.09 ± 0.26 (range 0.79–1.09) across the NHSN antibiotic agent categories. Five quarters were found to have seasonal variation in AD/1000DP for azithromycin (Figure 2). Simulations demonstrated that changing antimicrobial usage at comparator hospitals does not impact the local SAAR, and seasonal variation may cause fluctuating SAARs.

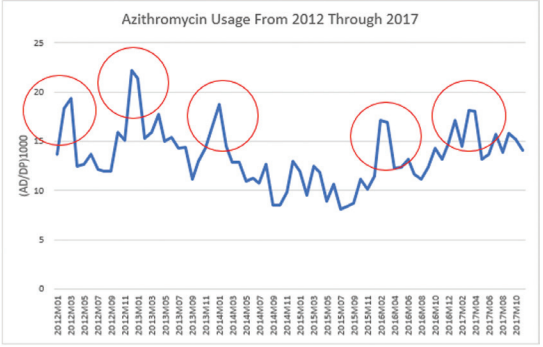
***Conclusion.*** Month-to-month changes in the SAAR mirror monthly changes in an institution's AD/1,000DP. Seasonal variation can impact the SAAR, and the effect changing peer hospital antibiotic consumption is not currently captured by the SAAR methodology.

**Figure 1. Overall Matched-Month Percent Change for all 8 Classifications**




Abbreviations: ICU= intensive care unit, MDRI = multidrug resistant infections, MRSA= methicillin resistant Staphylococcus aureus, PPX= prophylaxis, AD= antimicrobial days

**Figure 2. Facility-wide, Seasonal Variation of Azithromycin Between 2012 and 2017**




*Each circle represents a quarter found to have quarterly variation

** Seasonal variation was defined as quarter change >20% above the overall mean for all months[9].

Abbreviations: AD = antimicrobial days, DP = days present

***Disclosures.*** **J. Liu**, Merck: Grant fund from Merck, Research grant. **D. Martin**, Syneos Health: Employee, Salary. GlaxoSmithKline: Independent Contractor, Salary. **M. H. Scheetz**, Merck & Co., Inc.: Grant Investigator, Grant recipient. Bayer: Consultant, Consulting fee.

### 1822. Veterans Are Special: Clinical Decision Tree Misses ESBL Status in Bacteremic Veterans

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***Background.*** Severe bacterial infections require appropriate empiric antibiotic choices. The Johns Hopkins Hospital clinical decision tree (JHH-CDT) to detect bacteremia with ESBL+ Enterobacteriaceae performed well at the developer's institution, but its external validity is not known. We sought to determine the performance of the JHH-CDT to predict bacteremia with ESBL+ Enterobacteriaceae in a VA population and compare the JHH-CDT with standard of care (empiric antibiotics prescribed to the patient, without using the CDT).

***Methods.*** Electronic medical records were examined for clinical and microbiological data. The first episodes of mono-microbial bacteremia in patients at the Houston VA with positive blood cultures that grew either *E. coli* or *Klebsiella* species during 2016 were included. The JHH-CDT was used to predict whether or not the isolate would be ESBL+. Empiric initial antibiotic selection was also collected.

***Results.*** Eighty-seven cases occurred during the study period; 95% were in men. In veterans at the VA in Houston compared with patients at JHH, respectively, the JHH-CDT demonstrated lower sensitivity (35.7% vs. 51%), positive predictive value (83.3% vs. 90.8%), negative predictive value (88.8% vs. 91.9%) but similar specificity (98.6% vs. 99.1%). Of note, of the five questions in the JHH-CDT, only one was applicable to the Veteran population: history of ESBL colonization or infection in the prior 6 months. Two other CDT questions did not apply to the VA population (no Veterans had these conditions): hospitalization for ≥1 day in an ESBL high-burden in the prior 6 months and age <43 years old. Standard of care led to carbapenems being empirically prescribed for 4/14 (28.6%) ESBL+ bloodstream infections and for 3/73 (4.1%) of non-ESBL bloodstream infections.

***Conclusion.*** In this VA population, the JHH-CDT had low sensitivity because two decision nodes did not apply to our older population with little international travel. Standard of care empiric choice of antibiotics also had low sensitivity, covering only 28.6% of ESLB infections appropriately. These findings highlight the importance of developing and validating population-specific predictive stewardship tools.

***Disclosures.*** **B. W. Trautner**, Paratek: Consultant, Consulting fee. Zambon: Consultant, Consulting fee and Research grant.

### 1823. Signal or Noise? A Comparison of Methods to Identify Outliers in Antimicrobial Use (AU)

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***Background.*** Antimicrobial Stewardship Programs (ASPs) use AU benchmarking data to help identify areas in need of investigation. The high frequency and wide variation in AU make statistical tests frequently significant.

***Methods.*** We compared four statistical methods of analyzing AU data to quantify how often statistically significant outliers occur. We analyzed days of therapy (DOT) per 1,000 days present (dp) from 2017 in medical and surgical adult wards and three NHSN AU antibiotic groups: anti-MRSA agents (anti-MRSA), broad agents for community-onset infections (CO), and broad agents for hospital-onset multidrug-resistant organisms (HO/MDRO). Outliers were defined as follows: (1) Units ≥90th or ≤10th percentiles. (2) Units with Standardized Antimicrobial Administration Ratios (SAARs) outside 95% confidence intervals (CI). (3) Units with observed rates outside 95% CI predicted by a generalized estimating equation (GEE) negative binomial regression model. (4) Units with observed rate outside 95% CI predicted by mixed effects negative binomial regression model with hospital as a random effect. Adjustment in method 2 included hospital teaching status and location type. Methods 3 and 4 included adjustment for teaching status, location type, average age, average hospital length of stay, surgical volume, percent sepsis admissions, and average DRG weight.

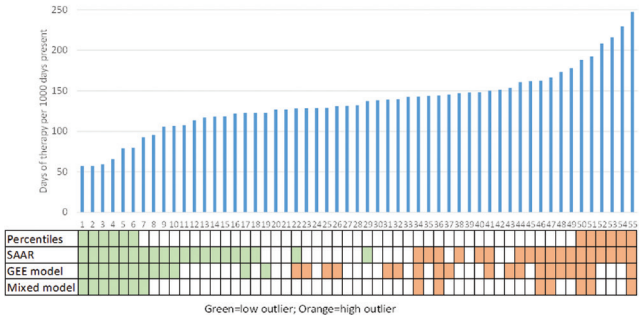
***Results.*** Fifty-five units and 628,358 dp were included in the 1-year sample. Each method identified both positive and negative outliers. SAAR and GEE methods identified the largest number of outliers; percentiles identified the least (table). The four methods identified different individual units as outliers (figure).

***Conclusion.*** Overly sensitive statistical methods may produce more signals than are clinically meaningful. Investments of ASP resources to investigate such signals may vary widely depending on statistical method used. Additional research is required to develop AU analysis methods with high positive predictive value.

**Table:** Number (%) of Outlier Units Identified Using Four Statistical Methods

| Group | AU in DOT/1,000 dp median (IQR) | 1. Percentile | 2. SAAR | 3. GEE model | 4. Mixed model |
|---|---|---|---|---|---|
| Anti-MRSA | 84 (73–103) | 10 (18%) | 42 (76%) | 30 (55%) | 14 (26%) |
| CO | 132 (106–184) | 10 (18%) | 50 (91%) | 22 (40%) | 14 (26%) |
| HO/MDRO | 132 (118–151) | 12 (22%) | 38 (69%) | 31 (56%) | 14 (26%) |

Figure. HO/MDRO AU outliers among 55 adult wards using four statistical methods




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

### 1824. Care Transformation in Infectious Diseases: Using a Novel Approach for Tracking Antimicrobial Stewardship Metrics

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***Background.*** A key component of antimicrobial stewardship (AS) programs is the use of adequate metrics to monitor antimicrobial utilization. Limitations have been described in the literature for traditional metrics such as Defined Daily Doses (DDD) and Days of Therapy (DOT), including practitioner's unfamiliarity with the terminology in relation to their meaning. This abstract describes an innovative approach developed by our organization that resulted in improved utilization of high-cost antimicrobials and increased the engagement of practitioners based on real-time (RT) analytics using a novel metric: Defined Daily Goal (DDG).

***Methods.*** A RT medication utilization dashboard (DB) for daptomycin (DAP) was created in October 2017 by clinical analysts and pharmacists. The DB provides a list of patients with active orders for DAP and compares the sum of active orders to the sum of available orders to meet the DDG. At Florida Hospital Orlando (FHO), the DAP goal based on national benchmark data were 6.8 days of therapy (DOT)/1,000 patient days (PDs) or a total of 240 orders/month. The average PDs/month was calculated to be 35, 380, thus the DAP DDG for FHO was determined to be 8 orders/day to meet a goal of 6.8 DOT/month. This goal of 8 DAP orders/day was built into the DB for daily AS team review. This calculation allowed for a conversion of our monthly DOT goal to a DDG equivalent.

***Results.*** From October to December 2017, the DB identified an average of 230.7 orders/month at FHO, which was below the goal of 240 orders/month. Visualizing the daily goals for the number of allotted orders for DAP using a DDG format, this allowed the AS team to effectively meet the DOT/1,000 PDs goal. Focusing on the DDG combined with standard AS activities, resulted in a significant reduction of DAP utilization. When discussing utilization goals with ID specialists and general practitioners, the use of the DDG concept proved to be intuitive and facilitated understanding around specific metrics.

***Conclusion.*** Implementation of a medication utilization RT DB, combined with the introduction of the DDG concept, allowed for an actionable measure to trend daily and facilitated the goals of our AS program. Based on this valuable information provided by the DB, this intiative has now been expanded to include other high-cost agents across all campuses.

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