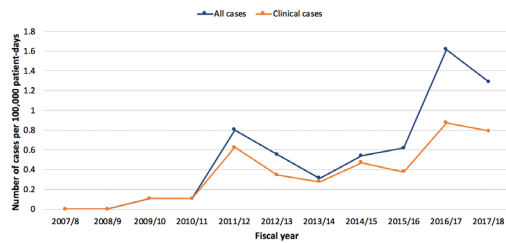


test (10/36 (28%) were on admission). The median incidence of HA CPE per 100,000 patient-days at each hospital was 0.44 (IQR 0.15–0.68) ( $P < 0.0001$ ).

**Conclusion.** A quarter of CPE cases in southern Ontario were HA and the incidence of HA cases is increasing. Most cases were admitted to >1 Ontario hospital. Strategies to control transmission are critical.

**Figure.** Incidence of nosocomial CPE (all and clinical cases) in southern Ontario hospitals.



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

**513. Transmission of Carbapenem-Resistant Enterobacteriaceae in a Community-Based, Residential Care Setting: Nevada, 2018**

Danica Gomes, MD, MSc<sup>1</sup>; Ana Bardossy, MD<sup>1</sup>; Andrew Gorzalski, PhD<sup>2</sup>; Heather Holmstadt, RN<sup>3</sup>; Sandra Larson, MPH<sup>4</sup>; Alison L. Halpin, PhD<sup>1</sup>; Lei Chen, PhD<sup>5</sup>; Kimisha Causey, MPH<sup>6</sup>; Chidinma V. Njoku, MHA<sup>7</sup>; Nimalie D. Stone, MD MS<sup>8</sup>; Abimbola Ogundimu, DrPH, RN, CIC<sup>1</sup>; Heather Moulton-Meissner, PhD<sup>1</sup>; Gillian A. McAllister, BS<sup>1</sup>; Paige Gable, BS<sup>1</sup>; Nick Vlachos, MS<sup>1</sup>; Maroya S. Walters, PhD<sup>9</sup>; Lauren Epstein, MD MSc<sup>1</sup> and Adrian Forero, BS Health Ecology<sup>10</sup>; <sup>1</sup>Centers for Disease Control and Prevention, Atlanta, Georgia; <sup>2</sup>Nevada State Public Health Lab, Reno, New Jersey; <sup>3</sup>Washoe County Health District, Reno, Nevada; <sup>4</sup>Nevada Department of Health and Human Services, Las Vegas, Nevada; <sup>5</sup>Retired Epidemiology Program Manager, Washoe County Health District, Reno, Nevada; <sup>6</sup>Nevada Division of Public and Behavioral Health, Las Vegas, Nevada; <sup>7</sup>Office of Public Health Investigations and Epidemiology, Las Vegas, Nevada; <sup>8</sup>CDC, Atlanta, Georgia; <sup>9</sup>Division of Healthcare Quality Promotion, Centers for Disease Control and Prevention, Atlanta, Georgia; <sup>10</sup>Office of Public Health Informatics and Epidemiology, Las Vegas, Nevada

**Session:** 55. HAI: MDRO – GNR Transmission  
**Thursday, October 3, 2019: 12:15 PM**

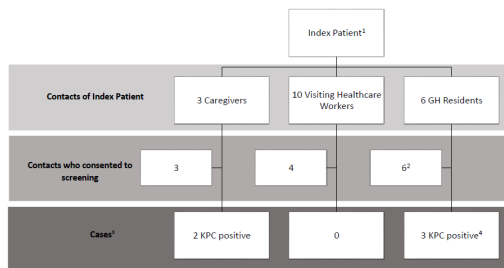
**Background.** *Klebsiella pneumoniae* carbapenemase-producing organisms (KPCOs) are often multidrug-resistant, and the KPC resistance determinant can be transmitted between bacteria. KPCOs are associated with healthcare facility exposures; identification in community-based, residential care settings is uncommon. In September 2018, the Washoe County Health District was notified of a KPC-producing *Escherichia coli* from a group home (GH) resident. We investigated the source of this KPCO and evaluated transmission in the GH.

**Methods.** A case was defined as detection of KPCO from a GH resident or staff from June 1 to November 30, 2018. Staff included caregivers who provided daily care (including toileting, bathing, feeding) and visiting healthcare workers. Residents and staff were offered KPCO screening to assess colonization status. Exposures were assessed by medical record review and interviews. Genetic relatedness of KPCOs was evaluated by whole-genome sequencing (WGS). Infection prevention and control (IPC) practices were reviewed.

**Results.** Overall, six cases were identified, including the index, two of seven staff screened and three of six residents screened. Three residents with KPCOs had recent hospitalizations and shared a bathroom in the GH; one overlapped on the same hospital unit as a patient with KPC-producing *Klebsiella oxytoca*. Staff with KPCOs were caregivers who had extensive contact with residents and their environment and no IPC training. Gaps in hand hygiene and environmental cleaning were observed. Organism was recovered from 4 positive screening tests as well as from blood cultures from the index case; all were KPC-producing *E. coli*. WGS showed that the five *E. coli* isolates were closely related, consistent with transmission, and harbored the same KPC variant as the *K. oxytoca*. No new cases occurred after IPC was improved.

**Conclusion.** A GH resident likely acquired KPCOs during a recent hospitalization, and extensive transmission among GH residents and staff occurred. Factors contributing to transmission included resident dependence on caregivers for daily care and minimal IPC knowledge among caregivers. Facilities with similar populations should increase IPC training to prevent transmission of resistant pathogens.

**FIGURE: Screening Assessments of Contacts and KPC Case Finding**



<sup>1</sup>No recent hospitalizations.  
<sup>2</sup>Includes 5 direct contacts of the index case (one expired and could not be screened) and a GH resident that was admitted after the index case expired, but was in contact with other GH residents and caregivers with KPC-producing *E. coli*.  
<sup>3</sup>Overall, 6 cases identified (including index case).  
<sup>4</sup>All had recent hospitalization in previous 3 months; one overlapped on the same hospital unit as a patient with KPC-producing *Klebsiella oxytoca*.

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

**514. Shedding of Multidrug-Resistant Gram-Negative Bacilli by Colonized Patients during Procedures and Patient Care Activities**

Heba Alhmidi, MD<sup>1</sup>; Jennifer Cadnum, BS<sup>1</sup>; Annette Jenson, MT, CIC<sup>1</sup>; Robert A. Bonomo, MD<sup>2</sup>; Brigid Wilson, PhD<sup>2</sup>; Jeanmarie Mayer, MD<sup>3</sup>; Matthew H. Samore, MD<sup>4</sup> and Curtis Donskey, MD<sup>5</sup>; <sup>1</sup>Northeast Ohio VA Healthcare System, Cleveland, Ohio; <sup>2</sup>Louis Stokes Cleveland VA Medical Center, Cleveland, Ohio; <sup>3</sup>University of Utah School of Medicine, Sandy, Utah; <sup>4</sup>University of Utah, Salt Lake City, Utah; <sup>5</sup>Cleveland VA Medical Center, Cleveland, Ohio

**Session:** 55. HAI: MDRO – GNR Transmission  
**Thursday, October 3, 2019: 12:15 PM**

**Background.** Contaminated environmental surfaces contribute to transmission of healthcare-associated pathogens such as multidrug-resistant gram-negative bacilli. We hypothesized that medical procedures and patient care activities facilitate environmental dissemination of multidrug-resistant gram-negative bacilli in hospitalized patients.

**Methods.** We conducted a cohort study of hospitalized patients in contact precautions for carriage of extended-spectrum  $\beta$ -lactamase (ESBL)-producing or carbapenem-resistant gram-negative bacilli (CR-GNB) to determine the frequency of environmental shedding during procedures and care activities. Perirectal, wound, and skin were cultured for the gram-negative bacilli of interest. Prior to each procedure or activity, surfaces in the room and portable equipment used for procedures were disinfected. After procedures, high-touch surfaces and portable equipment were cultured; negative control cultures were collected after 1 hour in the absence of a procedure.

**Results.** Of 60 participants, 38 (63%) were in contact precautions for ESBL-producing gram-negative bacilli and 22 (37%) for CR-GNB. Thirty-four (57%) participants had positive perirectal, wound, or skin cultures. Contamination of surfaces with the colonizing multidrug-resistant gram-negative bacilli occurred frequently during procedures and activities such as wound care, assistance with meals, and urinary catheter or colostomy care (11% to 29% of procedures/activities), whereas contamination was rare in the absence of a procedure (1%). Contamination was recovered from 6 of 56 (10%) portable devices used for procedures.

**Conclusion.** Environmental shedding of multidrug-resistant gram-negative bacilli occurs frequently during medical and non-medical procedures in hospitalized patients. Our results suggest that there is a need for effective strategies to disinfect surfaces and equipment after procedures.

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

**515. Acquisition of Antibiotic-Resistant Gram-Negative Bacteria in the Benefits of Universal Glove and Gown (BUGG) Cluster Randomized Trial**

Anthony Harris, MD, MPH<sup>1</sup>; Daniel Morgan, MD, MS<sup>2</sup>; Lisa Harris, MA<sup>3</sup>; Laurence S. Magder, PhD MPH<sup>4</sup>; Lyndsay M. O'Hara, PhD, MPH<sup>5</sup> and Kristie Johnson, PhD<sup>5</sup>; <sup>1</sup>University of Maryland School of Medicine, Baltimore, Maryland; <sup>2</sup>University of Maryland and VA Maryland Health Care System, Baltimore, Maryland; <sup>3</sup>University of Maryland Dept of Epidemiology and Public Health, Baltimore, Maryland; <sup>4</sup>University of Maryland School of Medicine, Baltimore, Maryland; <sup>5</sup>University of Maryland Medical Center, Baltimore, Maryland

**Session:** 55. HAI: MDRO – GNR Transmission  
**Thursday, October 3, 2019: 12:15 PM**

**Background.** The Benefits of Universal Gloves and Gowns (BUGG) randomized trial found a decrease in MRSA acquisition, no effect on VRE acquisition and no increase in adverse events with the intervention of wearing gloves and gowns for all patient contact in the intensive care unit (ICU). The objective of the study was to assess whether wearing gloves and gowns for all patient contact in the ICU decreases the acquisition of antibiotic-resistant Gram-negative bacteria.

**Methods.** Design: Secondary study of the BUGG cluster-randomized trial.

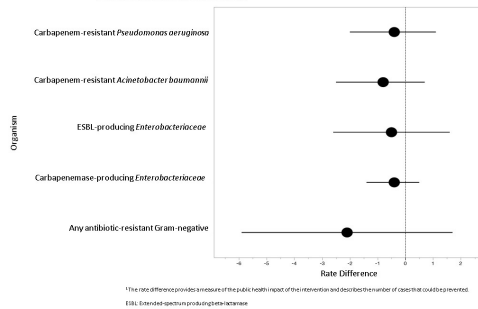
**Participants:** 20 medical and surgical ICUs in 20 US hospitals.

**Intervention:** Healthcare workers were required to wear gloves and gowns when entering any patient room compared with standard care. **Main outcomes and measures:** The primary composite outcome was acquisition of any antibiotic-resistant Gram-negative bacteria based on surveillance cultures collected on admission and discharge. Secondary outcomes were acquisition of carbapenem-resistant *Acinetobacter baumannii*, *Pseudomonas aeruginosa*, *Enterobacteriaceae*, or ESBL-producing *Enterobacteriaceae*.

**Results.** For the primary outcome, the intervention had a RR of 0.90 (95% CI 0.71 to 1.12,  $P = 0.34$ ). Effects on the secondary outcomes were: carbapenem-resistant *Enterobacteriaceae* [RR 0.86 (95% CI, 0.60 to 1.24),  $P = 0.43$ ], carbapenem-resistant *Acinetobacter* [RR 0.81 (95% CI, 0.52 to 1.27)  $P = 0.36$ ], carbapenem-resistant *Pseudomonas* [RR 0.88 (95% CI, 0.55 to 1.42)  $P = 0.62$ ], ESBL producing bacteria [RR 0.94, (95% CI, 0.71 to 1.24)  $P = 0.67$ ].

**Conclusion.** The association of universal glove and gown use in the ICU with acquisition of antibiotic-resistant Gram-negative bacteria was inconclusive. The observed rate ratios for all five outcomes suggest that the intervention was protective, however, none were statistically significant. The study was likely underpowered to detect statistical significance for the effect sizes found. Individual hospitals should consider implementing the intervention based on the importance of these organisms at their hospital, effect sizes, confidence intervals, and cost.

Figure 1. Rate differences (per 1,000 person-days) and 95% confidence intervals for the impact of universal glove and gown use by organism



Disclosures. All authors: No reported disclosures.

### 516. Social Network Analysis to Study MDRO Transmission in VA Community Living Centers and Spinal Cord Injury Units

Svetlana Bondar, MPH<sup>1</sup>; Tola Ewers, MS, PhD<sup>2</sup>; Amanda Vivo, MPH<sup>3</sup>; Marissa Gutkowski, MPH<sup>4</sup>; Charlesnika T. Evans, PhD, MPH<sup>5</sup>; Eli N. Perencevich, MD MS<sup>6</sup> and Christopher Crnich, MD PhD<sup>7</sup>; <sup>1</sup>University of Wisconsin-Madison, Madison, Wisconsin; <sup>2</sup>University of Wisconsin-Madison School of Medicine and Public Health, Madison, Wisconsin; <sup>3</sup>CINCCCH at Hines VA, Hines, Illinois; <sup>4</sup>Veteran Affairs, Hines, Illinois; <sup>5</sup>Northwestern University and VA, Hines, Illinois; <sup>6</sup>University of Iowa Carver College of Medicine, Iowa City, Iowa; <sup>7</sup>University of Wisconsin, Madison, Wisconsin

Session: 55. HAI: MDRO – GNR Transmission

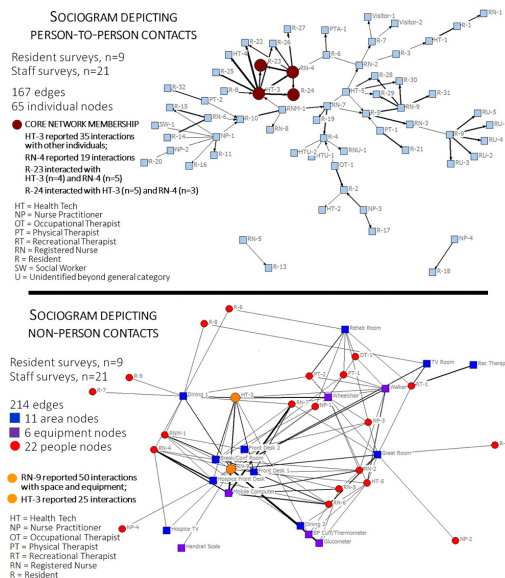
Thursday, October 3, 2019: 12:15 PM

**Background.** Residents of VA Community Living Centers (CLC) and Spinal Cord Injury units (SCI) are commonly colonized or infected with multidrug-resistant organisms (MDROs). The mechanisms by which MDROs are spread between residents in CLC/SCI settings remain poorly understood. Our objective was to develop methods to better understand how MDROs are spread in VA CLCs/SCIs.

**Methods.** Preliminary data from two of the four VA medical centers participating in an ongoing study are included in these analyses. A structured sociometric survey was employed to collect data on interactions between residents, staff and environmental surfaces in study units. UCINET was used to construct a sociogram and calculate network characteristics (density, centrality) using responses to the surveys administered in one of the participating facilities.

**Results.** A total of 136 surveys were completed by 49 staff and 45 residents at the two VA sites. Staff reported more interactions with residents than with other staff. Residents reported more interactions with staff than with other residents, the latter tending to only occur during group activities. Sociograms generated from preliminary surveys collected at one site suggest a four-core-person social network pattern connecting two staff with two specific residents and showed that the dining room was the group setting most frequently visited by residents. Mobile computers, blood pressure cuffs/thermometers and glucometers were the equipment used most heavily during resident care activities (figure). Challenges in identifying contact patterns include recall bias and inability of some residents to identify names of individuals with whom they interacted. Residents were still able to reliably identify staff roles.

**Conclusion.** This preliminary work shows heterogeneous contact patterns between persons and surfaces in VA CLCs/SCIs. Characterizing this heterogeneity and its influence on MDRO spread via this type of social network analysis is feasible in the VA CLC/SCI setting, albeit with some limitations. Next steps in our studies include adding data from two additional sites and using observation techniques supplemented with microbiological sampling of targeted environmental surfaces to further understand potential transmission patterns.



Disclosures. All authors: No reported disclosures.

### 517. Treatment Patterns of Hospitalized Adults with Infections Due to Carbapenem Non-Susceptible Gram-Negative Organisms in a Large Electronic Health Record Database in the United States

Tanya Burton, PhD<sup>1</sup>; Amy Anderson, MS<sup>1</sup>; Jerry Seare, MD<sup>1</sup>; Ryan J. Dillon, MSc<sup>2</sup> and Eilish McCann, PhD<sup>3</sup>; <sup>1</sup>Optum, Boston, Massachusetts; <sup>2</sup>Merck & Co., Inc., Kenilworth, New Jersey; <sup>3</sup>Merck & Co., Inc., Kenilworth, New Jersey

Session: 56. HAI: MDRO – GNR Treatment

Thursday, October 3, 2019: 12:15 PM

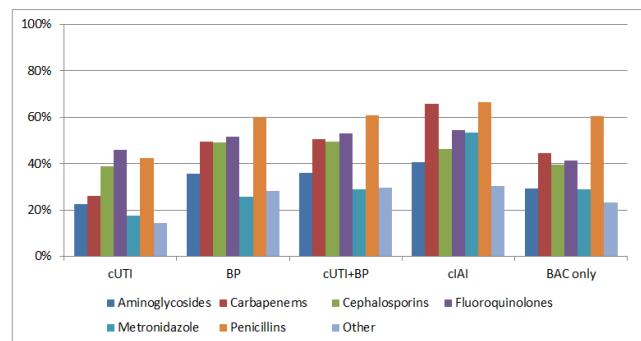
**Background.** Infections caused by carbapenem non-susceptible (C-NS) Gram-negative (GN) organisms pose a major threat, due in part to limited treatment options. The aim of this study was to assess treatment patterns for these infections in a large US electronic health record database.

**Methods.** A retrospective cohort study of hospitalized adults with complicated intra-abdominal infection (cIAI), complicated urinary tract infection (cUTI), bacterial pneumonia (BP), or bacteremia (BAC) due to C-NS (resistant/intermediate susceptibility to carbapenem) GN organisms from January 2013 to March 2018. Patients with inherently C-NS organisms (e.g., *Pseudomonas aeruginosa* to ertapenem) were only included if resistance to another carbapenem was identified. The index date was the date of first C-NS culture in a qualifying hospitalization ( $\pm 3$  days from admission/discharge). Clinical characteristics and administered treatments were assessed from admission to discharge with variables summarized descriptively and stratified by infection type.

**Results.** 7,702 patients met inclusion criteria: 31% cUTI  $\pm$  BAC, 24% BP  $\pm$  BAC, 21% cUTI + BP  $\pm$  BAC, 17% cIAI  $\pm$  BAC, cUTI, or BP, 7% BAC only. The median age was 66 years, ranging from 60 (BAC) to 69 (cUTI) years; male, 57%. The most common pathogens were *Pseudomonas aeruginosa* (64%) and *Klebsiella pneumoniae* (15%). Antibiotics were administered to the majority of patients (87%); of which, 79% received combination therapy (median classes: 3, maximum: 7), the remainder received monotherapy. For antibiotic-treated patients, 93% initiated an antibiotic before the non-susceptibility status of the underlying organism was known. The most common classes given during the index hospitalization were: penicillin (49%), fluoroquinolone (44%), carbapenem (40%), cephalosporin (39%), aminoglycoside (28%) (by infection type, Figure 1). Eleven percent of patients received colistin/polymyxin B.

**Conclusion.** Varied antibiotic use was observed in this cohort, with carbapenems frequently detected despite the C-NS nature of the underlying GN organisms. The use of antibiotics to which organisms are non-susceptible could lead to poor health outcomes, supporting the need for new targeted therapies to treat C-NS infections.

Figure 1. Antibiotic Use by Infection Type



Disclosures. All authors: No reported disclosures.

### 518. Comparing the Mortality of Carbapenemase-Producing and Non-Carbapenemase-Producing Carbapenem-Resistant *Enterobacteriaceae* Bacteremia

Hyeonji Seo, MD<sup>1</sup>; Eunmi Yang, MD<sup>1</sup>; Seongman Bae, MD<sup>1</sup>; Hyemin Chung, MD<sup>2</sup>; Eunbeen Cho, MD<sup>1</sup>; Sang-Oh Lee, MD<sup>1</sup>; Sang-Ho Choi, MD<sup>1</sup>; Yang Soo Kim, MD<sup>1</sup>; Sung-Han Kim, MD<sup>1</sup>; Jun Hee Woo, PhD<sup>1</sup>; Jiwon Jung, MD<sup>1</sup>; Min Jae Kim, MD<sup>1</sup>; Heungsung Sung, PhD<sup>1</sup>; Mi-Na Kim, PhD<sup>1</sup>; Su-Jin Park, Doctor<sup>3</sup> and Yong Pil Chong, MD<sup>1</sup>; <sup>1</sup>Asan Medical Center, Songpa-gu, Seoul-t'ukpyolsi, Republic of Korea; <sup>2</sup>Seoul medical center, Seoul, Seoul-t'ukpyolsi, Republic of Korea; <sup>3</sup>Center for Antimicrobial Resistance and Microbial Genetics, Seoul, Seoul-t'ukpyolsi, Republic of Korea

Session: 56. HAI: MDRO – GNR Treatment

Thursday, October 3, 2019: 12:15 PM

**Background.** Carbapenem-resistant *Enterobacteriaceae* (CRE) infection is an emerging clinical issue. One of the mechanisms of carbapenem-resistance is carbapenemase production. This study aimed to identify whether clinical outcomes differ by CRE resistance mechanism and to evaluate risk factors for mortality in patients with CRE bacteremia.

**Methods.** We conducted a retrospective cohort study comparing 14-day mortality between patients with carbapenemase-producing (CP)-CRE and non-CP-CRE bacteremia during January 2011 to October 2018. Only monomicrobial *Escherichia coli* or *Klebsiella pneumoniae* bacteremia were included in the study. A modified