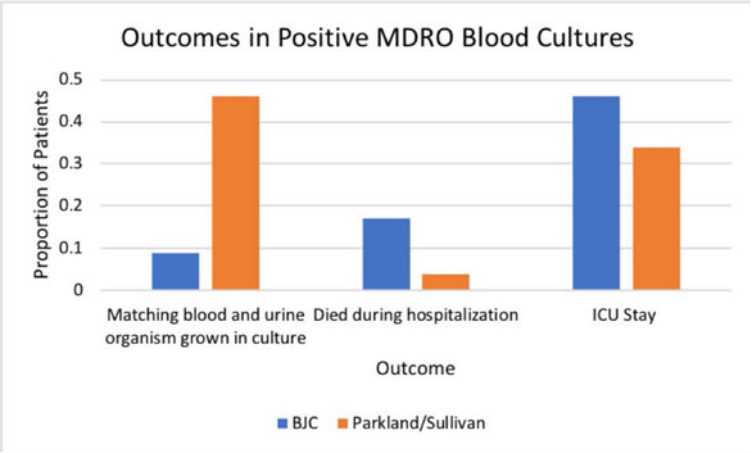

Fig. 2

Presentation Type:
Poster Presentation

Estimating the Contribution of a Contaminated Wheelchair to Pathogen Spread With an Agent-Based Model

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Background: Wheelchairs can contribute to healthcare-associated infection transmission due to direct contact with patients and healthcare workers and due to wide spatial movement in facilities. **Objective:** We utilized location data of a wheelchair to inform an agent-based model for estimating the contribution of a single contaminated patient ride in a wheelchair to subsequent environmental contamination and to estimate the potential for wheelchair disinfection between patients to disrupt this spread. **Methods:** The destination and origin of wheelchairs were tracked in several facility locations: specialty care services, long-term care, radiology, acute care, common spaces, domiciliary, and outpatient clinics. An agent-based model was developed in which the probability of the wheelchair traveling directly from one location to another was informed by wheelchair origin and destination data. We assumed that the first patient's hands were contaminated with methicillin-resistant *Staphylococcus aureus* (MRSA). For each patient trip, each simulated patient made contact with the wheelchair arm rests and a surface in the destination location. To evaluate potential exposures of uninfected patients, all patients riding in the wheelchair after the contaminated patient were assumed to be uncontaminated. In total, 50 patient rides were simulated. The concentration and number of contaminated surfaces in each hospital area were compared in addition to the average concentration of MRSA on patient hands over time. The intervention simulation involved a disinfection of wheelchair armrests with 90%, 70%, or 50% efficacy. **Results:** The 3 areas that had the largest estimated number of contaminated surfaces after 50 wheelchair trips following the first patient assumed to be infected were specialty care services, long-term care, and acute care. This finding was consistent with the paths that were most frequented by the wheelchair. Without cleaning between patients, the fiftieth patient to use the wheelchair had an average MRSA concentration of 41.5 CFU/cm^2. With cleaning between patients, assuming a 50% cleaning efficacy, average MRSA concentration on the hands for the fiftieth patient was reduced to 7.4×10^{-14} CFU/cm^2. **Conclusions:** We have demonstrated that cleaning, even with efficacies as low as 50%, may protect patients using contaminated wheelchairs from potential pathogen exposures. This study also demonstrates that tracking portable equipment can be useful not only for exposure modeling but also for predicting where the largest number of surfaces contaminated via portable equipment routes may be found. Future steps include performing a sensitivity analysis to evaluate the influence of spatial assumptions.

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Disclosures: None
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Poster Presentation

Evaluation of Discrepancies in Carbapenem Minimum Inhibitory Concentrations Obtained at Clinical Laboratories Compared to a Public Health Laboratory

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Background: Automated testing instruments (ATIs) are commonly used by clinical microbiology laboratories to perform antimicrobial susceptibility testing (AST), whereas public health laboratories may use established reference methods such as broth microdilution (BMD). We investigated discrepancies in carbapenem minimum inhibitory concentrations (MICs) among Enterobacteriaceae tested by clinical laboratory ATIs and by reference BMD at the CDC. **Methods:** During 2016–2018, we conducted laboratory- and population-based surveillance for carbapenem-resistant Enterobacteriaceae (CRE) through the CDC Emerging Infections Program (EIP) sites (10 sites by 2018). We defined an incident case as the first isolation of *Enterobacter* spp (*E. cloacae* complex or *E. aerogenes*), *Escherichia coli*, *Klebsiella pneumoniae*, *K. oxytoca*, or *K. variicola* resistant to doripenem, ertapenem, imipenem, or meropenem from normally sterile sites or urine identified from a resident of the EIP catchment area in a 30-day period. Cases had isolates that were determined to be carbapenem-resistant by clinical laboratory ATI MICs (MicroScan, BD Phoenix, or VITEK 2) or by other methods, using current Clinical and Laboratory Standards Institute (CLSI) criteria. A convenience sample of these isolates

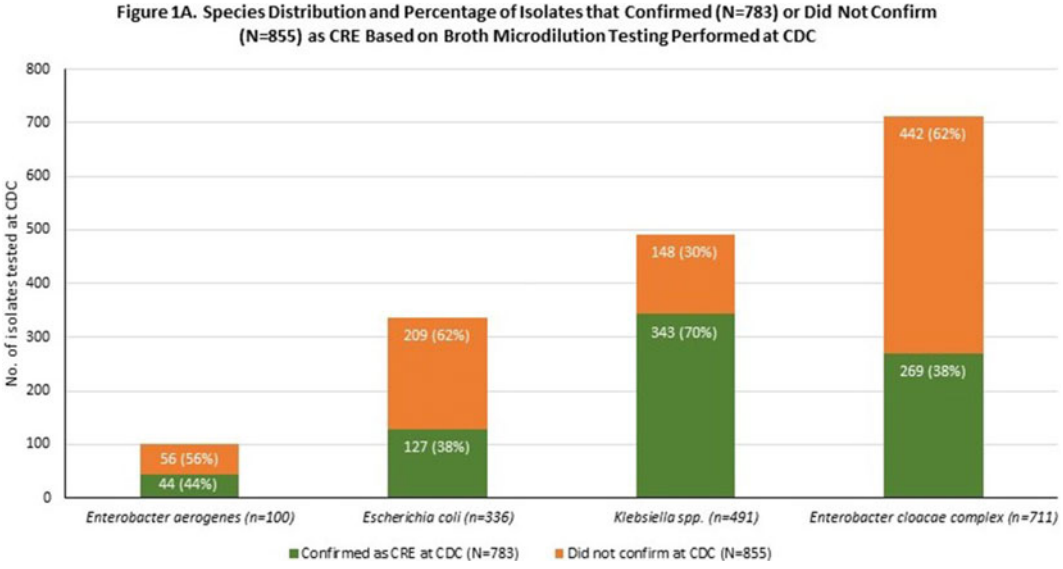

Fig. 1.

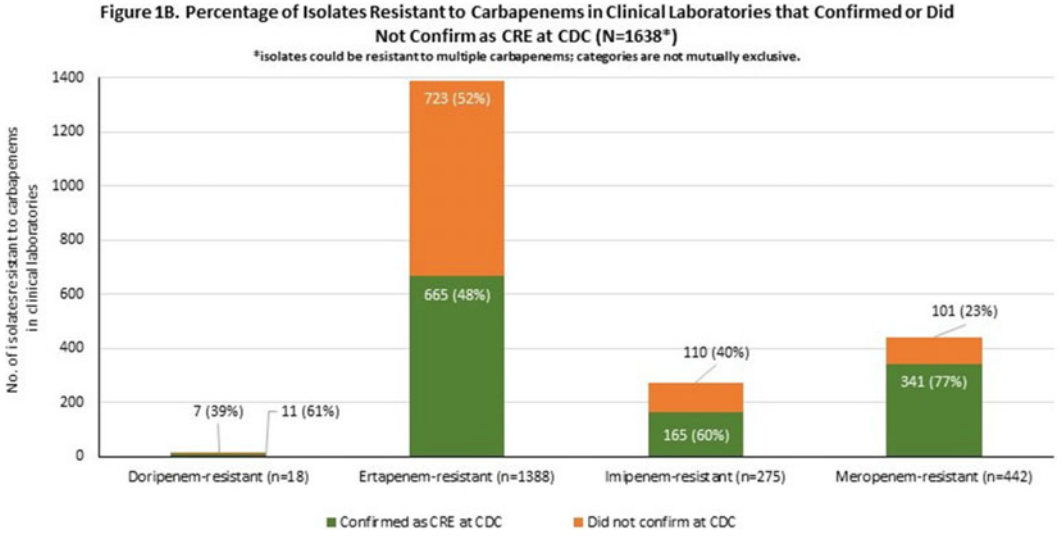

Fig. 2.

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was tested by reference BMD at the CDC according to CLSI guidelines. **Results:** Overall, 1,787 isolates from 112 clinical laboratories were tested by BMD at the CDC. Of these, clinical laboratory ATI MIC results were available for 1,638 (91.7%); 855 (52.2%) from 71 clinical laboratories did not confirm as CRE at the CDC. Nonconfirming isolates were tested on either a MicroScan (235 of 462; 50.9%), BD Phoenix (249 of 411; 60.6%), or VITEK 2 (371 of 765; 48.5%). Lack of confirmation was most common among *E. coli* (62.2% of *E. coli* isolates tested) and *Enterobacter* spp (61.4% of *Enterobacter* isolates tested) (Fig. 1A), and among isolates testing resistant to ertapenem by the clinical laboratory ATI (52.1%, Fig. 1B). Of the 1,388 isolates resistant to ertapenem in the clinical laboratory, 1,006 (72.5%) were resistant only to ertapenem. Of the 855 nonconfirming isolates, 638 (74.6%) were resistant only to ertapenem based on clinical laboratory ATI MICs. **Conclusions:** Nonconfirming isolates were widespread across laboratories and ATIs. Lack of confirmation was most common among *E. coli* and *Enterobacter* spp. Among nonconfirming isolates, most were resistant only to ertapenem. These findings may suggest that ATIs overcall resistance to ertapenem or that isolate transport and storage conditions affect ertapenem resistance. Further investigation into this lack of confirmation is needed, and CRE case identification in public health surveillance may need to account for this phenomenon.

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Presentation Type:
Poster Presentation

Evaluation of a Large Urban–Rural Outpatient Antibiotic Stewardship Program

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Background: Judicious prescribing of antibiotics is necessary in addressing the crisis of emerging antibiotic resistance and reducing adverse events. Nearly half of antibiotic prescriptions in the outpatient setting are inappropriate, most for viral upper respiratory infections (URIs). Data outlining the misuse of antibiotics in the outpatient setting provide compelling evidence of the need for more rational use of antimicrobial agents beyond hospital settings. **Objectives:** We evaluated the effect of a behaviorally enhanced quality improvement (QI) intervention to reduce inappropriate antibiotic prescribing for viral URI in the ambulatory care clinics of a large quaternary care healthcare system serving an urban-rural population. **Methods:** The outpatient antibiotic stewardship program was implemented in January 2018 at 5 pilot sites. Interventions included identification of a site champion, educational sessions, sharing of clinic and individual provider data, and patient and provider educational materials. In addition, preclinic huddles and resident education sessions for internal medicine resident physicians were conducted with a display of public commitment to prescribe antibiotics appropriately. Site champions collaborated with onsite staff to ensure interventions were consistent with local workflows, policies, and standards. The primary outcome was defined as the provider-level antibiotic prescribing rate for acute URI, defined as patient visits with antibiotic-nonresponsive diagnoses without concomitant diagnostic codes to support antibiotic prescribing (see the public MITIGATE tool kit for a complete list). **Results:** In total, 116,122 antibiotic prescriptions were dispensed from April 2017 through December 2018 compared to the period from April 2017 to December 2017 during which 9,129 fewer prescriptions were ordered. Inappropriate antibiotic prescribing for viral URI for ambulatory clinic encounters ($n \geq 45{,}000$ visits per month) declined from 14.3% to 7.6%. Academic hospital-based sites showed little seasonality trends and no statistically significant decrease in prescription rates ($P = .5176$). On the other hand, community-based sites showed strong seasonal fluctuations and a statistically significant decrease in prescription rates after intervention ($P = .000189$). **Conclusions:** A multifaceted behaviorally enhanced QI intervention to reduce inappropriate prescribing for URI in ambulatory care encounters at a large integrated health system was successful in reducing both inappropriate prescriptions for presumed viral URI as well as total antibiotic use. Findings suggest that implementing leadership roles, education sessions, and low resource behavioral nudging (peer comparison and public commitment) together can decrease excessive use of antibiotics by physicians. A Hawthorne effect may be an important component of these interventions. Future studies are needed in order to determine the optimal combination of behavioral interventions that are cost-effective in outpatient settings.

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Presentation Type:
Poster Presentation

Evaluation of Patients' Adverse Events Associated With Contact Isolation: Matched Cohort Study With Propensity Score

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Background: Contact isolation (ie, patient isolation with contact precautions) has been frequently used for preventing healthcare-associated infections caused by epidemiologically important pathogens (eg, vancomycin-resistant enterococcus [VRE]) via direct or indirect contact with patients. Based on ineffective components of routine contact isolations (eg, fewer healthcare provider visits), some studies have reported an association between the likelihood of adverse events and contact isolation. **Objective:** Given no strong evidence for this association due to most studies' invalid study designs and systematic misclassification, we compared adverse events between a VRE isolation cohort and a matched comparison cohort, using a propensity score matching cohort study design. **Methods**: This