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

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Session: 219. Antimicrobial Stewardship: New Methods and Metrics
Saturday, October 6, 2018: 12:30 PM

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.

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

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Session: 219. Antimicrobial Stewardship: New Methods and Metrics
Saturday, October 6, 2018: 12:30 PM

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.

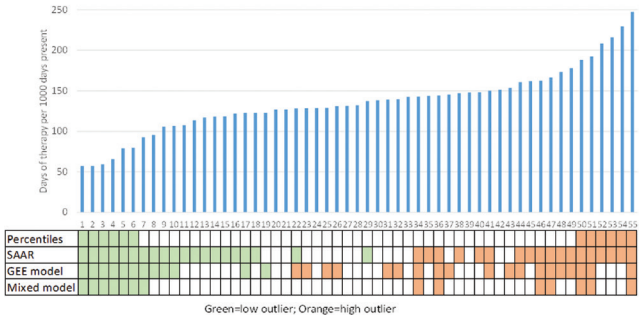
Results. Fifty-five units and 628,358 dp were included in the 1-year sample. Each method identified both positive and negative outliers. SAAR and GEE methods identified the largest number of outliers; percentiles identified the least (table). The four methods identified different individual units as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



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

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Session: 219. Antimicrobial Stewardship: New Methods and Metrics
Saturday, October 6, 2018: 12:30 PM

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.

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