Presentation Type:
Poster Presentation

Epidemiology and Microbiology of Outpatient Cases of Carbapenem-Resistant Enterobacteriaceae in Connecticut During 2018

Simran Gupta, University of Connecticut School of Medicine; Vivian Leung, Connecticut Department of Public Health; Meghan Maloney, Connecticut Department of Public Health, Healthcare Associated Infections & Antimicrobial Resistance Program; Bobbie Macierowski, Dr. Katherine A. Kelley State Public Health Laboratory; Diane Noel; Jafar Razeq; Anthony Muyombwe; David Banach, University of Connecticut School of Medicine

Background: Little is known about the epidemiology, microbiology, and clinical management of carbapenem-resistant Enterobacteriaceae (CRE) in outpatient settings. In Connecticut, all clinical CRE isolates are submitted to the state public health laboratory (SPHL) for a customized panel of antimicrobial susceptibility and carbapenemase gene testing. We describe all outpatient cases of CRE in Connecticut in 2018, including location of presentation, risk factors, microbiology and aspects of treatment. **Methods:** Outpatient CRE cases were defined as CRE infection in a patient not hospitalized at the time of positive CRE culture or within 30 days after culture collection. Outpatient cases were identified from routine statewide CRE reporting by reviewing clinical and laboratory data. A questionnaire was sent to outpatient providers who ordered the cultures that yielded CRE to collect additional clinical information. Antimicrobial susceptibility and carbapenemase gene detection results from the SPHL were also summarized. **Results:** Among 53 outpatient CRE cases (1 blood, 52 urine), the most common organisms were *Enterobacter* (25, 47%), *Klebsiella* (12, 23%), and *E. coli* (11, 21%). Overall, 21 (39.6%) patients presented in primary care settings, 8 (15%) in urology offices, 6 (11%) in women's health/OBGYN clinics; the remainder presented across various clinical settings (Fig. 1). Of 42 patients for whom clinical data were available, 45% had been hospitalized within the prior year and 19% had a chronic indwelling device. Among outpatient CRE cases, infectious diseases consultation was reported in 9.5% and lab consultation in none. Median patient age was 83 years. Of 36 CRE samples for which lab data were available, 9 (25%) were carbapenemase-producers (CP-CRE), of which 8 were *bla*KPC positive. Sensitivity rates to oral antimicrobials ranged from 43% to 75% (Table 1). **Conclusions:** CRE infections occur in several different outpatient settings, and formal ID consultation in the management of these patients is infrequent. These findings highlight the critical need for providers across different outpatient specialties to be familiar with the clinical management and infection control practices needed in caring for patients with CRE. Hospitalization within the year prior to presentation was frequent among patients who developed subsequent CRE-positive cultures. Most outpatient CP-CRE cases in CT are due to KPC production. Overall, sensitivity to oral antimicrobials frequently prescribed in outpatient settings is low, providing additional challenges to the outpatient management of patients with CRE infection. Fosfomycin, though only approved for *E. coli* infections, may be an acceptable antibiotic choice for the treatment of these patients.

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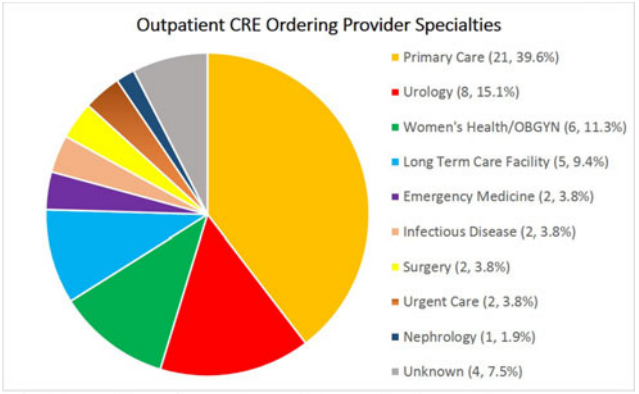

Figure 1: Breakdown of CRE culture-ordering providers by specialty. Patients most commonly presented to primary care, urology, and Women's Health/ OBGYN settings (39.6%, 15.1%, 11.3% respectively).

Fig. 1.

ORAL ANTIMICROBIAL	% SENSITIVE
LEVOFLOXACIN (n = 47)	66.0
CIPROFLOXACIN (n = 37)	54.1
MOXIFLOXACIN (n = 34)	58.8
FOSFOMYCIN (n = 24) *	75.0
TMP/SMX (n = 40)	60.0
NITROFURANTOIN (n = 37)	43.2

Table 1. Extended antimicrobial susceptibility testing results for oral antibiotics. Sensitivity rates to oral antimicrobials ranged from 43-75%. Data for each antimicrobial were collected from SPHL and reported clinical susceptibilities. *Fosfomycin resistance interpreted using CLSI breakpoint for E. coli. (<16mm).

Table 1.

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Epidemiology of Hospital Onset *Staphylococcus aureus* Bloodstream Infections (HO-SA-BSI) in the Era of MRSA LabID Reporting

Cassandra Salgado, Medical University of South Carolina; Stephanie O'Driscoll, Medical University of South Carolina; Shruti Puri, Medical University of South Carolina; Adrienne Lorek, Medical University of South Carolina; Scott Curry, Medical University of South Carolina

Background: Acute-care hospitals began reporting methicillin-resistant *Staphylococcus aureus* (MRSA) LabID facility-wide inpatient events to the NHSN in 2013. Few data are available regarding the epidemiology of these patients. **Methods:** We conducted a retrospective cohort study of patients who developed hospital onset *Staphylococcus aureus* bloodstream infections (HO-SA-BSIs) to describe the epidemiology (characteristics and outcomes) from January 2014 through June 2019 and to compare MRSA LabID BSIs to HO-MSSA BSIs. Proportions were compared using χ^2 and continuous variables using the Kruskal-Wallis test (EpiInfo). **Results:** Overall, 264 HO-SA BSIs occurred over the study period (2.21 per 10,000 patient days), 160 HO-MSSA BSIs (1.34 per 10,000 patient days), and 104 MRSA LabID BSIs (0.869 per 10,000 patient days). These rates have not significantly changed over time (Fig. 1). Most of these patients were men (64%);

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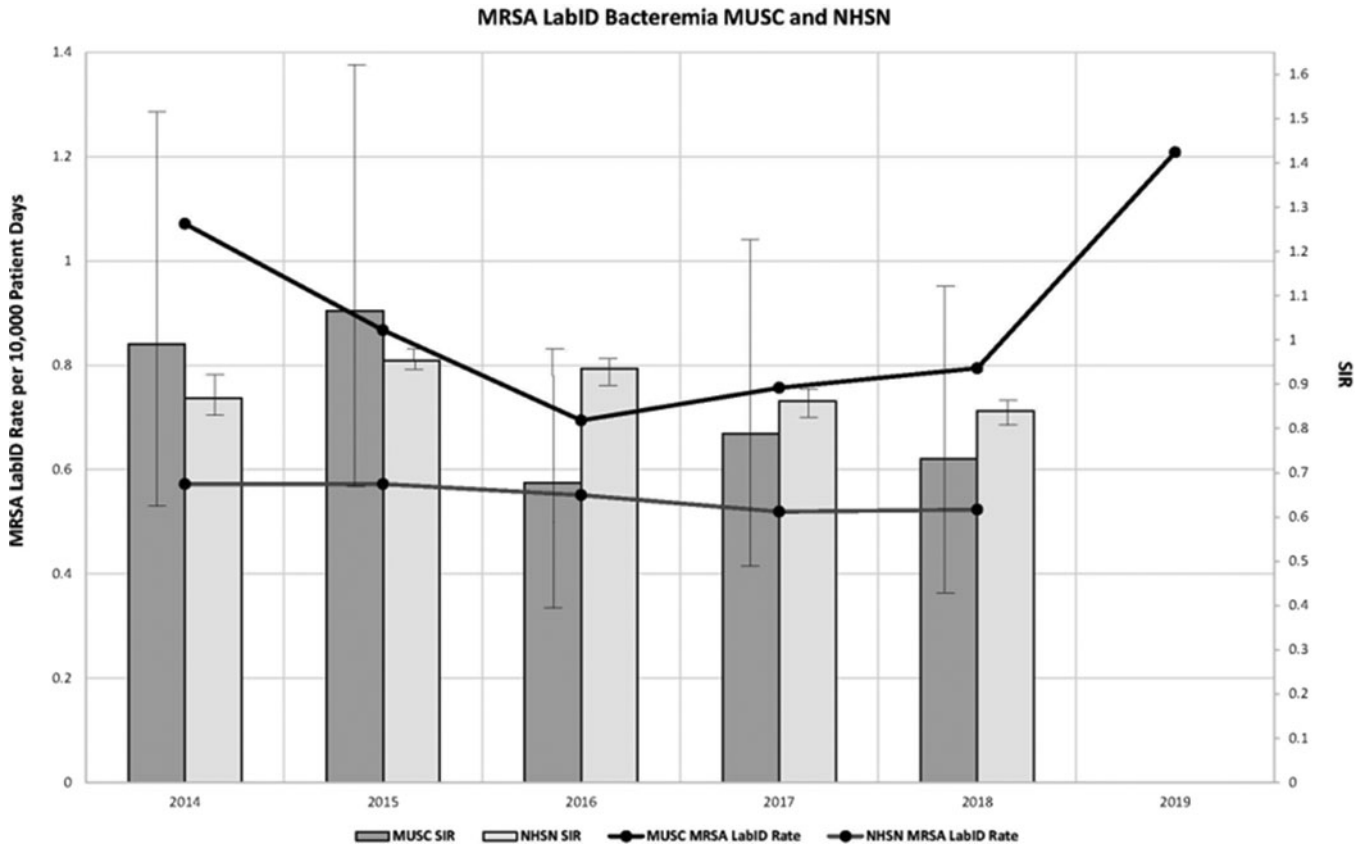

Fig. 1.

42.4% were African-American; mean age was 43.5 years; mean Charlson comorbidity index was 3.2; 67.8% were admitted for medical care (vs surgical); and 13.3% had a previous history of *S. aureus* infection. Of all HO-SA-BSIs, 49.2% were acquired in the ICU, 53.8% were primary BSIs, and 37.9% were catheter associated. Patients were hospitalized a mean of 19.9 days prior to HO-SA BSI, and the mean overall length of stay was 48.5 days. Compared to HO-MSSA BSIs, there were no significant differences in these characteristics among MRSA LabID BSIs except that a significantly greater proportion were catheter associated (46.2% vs 32.5%; OR, 1.78; 95% CI, 1.07–2.96; $P = .04$). Overall, 101 patients (38.3%) died: 41 with MRSA LabID BSI (39.4%) and 60 with HO-MSSA BSI (37.5%). Mortality rates have not changed significantly over time. The mean number of days to death was 154.2, and 59 patients (22.3%) died during incident hospitalization: 26.9% of MRSA patients and 19.4% of MSSA BSI patients. Moreover, 28.3% of patients were readmitted within 30 days of discharge from incident hospitalization, and compared to HO-MSSA BSI, this rate was significantly higher among MRSA LabID BSI patients (34.2% vs 24.8%; OR, 2.07; 95% CI, 1.09–3.93; $P = .03$). Among those who died, 58.4% died during hospitalization, 52.5% died within 30 days, 66.3% died within 60 days, and 74.3% had died within 90 days. Also, 47.5% died as a result of their HO-SA BSI, and compared to HO-MSSA BSI, this rate was significantly higher among those with MRSA LabID-BSI (63.4% vs 36.7%; OR, 2.99; 95% CI, 1.31–6.83; $P = .02$). **Conclusions:** Among patients with HO-SA BSI, methicillin-resistance continues to be associated with higher attributable mortality, and in our study, higher rates of 30-day readmission. There has been no significant change in HO-SA BSI rates (MSSA or MRSA) since reporting for MRSA LabID events began. Furthermore, mortality rates have not changed and remain high for both MRSA BSI and MSSA BSI patients. Given these findings, MSSA LabID event reporting should be considered.

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Epidemiology of NDM-Producing Enterobacteriaceae in Michigan

Gurmat Gill, Detroit Medical Center; Avnish Sandhu, Detroit Medical Center; Jordan Polistico, Detroit Medical Center Infectious Disease; Reda Awali, Wayne State University; Brenda Brennan; Sara McNamara, Michigan Department of Health and Human Services; Teena Chopra, Wayne State University

Background: Carbapenem-resistant Enterobacteriaceae (CRE) are classified as an urgent antibiotic-resistant threat by the CDC, and they are listed on the critical priority list by the World Health Organization due to the lack of antibiotic treatment options. New-Delhi metallo-β-lactamase (NDM) is an emerging mechanism of carbapenem resistance in the United States. We sought to understand the risk factors and clinical characteristics of patients with NDM CRE in Michigan to improve surveillance.