534. *Clostridium difficile* Reduction: An Agent-Based Simulation Modeling Approach to Evaluating Intervention Comparative Effectiveness at Pediatric Hospitals

Anna Barker, PhD[1]; Elizabeth Scaria, BE[2]; Oguzhan Alagoz, PhD[2]; Ajay Sethi, PhD, MHS[1] and Nasia Safdar, MD, PhD[3]; [1]Department of Population Health Sciences, School of Medicine and Public Health, University of Wisconsin – Madison, Madison, Wisconsin, [2]Department of Industrial and Systems Engineering, College of Engineering, University of Wisconsin – Madison, Madison, Wisconsin, [3]Division of Infectious Diseases, School of Medicine and Public Health, University of Wisconsin – Madison, Madison, Wisconsin

Session: 59. Healthcare Epidemiology: Updates in *C. difficile*
Thursday, October 4, 2018: 12:30 PM

Background. *Clostridium difficile* surveillance data are lacking from pediatric facilities and there are few pediatric-centered guidelines or studies evaluating *C. difficile* targeted pediatric interventions. Compared with the adult setting, *C. difficile* control in pediatric healthcare facilities is also further complicated by epidemiologic variability across the age spectrum and increased patient-to-patient and patient-to-family interactions.

Methods. We constructed an agent-based simulation model of *C. difficile* transmission at a freestanding children's hospital. The 80-bed hospital model included interactions between the physical environment, patients, visitors, family caregivers, nurses, and physicians. The model was then used to evaluate the comparative effectiveness of nine infection control interventions and six multiple-intervention bundles at reducing hospital-onset *C. difficile* infections and asymptomatic *C. difficile* colonization.

Results. The most effective two-intervention bundle, composed of daily cleaning with sporicidal disinfectant and an asymptomatic *C. difficile* screening protocol, reduced hospital-onset *C. difficile* infection by 62.0% and asymptomatic colonization by 88.4%. Six of the nine single-intervention strategies also significantly reduced both outcomes, including daily and terminal cleaning, asymptomatic *C. difficile* screening, healthcare worker and patient hand hygiene, and reducing room transfers. The remaining three single-intervention strategies, visitor hand hygiene and visitor and healthcare worker contact precautions, did not significantly reduce either measure.

Conclusion. This is the first mathematical model to evaluate pediatric *C. difficile* transmission. Hospitals can achieve a high rate of reduction for hospital-onset *C. difficile* infections by prioritizing implementation of a small number of interventions with high fidelity.

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

535. Transmission of *Clostridium difficile* (CD) From Patients ≤2 Years of Age in a Pediatric Oncology Setting

Elizabeth Robilotti, MD, MPH[1]; Hoi Yan Chow, MS[2]; Tracy McMillen, BS[3]; Weihua Huang, PhD[4]; Donald Chen, MD[5]; N. Esther Babady, PhD[6] and Mini Kamboj, MD[1]; [1]Memorial Sloan Kettering Cancer Center, New York, New York, [2]Infection Control, Memorial Sloan Kettering Cancer Center, New York, New York, [3]Laboratory Medicine, Memorial Sloan Kettering Cancer Center, New York, New York, [4]Pathology, New York Medical College, Valhalla, New York, [5]Infection Prevention and Control, Westchester Medical Center, Valhalla, New York, [6]Clinical Microbiology Service, Department of Laboratory Medicine, Memorial Sloan Kettering Cancer Center, New York, New York

Session: 59. Healthcare Epidemiology: Updates in *C. difficile*
Thursday, October 4, 2018: 12:30 PM

Background. Testing for *Clostridium difficile* (CD) is not recommended in patients under 2 years old because of CD endemicity in young children and absence of associated disease. These patients may, however, represent a reservoir for CD transmission to other high-risk pediatric patients. We describe the strain relatedness of CD isolates among a cohort of pediatric oncology patients by multilocus sequence type (MLST) and interrogate putative transmission events originating from donors ≤2 years of age with whole-genome sequencing (WGS).

Methods. Demographic and epidemiologic information was extracted from our infection control database for all laboratory identified CD cases in pediatric patients from October 2014 to December 2017. Patients ≤2 year old were identified as potential CD donors in a temporal–spatial model of transmission based on initial MLST analysis. CD recipients were identified as any patient with overlapping hospitalization within 12 weeks of the donor, regardless of recipient's age. Donor–recipient pairs were further characterized with WGS to investigate the validity of presumed transmission events by epidemiologic links and MLST.

Results. During the study period CD infection (CDI) was diagnosed in 179 unique pediatric patients. Thirty-nine were ≤2 years. Overall MLST distribution of strains and frequency among patients ≤2 years is shown in Figure 1. ST-2 and 42 were the dominant strains (32% total). ST-11 was not isolated among ≤2 years group and only two ST-1 were isolated without identification of any related recipient cases. Based on concordant strain type on initial MLST, 27 (69%) patients ≤2 years of age were identified as potential donors to 48 pediatric patients; 40 samples were recoverable for WGS representing seven donors and 33 recipients. Despite the high concordance on MLST, WGS revealed only one pair of related CD isolates among these based on a single nucleotide polymorphism (SNP) difference of 1. Retrospective review revealed that these patients were in adjoining rooms during an overlapping admission but were diagnosed with CDI 7 days apart.

Conclusion. In a pediatric oncology unit, hospitalized children ≤2 years of age are not a substantial reservoir for hypervirulent or epidemic strains and an infrequent source of transmission to others with spatial proximity.

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

536. *Clostridium difficile* Colonization in the First Year of Life

Jason A. Clayton, MD, PhD[1]; Jennifer Cadnum, BS[2]; Shelly Senders, MD[3]; Curtis J. Donskey, MD[4] and Philip Toltzis, MD[1]; [1]Pediatric Critical Care Medicine, UH Rainbow Babies and Children's Hospital, Cleveland, Ohio, [2]Research Service, Cleveland VA Medical Center, Cleveland, Ohio, [3]Senders Pediatrics, South Euclid, Ohio, [4]Infectious Diseases, Case Western Reserve University, Cleveland, Ohio

Session: 59. Healthcare Epidemiology: Updates in *C. difficile*
Thursday, October 4, 2018: 12:30 PM

Background. Recent years have witnessed an explosive increase in community-associated *Clostridium difficile* infection (CA-CDI) in adults. Contact with infants, a population known to be asymptomatically colonized by *C. difficile* (CD), has been identified as a risk factor for CA-CDI, rendering it vital to explore the epidemiology and determinants of acquisition in babies.

Methods. In this prospective cohort study, healthy infants attending a demographically diverse suburban pediatric practice were enrolled at birth and followed through their 2-month, 6-month, and 12-month well child visit. At each visit, stool samples were collected, and questionnaires including interim exposure to potential risk factors for CD acquisition were administered. Stool was inoculated on pre-reduced CCFA agar with a graduated loop. Among CD isolates, toxin genes were identified by PCR.

Results. Fifty infants were recruited; 90% of samples and questionnaires were completed. The average gestational age was 39 weeks and 46% were male. Twenty-eight (56%) infants had at least one sample positive for CD during the study: cross sectional incidence was 0/50 at birth; 9/47 (19%) at 2 months; 22/43 (51%) at 6 months; 6/37 (16%) at 1 year. Of those with positive stool cultures, three(11%) tested positive at multiple visits. Of the 37 (81%) isolates, 30 were PCR-positive for CD toxin. Five stool samples harbored >4.5 $\log_{10}$ cfu of toxigenic CD/g of stool. Proportions of CD+ vs. CD− subjects, respectively, with interim exposure to selected CD risk factors at each visit were as follows: infant healthcare visit 45% vs. 42%; household member healthcare visit 17% vs. 23%; household member with diarrhea 14% vs. 29%; antibiotic exposure 5% vs. 4%; antacid exposure 7% vs. 3%, all $P > 0.05$. Regarding risks for acquisition of enteric pathogens in general: breastmilk-including nutrition 57% vs. 73% ($P < 0.05$ only at 2-month visit); 48% CD+ infants had interim daycare attendance vs. 25% CD− (but $P > 0.05$ at each visit).

Conclusion. Asymptomatic carriage of toxigenic CD occurred in over half of healthy infants during the first year of life, and several had a high organism burden that could increase the risk for transmission. While daycare attendance was more common among colonized infants, the majority of infants who were CD+ had no daycare exposure.

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

537. Engaging the Bedside Nurse in Reducing *Clostridium difficile* Infection Through an Innovative Patient Care Rounding Program

James Newton, Jr., MD, FACP, FIDSA[1]; Julie Gregory, RN[2]; Susan Benedetti, BA, RN, CIC[3]; Jamie Huneycutt, BSN, RN, CIC[3] and Rebecca Cowie, APRN, RN, ACNS-BC, CCRN[4]; [1]Antimicrobial Stewardship, Washington Regional Medical Center, Fayetteville, Arkansas, [2]Infection Prevention and Control, Washington Regional Medical Center, Fayetteville, Arkansas, [3]Infection Prevention and Control, Washington Regional Medical Center, Fayetteville, Arkansas, [4]Nursing Administration, Washington Regional Medical Center, Fayetteville, Arkansas

Session: 59. Healthcare Epidemiology: Updates in *C. difficile*
Thursday, October 4, 2018: 12:30 PM

Background. Bedside nurses comprise the largest personnel group in a hospital and are intimately familiar with a patient's day to day clinical status. They can be an effective group to engage and empower to assist with hospital-wide *Clostridium difficile* infection (CDI) reduction efforts. The objective of this study was to evaluate the impact of a nursing driven intervention bundle on CDI rates at a 365-bed community hospital.

Methods. Daily nursing led CDI and invasive line assessment rounds were implemented in April 2017. Nurses were empowered through a pre-approved protocol to place symptomatic patients in isolation and order a test for *C. difficile*. Additionally, patient care rounds that included nursing leadership, the antibiotic stewardship program physician director, infection preventionist and bedside nurses