Background: Delayed or in vitro inactive empiric antibiotic therapy may be detrimental to survival in patients with bloodstream infections (BSIs). Understanding the landscape of delayed or discordant empiric antibiotic therapy (DDEAT) across different patient, pathogen, and hospital types, as well as by their baseline resistance milieu, may enable providers, antimicrobial stewardship programs, and policy makers to optimize empiric prescribing.

Methods: Inpatients with clinically suspected serious infection (based on sampling of blood cultures and receiving systemic antibi-otic therapy on the same or next day) found to have BSI were identified in the Cerner Healthfacts EHR database. Patients were considered to have received DDEAT when, on culture sampling day, they received either no antibiotic(s) or none that displayed in vitro activity against the pathogenic bloodstream isolate. Antibiotic-resistant phenotypes were defined by in vitro resistance to taxon-specific prototype antibiotics (eg, methicillin/oxacillin resistance in *S. aureus*) and were used to estimate baseline resistance prevalence encountered by the hospital. The probability of DDEAT was examined by bacterial taxon, by time of BSI onset, and by presence versus absence of antibiotic-resistance phenotypes, sepsis or septic shock, hospital type, and baseline resistance.

Results: Of 26,036 assessable patients with a BSI at 131 US hospitals between 2005 and 2014, 14,658 (56%) had sepsis, 3,623 (14%) had septic shock, 5,084 (20%) had antibiotic-resistant phenotypes, and 8,593 (33%) received DDEAT. Also, 4,428 (52%) recipients of DDEAT received no antibiotics on culture sampling day, whereas the remaining 4,165 (48%) received in vitro discordant therapy. DDEAT occurred most often in *S. maltophilia* (87%) and *E. faecium* (80%) BSIs; however, 75% of DDEAT cases and 76% of deaths among recipients of DDEAT collectively occurred among patients with *S. aureus* and Enterobacteriales BSIs. For every 8 bacteremic patients presenting with septic shock, 1 patient did not receive any antibiotics on culture day (Fig. 1A). Patients with BSIs of hospital (vs community) onset were twice as likely to receive no antibiotics on culture day, whereas those with bloodstream pathogens displaying antibiotic-resistant (vs susceptible) phenotypes were 3 times as likely to receive in vitro discordant therapy (Fig. 1B). The median proportion of DDEAT ranged between 25% (14, 37%) in eight <300-bed teaching hospitals in the lowest baseline resistance quartile and 40% (31, 50%) at five ≥300-bed teaching hospitals in the third baseline resistance quartile (Fig. 2).

Conclusions: Delayed or in vitro discordant empiric antibiotic therapy is common among patients with BSI in US hospitals regardless of hospital size, teaching status, or local resistance patterns. Prompt empiric antibiotic therapy in septic shock and hospital-onset BSI needs more support. Reliable detection of *S. aureus* and Enterobacteriales bloodstream pathogens and their resistance patterns earlier with rapid point-of-care diagnostics may mitigate the population-level impact of DDEAT in BSI.
Funding: This study was funded in part by the National Institutes of Health Clinical Center, National Institutes of Allergy and Infectious Diseases, National Cancer Institute (NCI contract no. HHSN261200800001E) and the Agency for Healthcare Research and Quality.

Disclosures: None

Doi: 10.1017/ice.2020.526

Presentation Type: Oral Presentation

Predicting Vancomycin-Resistant Enterococci (VRE) and Carbapenem-Resistant Organism (CRO) Colonization in the Intensive Care Unit

Çağlar Çağlayan, Clemson University; Scott Levin, Johns Hopkins School of Medicine; Aaron Michael Milstone, Johns Hopkins School of Medicine; Pranita Tamma, Johns Hopkins School of Medicine; Patricia Simmer, Johns Hopkins School of Medicine; Katherine Goodman, University of Maryland School of Medicine; Joe Amoah, Johns Hopkins School of Medicine; Aria Smith, Johns Hopkins School of Medicine; Matt Toerper, Johns Hopkins School of Medicine; Sean Barnes, University of Maryland School of Business; Eili Klein, Johns Hopkins School of Medicine

Background: Rapidly identifying patients colonized with multidrug-resistant organisms (MDROs) upon ICU admission is critical to control and prevent the spread of these pathogens in healthcare facilities. Electronic health records (EHR) provide a rich source of data to predict the likelihood of MDRO colonization at admission, whereas surveillance methods are resource intensive and results are not immediately available. Our objectives were (1) to predict VRE and CRO colonization at ICU admission and (2) to identify patient subpopulations at higher risk for colonization with these MDROs. Methods: We conducted a retrospective analysis of patients aged ≥16 years admitted to any of 6 medical or surgical intensive care units (ICU) in the Johns Hopkins Hospital from July 1, 2016, through June 30, 2018. Perirectal swabs were collected at ICU unit admission and were tested for VRE and CRO. Patient demographic data, prior hospitalizations, and preadmission clinical data, including prior medication administration, prior diagnoses, and prior procedures, were extracted to develop prediction models. We employed the machine-learning algorithms logistic regression (LR), random forest (RF), and XGBoost (XG). The sum of sensitivity and specificity (ie, Youden’s index) was selected as the performance metric. Results: In total, 5,033 separate ICU visits from 3,385 patients were included, where 555 (11%) and 373 (7%) admissions tested positive for VRE and CRO, respectively. The sensitivity and specificity of our models for VRE were 78% and 80% with LR, 80% and 82% with RF, and 77% and 77% and 87% with XG. Predictions for CRO were not as precise, with LR at 73% and 53%, RF at 81% and 48%, and XG at 69% and 61%. The XG algorithm was the best-performing algorithm for both VRE and CRO. Prior VRE colonization, recent (<180 days) long-term care facility stay, and prior hospitalization >60 days were the key predictors for VRE, whereas the primary predictor for CRO colonization was prior carbapenem use. Conclusions: We demonstrated that EHR data can be used to predict >75% of VRE positive cases with a <15% false-positive rate and ~70% of CRO cases with a <40% false-positive rate. Future studies using larger sample sizes may improve the prediction accuracy and inform model generalizability across sites and thus reduce the risk of transmission of MDROs by rapidly identifying MDRO-colonized patients.

Funding: This work was funded by the Centers for Disease Control and Prevention (CDC) Epicenters Program (Grant Number 1U54CK000447) and the CDC MInD-Healthcare Program (Grant Number 1U01CK000536).

Disclosures: Aaron Milstone, BD (consulting)

Doi: 10.1017/ice.2020.527

Presentation Type: Oral Presentation

Prevalence and Epidemiology of Healthcare-Associated Infections (HAI) in US Nursing Homes (NH), 2017

Nicola Thompson, Centers for Disease Control and Prevention; Nimalie Stone, Centers for Disease Control and Prevention; Cedric Brown, Centers for Disease Control and Prevention; Taniece Eure,