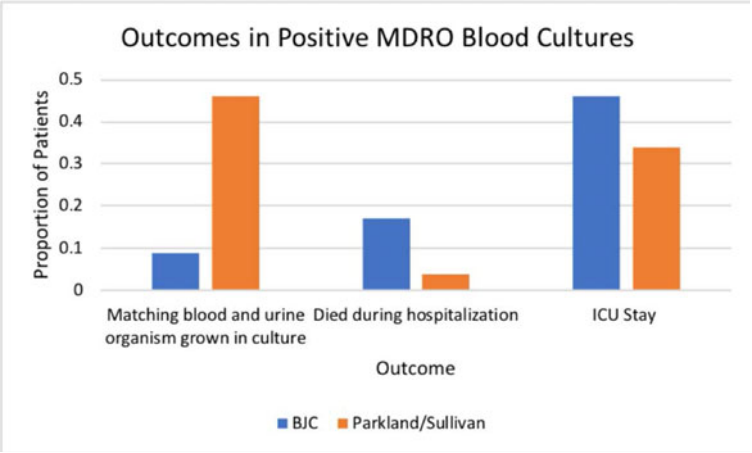

Fig. 2

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

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