

Zachary Shepard, University of Michigan; Robert Woods, University of Michigan Hospital; Twisha Patel, University of Michigan

**Background:** Vancomycin-resistant *Enterococcus* (VRE) is a leading cause of nosocomial infections that carries an increased risk of mortality when compared to vancomycin-sensitive *Enterococcus* (VSE). Data on the frequency of conversion between VSE and VRE in patients are scarce. Among patients presenting with VSE infections, little is known about the subsequent risk of conversion to VRE in the initial treatment period. **Methods:** A descriptive analysis of VSE to VRE conversion and a retrospective case-control study were performed examining cases of VSE that had subsequent cultures positive for VRE within 90 days within a quaternary healthcare system. Cases were obtained from June 2013 through December 2018. Controls were patients who had VSE culture followed by another VSE culture and were matched by organism (*E. faecalis* or *E. faecium*), time between cultures, and initial culture site. Age, gender, healthcare, antibiotic, *Clostridiodes difficile*, proton pump inhibitor (PPI) exposure, and H2 blocker exposures, and prior VRE infection or colonization were abstracted from the electronic medical record. A univariate analysis with the Fisher exact test was performed with significance considered for  $P < .05$ . **Results:** In total, 8,913 cases of *E. faecalis* and 2,322 cases of *E. faecium* were included in the study. Of 8,913 cases of *E. faecalis*, 51 of 8,503 (0.6%) cultured VRE after VSE, and 47 of 403 (11.7%) cultured VSE after initial VRE. Of *E. faecium*, 51 of 783 (6.5%) cultured VRE after VSE, and 76 of 1,532 (5.0%) cultured VSE after initial VRE. In total, 76 cases were matched with 99 controls. Patients converting from VSE to VRE were more likely to have prior admission to an intensive care unit ( $P = .0207$ ), prior positive swab or culture for VRE ( $P = .0114$ ), previous *C. difficile* infection ( $P = .0155$ ), prior vancomycin ( $P = .0022$ ) and cefepime ( $P = .0089$ ) exposure. Patients receiving vancomycin after initial VSE culture were more likely to have subsequent cultures positive for VRE ( $P = .0053$ ). There was no difference in age ( $P = .966$ ) or male sex ( $P = .7588$ ). **Conclusions:** Conversion from VSE to VRE is common, and *E. faecium* is more likely to become resistant than *E. faecalis*. Reversion to a vancomycin-sensitive phenotype is also common, and *E. faecalis* is more likely to show subsequent sensitivity than *E. faecium*. Previous admission to an intensive care unit, prior colonization or infection with VRE, prior *C. difficile* infection, and exposure to vancomycin and cefepime are risk factors for emergence of VRE after treatment for vancomycin-sensitive *Enterococcus*.

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#### Presentation Type:

Poster Presentation

#### Enhanced Bundled Interventions to Reduce Surgical Site Infections for Patients with Congenital Cardiac Disease

Ibukunoluwa C. Akinboyo, Duke University; Sarah Collier, Duke University Hospital

Charlene Carriker, Duke University Hospital; Kelly Ellington, Duke University Hospital;

Jennifer Turi, Duke University

Sheila Vereen, Duke University Hospital; Rebecca R. Young, Duke University; Michael J. Smith, Duke University; Becky A. Smith, Duke University; Sarah S. Lewis, Duke University

**Background:** Surgical site infections (SSIs) among cardiothoracic (CT) patients are associated with high rates of morbidity and mortality. Data are limited regarding SSI incidence among pediatric patients undergoing primary reparative procedures for congenital cardiac disease. Published evidence on targeted interventions to prevent pediatric CT-surgery SSI is lacking. We aimed to establish standard metrics for measuring CT-surgery SSI incidence and to implement bundled interventions for SSI prevention. **Methods:** A dedicated CT-surgery SSI prevention workgroup was established, consisting of hospital leadership, CT surgeons, cardiac critical care unit staff, anesthesia, perfusion, environmental services, instrument sterile processing, risk management, infection prevention and antibiotic stewardship. We created a standard definition for CT-surgery SSI and calculated retrospective SSI rates over a 24-month period (2017–2019). The outcome measured was incidence of CT-surgery SSI per 100 primary cardiac procedures with delayed ( $\geq 3$  days after primary surgery) or non-delayed chest closure. The difference in proportion of SSI was reported separately for delayed closure and non-delayed closure; statistical significance was tested using a Fisher's Exact test. We identified many potential improvement opportunities, including gaps in SSI surveillance, poor compliance with daily bathing, inconsistent perioperative antimicrobial prophylaxis, lack of controlled environment for bedside chest closures, and lapses in environmental cleaning. These issues informed the enhanced SSI prevention bundle, which included education on sterility with the operating room (OR) staff. Protocols for care of cardiac patients with delayed chest closures focused on universal daily and preoperative chlorhexidine baths. In addition, the bundle incorporated stringent environmental cleaning interventions including scheduled decluttering of patient rooms and clinical spaces, terminal cleaning of patient rooms prior to returning from the OR, and use of adjunctive ultraviolet light for the daily cleaning of operating rooms and patient rooms at discharge. **Results:** Surveillance definition of microbiological growth from a clinical sample obtained within 30 days of primary cardiac procedure sufficiently captured all CT-surgery SSIs. Of 551 CT-surgery procedures prior to intervention, 91 (17%) had delayed final operative closures. Prior to the intervention, 16 SSIs were identified from July 2017 – May 2019 for a rate of 2.90 per /100 procedures, and was higher among patients with delayed chest closure 6.59 per /100 procedures (6 SSIs/91 procedures) versus those with primary chest closure 2.17 per /100 procedures (10 SSIs/460 procedures;  $P = 0.034$ ). Gram-positive organisms, including coagulase coagulase-negative Staphylococci, were most frequently identified as the causative organisms for SSIs. Compliance with bundled intervention, rolled out over a 2-month period, was associated with an immediate decrease in the number of SSIs for primary and delayed chest closures 6SSIs /185 procedures in the initial quarters (August – December 2019) of the post-intervention period. However, this decrease was not reflected in the overall rate (3.24 per /100 procedures) due to fewer procedures performed. Data collection to measure sustainability is ongoing. **Conclusions:** Bundled interventions targeting skin antisepsis and environmental cleaning may be associated with a decrease in SSIs among pediatric CT-surgery patients.

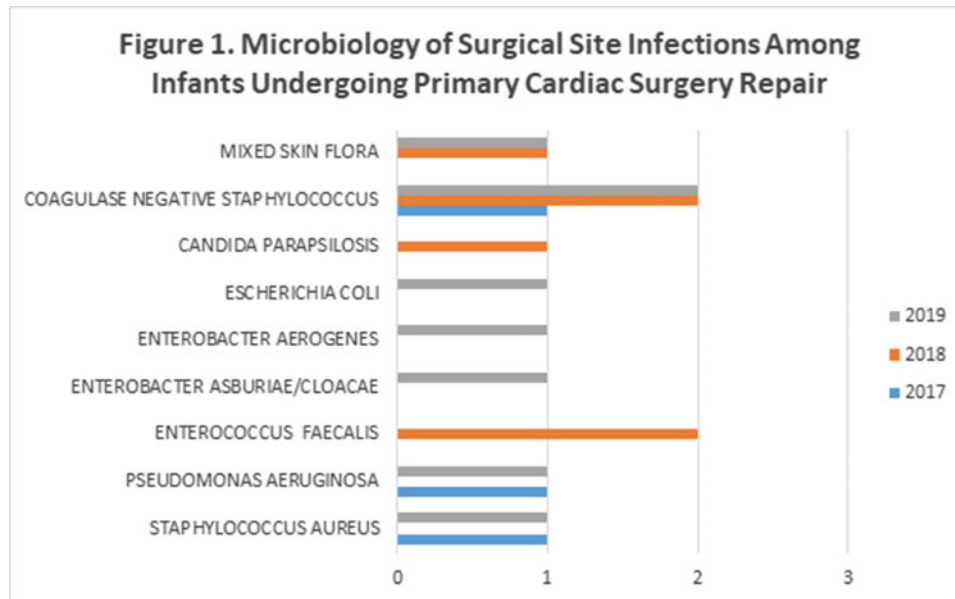


Fig. 1.

Ongoing surveillance is required to determine sustainability of these interventions.

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**Enhanced Environmental Cleaning to Reduce Rates of *Clostridioides difficile* Infection on Oncology Units**

Matthew Ziegler, University of Pennsylvania; David Pegues, HUP University of Pennsylvania Health System; Daniel Landsburg; Steven Gaynes, Hospital of the University of Pennsylvania; Ariel Desphy-Carter, Hospital of the University of Pennsylvania; Jacqueline Omorogbe, University of Pennsylvania; Cheryl Gilmar, Hospital of the University of Pennsylvania; Pam Tolomeo, University of Pennsylvania Perelman School of Medicine; Theresa Gorman; Melissa Palmer; Christina Harker; Ebbing Lautenbach, Perelman School of Medicine, University of Pennsylvania; Jennifer Han, Hospital of the University of Pennsylvania

**Background:** *Clostridioides difficile* infection (CDI) is a major contributor to morbidity and mortality in patients with hematologic malignancy. Due to both immunosuppression and frequent antibiotic exposures, up to one-third of inpatients receiving chemotherapy or stem-cell transplant develop CDI. Transmission of *C. difficile* in healthcare facilities occurs due to environmental surface contamination and hand carriage by healthcare workers from colonized and infected patients. We investigated the effectiveness of enhanced room cleaning in collaboration with environmental services (EVS) staff to prevent CDI transmission and infection. **Methods:** From April 1, 2018, to September 30, 2018, a multimodal enhanced cleaning intervention was implemented on 2 oncology units at the Hospital of the University of Pennsylvania. This intervention included real-time feedback to EVS staff following ATP bioluminescence monitoring. Additionally, all rooms on the intervention units underwent UV disinfection after terminal cleaning. We performed a system-level cohort study, comparing rates of CDI

on the 2 study units to historic and 2 concurrent control units. Historic and concurrent control units received UV disinfection only for rooms with prior occupants with MRSA or CDI. All units during the intervention period received education on the importance of environmental cleaning for infection prevention. Mixed-effects Poisson regression was used to adjust for system-level confounders. Results: A median of 1.34 CDI cases per 1,000 patient days (IQR, 1.20–3.62) occurred during the 12-month baseline period. There was a trend toward a reduced rate of CDI across all units during the intervention period (median, 1.19; IQR, 0.00–2.47;  $P = .13$ ) compared with all units during the historical period. Using mixed-effects Poisson regression, accounting for the random effects of study units, the intervention was associated with an incidence rate ratio for *C. difficile* of 0.72 compared to control units (95% CI, 0.53–0.97;  $P = .03$ ). Average room turnaround time (TAT) increased across all units during the study period, from 78 minutes (IQR 74–81) to 92 minutes (IQR, 85–96;  $P < .001$ ). Within the intervention period, TAT was higher on intervention units (median, 94 minutes; IQR, 92–98) compared to concurrent control units (median, 85; IQR, 80–92;  $P = .005$ ). **Conclusions:** Enhanced environmental cleaning, including UV disinfection of all patient rooms and ATP bioluminescent monitoring with real-time feedback, was associated with a reduction in the incidence of CDI.

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**Enhancing Employee Influenza Immunization in a Tertiary-Care Healthcare Setting in the Middle East Using Epic Express Lane Workflow**

Lyssette Cardona, Cleveland Clinic Abu Dhabi; Shafii Mohammed, Cleveland Clinic Abu Dhabi; Aileen Federico, Cleveland Clinic Abu Dhabi

**Background:** Influenza virus illness affects millions. The virus's ability to change yearly and its dependence on private