Epidemiologic and Microbiologic Characteristics of 28 Hospitalized Patients Cocolonized With Multiple Carbapenem-Resistant *Enterobacteriaceae* (CRE) in the United States
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Background: As carbapenem-resistant *Enterobacteriaceae* (CRE) prevalence increases in the United States, the risk of cocolonization with multiple CRE may also be increasing, with unknown clinical and epidemiological significance. In this study, we aimed to describe the epidemiologic and microbiologic characteristics of inpatients cocolonized with multiple CRE. **Methods:** We conducted a secondary analysis of a large, multicenter prospective cohort study evaluating risk factors for CRE transmission to healthcare personnel gown and gloves. Patients were identified between January 2016 and June 2019 from 4 states. Patients enrolled in the study had a clinical or surveillance culture positive for CRE within 7 days of enrollment. We collected and cultured samples from the following sites from each CRE-colonized patient: stool, perianal area, and skin. A modified carbapenem inactivation method (mCIM) was used to detect the presence or absence of carbapenemase(s). EDTA-modified CIM (eCIM) was used to differentiate between serine and metal-dependent carbapenemases. **Results:** Of the 313 CRE-colonized patients enrolled in the study, 28 (8.9%) were cocolonized with at least 2 different CRE. Additionally, 3 patients were cocolonized with >2 different CRE (1.0%). Of the 28 patients, 19 (67.6%) were enrolled with positive clinical cultures. Table 1 summarizes the demographic and clinical characteristics of these patients. The most frequently used antibiotic prior to positive culture was vancomycin (n = 33, 18.3%).

TABLE 1. DEMOGRAPHIC AND CLINICAL CHARACTERSTICS AMONG PATIENTS WITH CRE CO-COLONIZATION (N=28)

CHARACTERSTICS	N (%)
AGE, MEAN (SD)	56.8 (16.4)
MALE	18 (64.3)
HISPANIC	3 (11.5)
RACE	
BLACK/AFRICAN AMERICAN	8 (30.8)
WHITE	13 (50.0)
ASIAN	5 (19.2)
ADMITTED TO ICU	15 (53.6)
NUMBER OF DEVICES, MEDIAN (IQR)	4 (1-5)
DURATION OF ANTIBIOTICS IN DAYS, MEAN(SD)	23.4 (60.7)
LENGTH OF STAY, MEAN (SD)	55.2 (71.5)
DAYS FROM HOSPITAL ADMISSION TO POSITIVE CULTURE, MEAN(SD)	21.7 (31.0)
DAYS FROM POSITIVE CULTURE TO DISCHARGE, MEAN(SD)	35 (45.7)
TRAVEL OUT OF COUNTRY IN THE LAST YEAR	2 (7.1)
LTAC IN THE LAST YEAR	7 (25)
OUTCOME	
DEATH	4 (14.3)
DISCHARGED	10 (35.7)
TRANSFER TO OTHER FACILITY	14 (50.0)

Fig. 1.

Among the 62 isolates from 59 samples from 28 patients cocolonized patients, the most common CRE species were *Klebsiella pneumoniae* (n = 18, 29.0%), *Escherichia coli* (n = 10, 16.1%), and *Enterobacter cloacae* (n = 9, 14.5%). Of the 62 isolates, 38 (61.3%) were mCIM positive and 8 (12.9%) were eCIM positive. Of the 38 mCIM-positive isolates, 33 (86.8%) were KPC positive, 4 (10.5%) were NDM positive, and 1 (2.6%) was negative for both KPC and NDM. Also, 2 *E. coli*, 1 *K. pneumoniae*, and 1 *E. cloacae* were NDM-producing CRE. **Conclusion:** Cocolonization with multiple CRE occurs frequently in the acute-care setting. Characterizing patients with CRE cocolonization may be important to informing infection control practices and interventions to limit the spread of these organisms, but further study is needed.

Epidemiology and Clinical Outcomes Associated With Extensively Drug-Resistant (XDR) *Acinetobacter* in US Veterans' Affairs Health Care
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Background: Infections caused by *Acinetobacter* spp are often healthcare acquired, difficult to treat, and associated with high mortality. Extensively drug-resistant (XDR) *Acinetobacter* are nonsusceptible to at least 1 agent in all but 2 or fewer antimicrobial classes. Epidemiologic and outcome data for XDR *Acinetobacter* are limited and have largely been reported outside the United States. This national cohort study describes epidemiology, clinical characteristics, and outcomes for patients with XDR *Acinetobacter* in VA health care. Methods: This was a retrospective cohort study including microbiology and clinical data from all patients hospitalized between 2012 and 2018 at any VA medical center who had cultures that grew XDR *Acinetobacter* spp. Performance and reporting of bacterial speciation and antibiotic susceptibility testing were performed by each VA laboratory according to their protocol. Descriptive statistics were used to summarize data. Results: Of 11,541 unique patients with 15,358 cultures that grew *Acinetobacter* spp during the study period, 410 (3.6%) patients had 670 (4.4%) cultures that grew XDR *Acinetobacter*. Mean age was 68 years (SD, 12.2 years) and the median Charlson comorbidity index was 3 (IQR, 1–5). The greatest proportion of isolates were from the respiratory tract (n = 235, 35%) followed by urine (n = 184, 28%). The South had the greatest proportion of patients with XDR *Acinetobacter* (n = 162, 40%); almost all patients were seen at urban VA medical centers (n = 406, 99%). Most patients (n = 335, 82%) had had antibiotic exposure in the prior 90 days, most commonly vancomycin (n = 238, 65%) and third- or fourth-generation cephalosporins (n = 155, 38%). Most patients (n = 334, 81%) also had a hospital or long-term care admission in the prior 90 days. Fig. 1 shows antibiotic susceptibilities of XDR *Acinetobacter* isolates; polymyxins, tigecycline, and minocycline