Background. Cl. difficile infection is the second most common health care-associated infection (HAI) and the most common gastrointestinal HAI, with an estimated 360,000 cases reported by the CDC in 2017. CDI continues to remain a major cause of inpatient admission and utilization of healthcare resources. The exact incidence of peri-procedural CDI with cystectomy is unknown, and reported incidence of CDI in literature vary widely.

We designed an analysis of patients undergoing cystectomy between 2015 and 2017 using the ACS National Surgical Quality Improvement Program (NSQIP) to study the incidence, risk factors and 30-day post-surgical outcomes associated with CDI following cystectomy. Developed by the American College of Surgery, this is a nationally validated, risk-adjusted, outcomes-based program designed to determine and improve the quality of surgical and post-surgical care.

Results. The incidence of CDI following cystectomy was 3.6% in our patient cohort. 18.8% of patients developed CDI following hospital discharge. Non-elective surgeries, and complete cystectomy procedures had higher rate of CDI. 48.4% of patients with CDI had a preceding post-operative infection. Post-operative organ space infections (OR 1.95), post-operative renal failure (OR 2.38), post-operative sepsis (OR 2.49) and septic shock (OR 2.33) were independently associated with development of CDI, (all p-values < 0.05). Patients who developed post-operative CDI during hospitalization had longer hospital admissions than those who did not develop a CDI (OR 2.29) and had a higher risk of DVT formation (2.48), and were also more likely to have unplanned readmissions (OR 7.8).

Conclusion. This is the first nationwide study looking at inpatient and 30-day post-operative CDI after cystectomy in the US. A sizable number of patients experience CDIs after cystectomy procedures, and CDI development is associated with an increase in length of stay and unplanned readmissions. This study lends further evidence to the need for continued interventions and initiatives to reduce this burden of post-operative CDI.

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761. Host Intestinal Defenses Against Clastodioides difficile Infection in Chemotherapy Patients

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Session: P-36. HAI: C. difficile

Background. Cl. difficile infection (CDI) is a common complication in patients undergoing cancer treatment with cytotoxic chemotherapy. Exposure to antibiotics or chemotherapy disrupts the microbiome by killing protective intestinal flora that consequently promotes C. difficile spore germination and disease. The host defense against CDI includes colonization resistance conferred by the healthy microbiome and innate defenses provided by intestinal epithelial cells. One protective factor secreted by Paneth cells of the intestinal epithelium is lysozyme, an enzyme that degrades the cell walls of Gram-positive bacteria such as C. difficile. We hypothesized that chemotherapy-induced mucosal barrier injury and the resultant death of Paneth cells leads to decreased production of lysozyme. We thus sought to examine changes in lysozyme concentration in stools of chemotherapy patients.

Methods. We collected stool samples from six patients undergoing cancer treatment at four different time points. The first stool sample corresponded to the day prior to the start of chemotherapy (day zero). We then performed ELISA assays to determine the lysozyme concentration for each stool sample.

Results. On day zero, the lysozyme levels (n=6) averaged 268.1 ± 131.7 ng/mL. Over the course of chemotherapy, the lysozyme levels decreased 78.70 ± 24.19% from the starting value. The lowest values were observed around days 5 through 11 for most patients, coinciding with when they were most neutropenic around day 11. One of the patients developed CDI on day 5 and experienced more fluctuating lysozyme levels thereafter. On the day that the patient developed CDI, lysozyme was measured as 6.63 ng/mL. Throughout treatment, 3/6 patients showed recovery of lysozyme production with white blood cell recovery.

Conclusion. Our data indicate that chemotherapy causes decreased concentrations of lysozyme in stool. Low lysozyme levels could in part account for the increased susceptibility to CDI during chemotherapy. Future experiments will include bioinformatics analyses to determine how the microbiome changes in response to chemotherapy. Together, these experiments will inform our approach to determining patient susceptibility to chemotherapy-associated CDI.

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762. Real-World Utilization of C. difficile Drug Treatments and Associated Clinical Outcomes in a US Hospital System

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Session: P-36. HAI: C. difficile

Background. IDSA recommends use of fidaxomicin or oral vancomycin for treatment of initial episode or first recurrence of Clastodioides difficile infection (CDI). This study aimed to evaluate impact of a clinical decision support order set driving appropriate use of fidaxomicin on utilization of CDI drug treatments and associated clinical outcomes.

Methods. This was a retrospective, quasi-experimental study evaluating CDI therapies pre (8/2016-11/2017) and post (5/2018-1/2020) CDI order set implementation at a level-one trauma center located in Virginia. Admitted adult patients were included if CDI testing was positive for a 1st or 2nd episode and received active CDI treatment. Exclusions included fulminant CDI and CDI diagnosis by PCR with <3 bowel movements or laxative use within 24 hours. The primary outcome was CDI recurrence within 30 days of completing therapy in patients who achieved clinical cure. Secondary outcomes were evaluated at 30 and 90 days and included sustained response and CDI-related readmissions.

Results. After screening, 186 patients in the pre-group and 187 in the post-group were included. Median age was 68 (59-77), most patients had an initial CDI episode (88.2%) and were diagnosed with severe CDI (50.7%). Baseline characteristics were similar between each group on Charlson comorbidity index, ICU admission, CDI risk factors, and concomitant antibiotic use. Primary treatment options in the pre-group were most commonly metronidazole 47.9% and oral vancomycin 50.5%, and in the post-group were fidaxomicin 56.7% and oral vancomycin 41.7% (Figure 1). CDI recurrence rates at 30 days post-index medication (17.2% vs. 6.3%, p<0.004) were lower in the post-group (Table 1). Clinical cure (84.4% vs. 94.1%, p=0.002) and sustained response at 90 days (55.8% vs. 73.3%, p<0.001) were higher in the post-group. CDI recurrence rates at 90 days and CDI-related readmissions at 30 and 90 days were also lower in the post-group.

Figure 1. CDI Treatment Utilization

| Table 1. Clinical Outcomes |
|---------------------------|
| **Outcomes**             | **Pre-Group (n = 186)** | **Post-Group (n = 187)** | **p-value** |
| Clinical Cure, n (%)      | 157 (84.4%)             | 170 (96.1%)              | 0.002       |
| Recurrence, n (%)         | 30-day                   | 27 (17.2%)               | 11 (6.3%)   | 0.004 |
|                          | 90-day                   | 39 (24.6%)               | 24 (13.6%)  | 0.003 |
| Sustained response at 90 days, n (%) | 104 (59.9%)             | 137 (73.3%)              | <0.001      |
| CDI-related readmissions, n (%) | 21 (11.3%)             | 9 (4.9%)                 | 0.006      |
|                          | 30-day                   | 30 (16%)                 | 14 (7.5%)   | 0.021 |
|                          | 90-day                   | 60 (55.7%)               | 49 (27.7%)  | 0.109 |
| All-cause readmissions, n (%) | 74 (44.1%)             | 65 (35.2%)               | 0.219      |

1 Recurrence was assessed only in patients with clinical cure (i.e., denominator = 157 for pre-group and 154 for post-group)

2 Patients with incomplete follow-up were not evaluated for outcome unless they had the outcome prior to end of available follow-up.

Conclusion. Implementation of the CDI order set increased fidaxomicin use and was associated with a decrease in CDI recurrences and CDI-related readmissions and was positively associated with chemotherapy-assoicate CDI and sustained response. Findings suggest increased first-line use of fidaxomicin results in better clinical outcomes.
763. Impact of Two-Step Testing Algorithm on Hospital-onset Clostridioides difficile Infections and Oral Vancomycin Prescription Practices at an Academic Medical Center
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**Session:** P-36. HAI: C. difficile

**Background.** Clostridioides difficile infection (CDI) is one of the leading causes of hospital-onset (HO) infections. Clinically distinguishing true CDI versus colonization with *C. difficile* is challenging. We implemented a two-step testing algorithm to discriminate true CDI from colonization then evaluated the effect on rate of HO CDI and oral vancomycin.

**Methods.** In May 2020, a two-step testing algorithm was implemented utilizing *C. difficile* PCR and enzyme immunoassay (EIA) glutamate dehydrogenase (Figure 1). Rates of HO CDI and use of oral vancomycin was compared in the three quarters preceding and after this intervention (July 2019-March 2020 and July 2020-March 2021, respectively). HO CDI was defined based on National Healthcare Safety Network (NHSN) Laboratory Identified (LabID) event as last positive *C. difficile* test result performed on a specimen collected >3 calendar days after admission to the facility. HO CDI rates were assessed based on Standardized Infection Ratio (SIR) data and antimicrobial use was reported in days of therapy (DOT) per 1000 patient days.

**Results.** During the pre-intervention period 30 HO CDI cases were reported compared to 9 cases in the post-intervention period (p=0.02) (Figure 2). There was a non-statistically significant reduction in CDI SIR in post-intervention period (0.133 vs. 0.305, p=0.11). Oral vancomycin use was similar in the pre- and post-intervention periods (3.89 vs. 3.84, p=0.96). Fidaxomycin use was rare (< 0.2 DOT/1000 pt days). Of 26 HO *C. difficile* colonized patients in post-intervention period, 14 (54%) patients received oral vancomycin treatment. Infectious diseases was consulted on 7/14 and recommended discontinuation of treatment in 3 while treatment was continued for other patients based on clinical status and immunocompromising conditions.

**Conclusion.** We successfully reduced our HO CDI infections and SIR below national average after implementation of two-step testing algorithm for CDI. There was no impact on the rate of oral vancomycin use. We observed at 54% rate of treatment for patients categorized as likely colonization. Provider education and stewardship interventions are necessary to reduce inappropriate use of oral vancomycin in colonized patients.

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764. Will the Addition of Probiotics to Patients Receiving Intravenous Antimicrobial Therapy Reduce the Incidence of Healthcare Facility-Onset *Clostridium difficile* Infection?\textsuperscript{1}
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**Session:** P-36. HAI: C. difficile

**Background.** Exposure to antimicrobials is a known risk factor for *Clostridium difficile* infection (CDI). Antimicrobials cause collateral damage by disrupting the natural intestinal microbiota allowing for *C. difficile* to thrive and production of *C. difficile* toxins. Probiotics could modulate the onset and course of CDI; however, the data on probiotics for the prevention of CDI is conflicting.

**Methods.** We conducted an IRB approved retrospective cohort study at a 340-bed community hospital. All hospitalized patients from August 1, 2017 through July 31, 2020 were evaluated for enrollment. Patients were included if they received at least one dose of intravenous (IV) antibiotic and had a length of stay of at least 3 days. Patients were excluded if they were younger than 18 years, or if they had a positive *C. difficile* polymerase chain reaction test before antibiotics were started. The primary outcome was the incidence of healthcare facility-onset *Clostridium difficile* infection (HO-CDI). Descriptive statistics were used to analyze demographics data, and the primary outcome of HO-CDI was analyzed using Fisher’s exact test and multiple logistic regressions.

**Results.** A total of 20,257 patients received IV antibiotics during the study time frame. Of these, 2,659 patients received probiotics. Primary outcome of HO-CDI occurred in 46 patients in the IV antibiotics alone cohort (0.26%) and 5 patients in the probiotics plus IV antibiotics cohort (0.19%). The difference in HO-CDI between these two groups was not statistically significant, p=0.677. A multiple logistic regression was performed to see the impact of proton pump inhibitor use, age, ICU admission [OR 1.81, 95%CI 1.02-3.19] were associated with higher CDI. The primary outcome of HO-CDI was analyzed using Fisher's exact test and multiple logistic regressions.

**Conclusion.** The addition of probiotics to standard of care was not beneficial in the prevention of HO-CDI. However, the data on probiotics for the prevention of CDI is conflicting.

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765. The Burden of Illness Associated with Recurrent *Clostridioides difficile* Infection: A Claims-based Analysis
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