Results. Fifty-three patients were identified with a culture-proven CRE diagnosis. CRE was isolated from the following sites: urine, sputum, bronchial wash, blood, and tissue/wound culture. True infection was identified in 32 cases. For the 18 cases with likely colonization, urine was the most common site. Klebsiella pneumoniae was the most common organism identified with carbapenem-resistance. Fluoroquinolones, either alone or in combination with other agents, were the most commonly used agents to treat CRE infection. The average duration of targeted antibiotic therapy was 9 days. Mortality rates at 30 and 90 days were 10% and 14%, respectively.

Conclusion. The prevalence of CRE infections is on the rise, and may be a result of increased broad-spectrum antibiotic use combined with inappropriate carbapenem use. Unconventional agents, such as fluoroquinolones, are being utilized to manage patients with documented CRE infection at Union Hospital.

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

510. Exposure Investigation Following a Confirmed Case of *Candida auris* and Multiple Carbapenemase-Producing Carbapenem-Resistant Organisms

Frances Nicholson, MPH, CPH, CIC [1]; Melanie Curless, MSHP, RN, CIC[1]; Maggie Schiffhauer, MHS, CIC[1]; Sean Zhang, MD, PhD[1]; Patricia Simner, PhD D (ABMM)[1]; Karen C. Carroll, MD[2]; Clare Rock, MD, MS[1]; Lisa Maragakis, MD, MPH[1] and Lisa Maragakis, MD, MPH[1]; [1]The Johns Hopkins Hospital, Baltimore, Maryland; [2]Johns Hopkins, Baltimore, Maryland

Session: 54. HAI: MDRO – GNR Epidemiology, CRE

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Background. Co-infections of *Candida auris* and carbapenemase-producing carbapenem-resistant Gram-negative organisms (CP-CRO) are an increasing global concern and rarely seen in the United States. We report the case of a 59-year-old male, with recent hospitalization in India, admitted to our facility with *C. auris* isolated from urine and axilla/groin specimens and CP-CRO from five body sites.

Methods. Travel screening in the emergency department identified a patient at high risk for colonization/infection with multidrug-resistant organisms (MDRO). Contact precautions were initiated. Eight CP-CRO isolates were subsequently identified from clinical and routine surveillance cultures from five separate sites. Of the isolates, seven contained one or more carbapenemase-producing genes detected by Xpert Carba-R assay (Cepheid, Sunnyvale, CA) (Table 1). The microbiology laboratory alerted the infection control department of a presumptive positive *C. auris* from a clinical urine culture from the same patient. Enhanced mitigation strategies were initiated in regards to cleaning and disinfection.

An exposure investigation was also conducted using a point prevalence approach. Surveillance cultures were obtained from inpatients currently admitted to the same unit as the index patient. Axilla/groin specimens were collected for *C. auris* testing, and rectal specimens were collected for CP-CRO gene testing (CRE Real-Time PCR).

Results. Eighteen patients in addition to the index patient were hospitalized on the acute medicine unit. One patient refused testing for CP-CRO; therefore, 17 patients were tested for CP-CRO, and 18 patients were tested for *C. auris*. Neither CP-CRO nor *C. auris* were recovered from any patient.

Conclusion. A patient co-infected with *C. auris* and multiple CP-CRO was identified by clinical and routine surveillance cultures at Johns Hopkins Hospital. Travel screening allowed proactive isolation upon presentation. Enhanced infection control measures were implemented and a point prevalence surveillance study was conducted on the general acute care medicine inpatient unit. No transmission of either *C. auris* or CP-CRO was detected, likely due in part to rapid identification and strict infection control measures.

Table 1: Diversity of CP-CRO colonization isolated from various body sites in a single patient.

Specimen Type	Bacterial Species	Gene
Abscess	*Klebsiella pneumoniae*	NDM, OXA-48
	Pseudomonas aeruginosa	KPC
Blood (Peripheral)	*Escherichia coli*	NDM
Endotracheal/nasotracheal Aspirate	*K. pneumoniae*	NDM, OXA-48
Rectal Swab	*E. coli*	NDM, OXA-48
	K. pneumoniae	NDM, OXA-48
Urine (catheterized)	*Acinetobacter baumannii*	N/A
	Providencia rettgeri	NDM, OXA-48

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

511. MDRO Carriage in Patients in Two ICUs and Prevalence of Environmental Surface and Healthcare Worker Hand Contamination

Windy Tanner, PhD[1]; Jana Coombs, BS[2]; Tasha Fernley, BS[2]; Suresh Danala, BS[2]; Bert K. Lopansri, MD, FIDSA[3] and Michael Rubin, MD, PhD[4]; [1]University of Utah, Salt Lake City, Utah; [2]Intermountain Healthcare, Salt Lake City, Utah; [3]Intermountain Healthcare and University of Utah, Salt Lake City, Utah; [4]VA Salt Lake City HCS, Salt Lake City, Utah

Session: 55. HAI: MDRO – GNR Transmission

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Background. Determining MDRO (multidrug-resistant organism) transmission routes in intensive care units (ICUs) can be complex and require the evaluation of multiple potential MDRO sources, including patients, the environment, and healthcare worker (HCW) hands. The objective of this study was to determine MDRO carriage in patients in two separate ICUs, and simultaneous environmental and HCW hand contamination from associated rooms.

Methods. Patient (P), environmental (E), and HCW hand (H) samples were collected from hospital A (1183 H, 1253 E, 729 P) and hospital B (699 H, 1372 E, 437 P) over approximately 5 weeks in each unit. Environmental and HCW hand samples were collected using a cellulose sponge. HCW hand samples were collected prior to any hand hygiene. Patient samples were collected from the axilla, groin, and perianal areas with a flocked swab with patient consent. All samples were tested semi-quantitatively for Clostridium difficile (Cdiff), vancomycin-resistant enterococci (VRE), and cefotaxime-resistant Enterobacteriaceae (Cef-R-Ent) by selective culture. Cdiff isolates representative of each P/E/H cluster were tested for Cdiff toxin testing by PCR.

Results. Cdiff, VRE, and Cef-R-Ent were detected in patients, patient rooms, and on HCW hands in both facilities (Table 1). Cdiff was more prevalent in Facility A, while Cef-R-Ent was more prevalent in Facility B. The prevalence of VRE was minimal in both facilities. Cdiff toxin gene testing revealed that 17% of the Cdiff isolate clusters tested positive for toxin genes. In Facility A, the prevalence of a given MDRO was similar regardless of sample type, but was more widely varied between sample types in Facility B. Prevalence of MDROs on HCW hands and in the environment was typically higher in Facility A compared with Facility B. Individual patient positives were frequently linked to positive HCW hand and environmental cultures.

Conclusion. We discovered a low prevalence of all MDROs in both facilities, with most positive cultures associated with patients who were not on MDRO precautions. HCW hand and environmental MDRO prevalence was generally similar for each MDRO, regardless of patient prevalence, supporting previously reported links on HCW hand contamination and hospital room surfaces.

	Facility A ICU			Facility B ICU		
	Cdiff*	VRE	Cef-R-Ent	Cdiff	VRE	Cef-R-Ent
HCW hands	3.50%	0.30%	2.80%	0.40%	0.40%	0.40%
Environment	4.30%	0.30%	3.70%	0.90%	0.50%	4.40%
Patients	4.10%	0.30%	2.10%	2.70%	1.80%	4.60%

Table 1. Prevalence of various MDROs of each sample type by facility; *Culture-positive

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

512. Healthcare-Acquired (HA) Carbapenemase-Producing Enterobacteriales (CPE) in Southern Ontario, Canada: To Whom Are We Transmitting CPE?

Alainna Jamal, MD-PhD Candidate[1]; Brenda Coleman, PhD[2]; Jennie Johnstone, MD, FRCPC, PhD[2]; Kevin Katz, MD, MSc, FRCPC [3]; Matthew P. Muller, MD, FRCPC, PhD[4]; Samir Patel, PhD, FCCM (D), ABMM[5]; Roberto Melano, MSc, PhD[6]; Anu Rebbapragada, PhD, D(ABMM), FCCM, CIC [7]; David Richardson, MD, FRCPC[8]; Alicia Sarabia, MD, FRCPC[9]; Samira Mubareka, MD, FRCPC[10]; Susan Poutanen, MD, MPH, FRCPC[2]; Zoe Zhong, PhD[2]; Philipp Kohler, MD, MSc[11] and Allison McGeer, MSc, MD, FRCPC, FSHEA[1]; [1]University of Toronto, Toronto, ON, Canada; [2]Sinai Health System, Toronto, ON, Canada; [3]North York General Hospital, Toronto, ON, Canada; [4]St. Michael's Hospital, Toronto, ON, Canada; [5]Public Health Ontario Laboratory, Toronto, ON, Canada; [6]Public Health Ontario Laboratories, Toronto, ON, Canada; [7]Dynacare, Brampton, ON, Canada; [8]William Osler Health System, Brampton, ON, Canada; [9]Trillium Health Partners, Mississauga, ON, Canada, [10]Sunnybrook Health Sciences Centre, Toronto, ON, Canada, [11]Cantonal Hospital of St. Gallen, St. Gallen, Switzerland

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Background. Though CPE in Canada are mainly acquired abroad, outbreaks/transmission in Canadian hospitals have been reported. We determined the incidence of HA CPE in southern Ontario, Canada, to inform prevention and control programs.

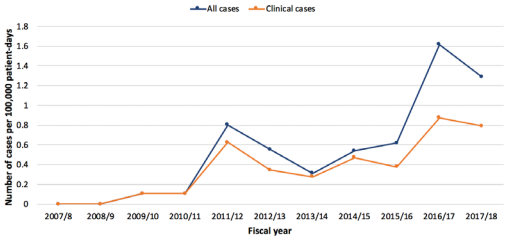
Methods. Toronto Invasive Bacterial Diseases Network (TIBDN) has performed population-based surveillance for CPE in the Toronto area/Peel region of southern Ontario, Canada, since CPE were first identified in October 2007. Clinical microbiology laboratories report all CPE isolates to TIBDN; annual lab audits are performed. Incidence calculations used first isolates as numerator; denominator (patient-days/fiscal year for Toronto/Peel hospitals) was from the Ontario Ministry of Health and Long-Term Care.

Results. The incidence of HA CPE has risen from 0 in 2007/2008 to 0.45 and 0.28 per 100,000 patient-days for all and clinical cases, respectively, in 2017/2018 (Figure, $P < 0.0001$). 190/790 (24%) incident cases of CPE colonization/infection in southern Ontario from October 2007 to December 2018 were likely HA (hospitalized in Ontario with no history of hospitalization abroad/high-risk travel). Eighty (25%) were female and the median age was 73 years (IQR 57–83 years). 157 (83%) had no prior travel abroad and 33 (17%) had prior low-risk travel. 122 (64%) had their CPE identified >72 hours post-admission (of which 83 also had ≥1 other prior Ontario hospitalization); 68 (36%) had their CPE identified at admission but had recent prior Ontario hospitalization. HA cases vs. foreign acquisitions were significantly more likely *K. pneumoniae* (48% vs. 38%, $P = 0.02$) and *Enterobacter spp.* (20% vs. 7%, $P < 0.0001$) and less likely *E. coli* (20% vs. 48%, $P < 0.0001$). Genes of HA vs. foreign acquisitions were significantly more likely bla_{KPC} (34% vs. 12%, $P < 0.0001$) and bla_{VIM} (12% vs. 2%, $P < 0.0001$) and less likely $bla_{NDM\pm OXA}$ (38% vs. 56%, $P < 0.0001$) and bla_{OXA} (13% vs. 27%, $P = 0.0001$). 36 (19%) HA cases had a negative CPE screen before their first positive CPE

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

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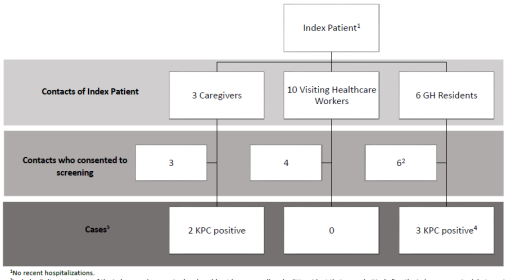
Background. *Klebsiella pneumoniae* carbapenemase-producing organisms (KPCOs) are often multidrug-resistant, and the KPC resistance determinant can be transmitted between bacteria. KPCOs are associated with healthcare facility exposures; identification in community-based, residential care settings is 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



[1]No recent hospitalizations.
[2]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*.
[3]Overall, 6 cases identified (including index case).
[4]All had recent hospitalization in previous 3 months; one overlapped on the same hospital unit as a patient with KPC-producing *Klebsiella oxytoca*.

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

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

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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 β-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.

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

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

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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.