Conclusion. Our analysis of the UHHC CDI cases shows significant spatio-temporal clustering in the observed CDI clusters. These results suggest that direct or environmental transmission may play a significant role in CDI acquisition at the UHHC.

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510. First Environmental Investigation of Toxigenic *Clostridium difficile* Strains in Texas Hospitals

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Background. *Clostridium difficile* is the most common cause of infectious diarrhea in hospitalized patients in the developed world and an emerging pathogen in developing countries due to increased use of broad-spectrum antibiotics worldwide. Spores of toxigenic *C. difficile* can survive and disseminate in any environs and act as sources for human colonization or infections. Although likely ubiquitous in any environs, the prevalence of *C. difficile* spores in the hospital environment of Texas hospitals is poorly understood. The objectives of the study are to isolate and characterize *C. difficile* from the hospital environs of three hospitals in three cities in Texas.

Methods. As part of a Texas hospital-wide surveillance effort, we collected shoe-bottom swabs from hospital employees, patients, and visitors inside three large hospital from three cities. Samples were analyzed for *C. difficile* using anaerobic enrichment culture and molecular methods. Suspected colonies from cycloserine-cefoxitin fructose agar (CCFA) plates were identified by PCR (*tcdA, tcdB, cdtA, cdtB, ctp*) and genotyped using fluorescent PCR ribotyping.

Results. A total 229 of 1079 (21.2%) surface swab and 81 of 121 (66.9%) shoe swab samples were culture positive for toxigenic *C. difficile* (*tcdA* and *tcdB*). A total of 29 distinct ribotypes were identified from 166 *C. difficile* isolates tested. Predominant ribotypes were F106, F019, F014-020, F002, and F255. Interestingly, ribotype F027 was not a predominant strain among the shoe samples. Each hospital had widely diverse strains. Shoes were the most contaminated item in all the hospitals.

Conclusion. We identified a high prevalence of toxigenic *C. difficile* with diverse ribotypes from hospital environmental shoe-bottom swabs and high touch surface swabs in hospitals in three cities of Texas. Our findings suggest that patients might be at higher risk for *C. difficile* colonization or infection in these hospitals.

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511. What Is the Current State of Patient Education after *Clostridium difficile* Infection

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Background. *Clostridium difficile* infection (CDI) is a common healthcare-associated infection that often recurs after treatment and is associated with reduced quality of life. High-quality patient engagement and education could reduce the risk for transmission and reinfection.

Methods. We surveyed 18 institutions, including academic, Veterans Affairs, and community hospitals, to evaluate if they had CDI-specific patient education practices in place. For three of the institutions, we surveyed CDI patients immediately after hospital discharge regarding the CDI education provided and assessed their knowledge of patient-based prevention measures.

Results. Of the 15 hospitals responding to the survey, 11 (73%) reported having standardized written educational materials regarding CDI. However, Infection Prevention personnel from four (27%) of these hospitals were not confident that the education was being implemented and five (33%) were not confident that the patients understood the education. Of 24 CDI patients surveyed, only 13 (54%) reported receiving any education about CDI from hospital personnel, and only three (12.5%) reported receiving written information. Seven of the 24 (29%) CDI patients reported looking up information online about CDI. Of the 24 CDI patients, three (12.5%) were not aware that soap and water should be used for hand hygiene, 7 (29%) were not aware that bleach should be used for cleaning their bathroom, and 13 (54%) did not choose taking antibiotics as the major risk for recurrence.

Conclusion. Although most hospitals reported having standardized educational materials for CDI patients, our survey of patients demonstrated substantial deficiencies in the education provided and in patients’ knowledge of CDI prevention measures. Engagement of CDI patients in prevention efforts will require improvement in education practices.

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512. Tracking the Use of Soap and Sanitizer for Hand Hygiene After Caring for *Clostridium difficile* Patients

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Background. Soap and water is more effective than alcohol-based hand rub (ABHR) at removing *Clostridium difficile* spores from hands. Our institution mandates that healthcare workers (HCW) use soap and water after contact with the patient or their environment for any *C. difficile* infection (CDI); CDC and SHEA recommend this only in outbreak settings for three main reasons: lack of evidence that preferential soap and water use reduces CDI, concerns that inconsistent messaging may result in decreased hand hygiene overall, and that glove use obviates soap and water use. The objective of this study was to investigate hand hygiene practices after caring for CDI patients.

Methods. CDI cases from July 2016 to December 2017 residing in any of 4 units in the hospital (1 medical ICU, 1 stepdown, 2 med/surg) were identified. These units had an electronic hand hygiene (EHH) monitoring system. Using radio frequency identification badges worn by HCW and sensors on each dispenser, handwashing.
opportunities and washes are recorded. eHH after CDI patient contact and any patient contact were collected. eHH adherence (using an ABHR or soap dispenser within 1 minute of room exit) was calculated overall and stratified by soap and water vs. ABHR. The primary outcome was eHH adherence using soap and water vs. ABHR after contact with a CDI patient. The secondary outcome was eHH adherence after CDI patient contact compared with all patients with and without CDI.

Results. A total of 1,061,288 exit eHH opportunities were recorded. Seventy-three CDI cases were identified (none in December 2017), and 16,404 (2%) exit eHH opportunities were linked to rooms with CDI patients. eHH adherence after CDI patient contact (78%) was significantly higher than for any patient contact (73%) ($P < 0.001$). Mean eHH adherence using soap and water after CDI patient contact was 29%; no changes in trend were noted over time (Figure 1).

Conclusion. Low adherence to mandated soap and water use after CDI patient contact was observed; however, HCW maintained a high level of overall adherence. This may indicate that concerns of inconsistent messaging reducing overall adherence may not be founded. ABHR may be used more often than soap and water after CDI patient care because our glove use is high; further investigation will be necessary to determine whether this is the case.

Figure 1. Hand Hygiene Adherence After Contact with Patients With Clostridium difficile Infection

Soap and Water vs. ABHR

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513. Effectiveness of Pulsed Xenon Ultraviolet Light Disinfection System to Decrease Clostridium difficile Infections at the South Texas Veterans Health Care System

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Background. Clostridium difficile is the leading pathogen implicated in healthcare-associated infections. C. difficile spores can survive for months on surfaces, allowing for transmission between patients; thus, environmental disinfection is a cornerstone for C. difficile infection (CDI) prevention. Pulsed xenon ultraviolet (PX-UV) light disinfection effectively eliminates C. difficile spores from surfaces and can be used as an adjunct to manual cleaning; however, few studies have evaluated the effects of this technology on healthcare facility-onset CDI (HO-CDI) rates. The objective of this study was to compare HO-CDI rates prior to and post-implementation of PX-UV disinfection in an acute care hospital.

Methods. This was a quasi-experimental study in the South Texas Veterans Health Care System (STVHCS), San Antonio, Texas from 2011 to 2018. The PX-UV system was implemented beginning January 1, 2013. HO-CDI rates were calculated as CDI cases per 10,000 patient-days. Rates were compared between the pre-PX-UV period (2011–2012) and post-PX-UV period (2013–2018) using the conditional maximum likelihood estimate of rate ratio. The association between number of beds cleaned and HO-CDI incidence was evaluated using Pearson correlation.

Results. During the 2-year preintervention period, the HO-CDI rate was 9.09 per 10,000 patient-days compared with 9.44 per 10,000 patient days in the postintervention period (RR 1.038; 95% CI 0.817 – 1.328) ($P = 0.7703$). HO-CDI rates peaked in 2015 (13.60 per 10,000) and declined steadily thereafter through 2018 (6.86 per 10,000). There was not a significant correlation between number of beds cleaned and HO-CDI incidence ($R^2=0.3713; 95\% CI \ -0.0597–0.6856; P = 0.0889$).

Conclusion. PX-UV disinfection did not significantly reduce HO-CDI rates in the first 5 years of use; however, more recent data demonstrate HO-CDI rates lower than that of the preintervention period.

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514. The Effect of Probiotics on the Incidence of Clostridium difficile

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Background. Currently there is conflicting evidence regarding probiotics affecting the incidence and/or severity of Clostridium difficile infection (CDI). According to the IDSA guidelines, there are insufficient data to support the use of probiotics as primary prophylaxis of CDI. The primary objective of this study was to evaluate whether the administration of probiotics is efficacious for CDI prophylaxis in patients who are on antibiotics making them at increased risk for contracting CDI.

Methods. This is an Institutional Review Board approved retrospective cohort study looking at patients who were admitted to NYU Winthrop University Hospital and received at least one dose of antibiotics considered high-risk of inducing CDI. Patients were grouped according to concurrent probiotic use and the association between probiotic use and incident CDI was examined. A model for incident CDI adjusting for number of concurrent antibiotics, patient age, proton pump inhibitors, histamine receptor antagonists, presence of colitis, and chemotherapy was also estimated. Microbiology reports were analyzed for up to 12 weeks post initial administration of antibiotics to determine whether patient acquired CDI. If no CDI occurred during the admission or post discharge, data was censored at 12 weeks.

Results. Of 2,208 patients, 1,502 (68%) were included in the interim analysis. Ninety-six out of 1,502 patients (6.39%) had CDI within 12 weeks of antibiotics initiation. One hundred thirty-five (9%) were on probiotics during antibiotic use and 1,367 (91%) were not. Of those taking probiotics, 11.1% had an incident of CDI and of those not taking probiotics, 5.9% had an incident of CDI with a relative risk of 1.88 (1.11, 3.16) and $P = 0.02$. After adjustment, although a positive association between probiotics and CDI was still observed, it was not statistically significant ($P = 0.24$).

Conclusion. Based on the interim analysis, probiotics were associated with a higher risk of CDI in univariate analysis, however, when adjusted for several confounding factors this association, while still positive, was no longer statistically significant. Further data collection is ongoing to corroborate these results.

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515. Estimating the Effect of Proton Pump Inhibitor Stewardship in Reducing Clostridium difficile Transmission

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Background. Antibiotic stewardship programs (ASPs) have been successful in reducing the incidence of Clostridium difficile (CDI) by reducing patient exposure to antibiotics, especially fluoroquinolones. Proton pump inhibitors (PPIs), while less studied as a risk factor for CDI, are widespread in their use, often for much longer durations than most courses of antibiotics. PPI stewardship may be a potential target for ASPs.

Methods. We used a mathematical model of C. difficile transmission in an ICU to estimate the effects of a co-occurring antibiotic and PPI stewardship program. This approach captured any synergistic dynamics between the two interventions (e.g., patients taking both PPIs and antibiotics) while being able to independently estimate their effects. This model simulated for five years and 5,000 iterations, with the reduction in antibiotic and PPI use independently varied between 0% and 40%. The rates of C. difficile were then estimated using Poisson regression models accounting for admission volume.

Results. Both antibiotic and PPI stewardship reduced the number of incident C. difficile cases within the simulated ICU. A 30% decrease in fluoroquinolone use corresponded with