Background. Clostridioides difficile infection (CDI) is an important cause of morbidity and mortality and management continues to evolve. For laboratories that diagnose by detection of toxin gene, it is unclear whether reporting toxin production is additive to patient care. Furthermore, there is still a role for metronidazole (MNZ) given current guidelines. We recommend first-line therapy for non-severely ill cases. We analyzed case data of CDI in our hospital to assess outcomes of patients on MNZ vs. VAN and with or without toxin production.

Methods. A retrospective chart review of inpatients with CDI (based on detection of C. difficile toxin gene by PCR) was conducted between November 2017 and August 2018. Comparison of demographics and outcomes was performed in a) cases that were toxin-positive by enzyme immunoassay vs. negative and b) non-severely cases initially managed with MNZ vs. VAN.

Results. 76 patients were included (46 toxin-positive, 30 toxin-negative). Toxic-positive patients were older (mean age 77 vs. 62, p = 0.002) but had similar disease severity and initial treatment. A CDI recurrence occurred in 22% vs 0% in the toxin-positive cases (p = 0.006). Any CDI-related complication occurred in 23% of toxic-negative and 35% of toxin-positive cases (ns). After adjusting for toxin status, age, and severity, the odds ratio of the composite outcome of any complication with toxin-positive CDI was not significant (OR 1.45 95% CI 0.45-4.6, p = 0.52).

Conclusion. Although no difference in the composite outcome of any CDI-related complication was detected between toxin positive vs negative patients, toxin-in-positivity may predict patients at risk for subsequent recurrence. Patients with non-severely non-CIDI did not have increased risk of complications when managed with MNZ; however, they were more likely to require treatment escalation.

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2436. Real-world Evidence of Fecal Microbiota Transplant Use and Outcomes in Patients with Clostridioides difficile Infection
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Session: 254. HAI: C. difficile - Treatment
Saturday, October 5, 2019: 12:15 PM

Background. Fecal microbiota transplants (FMT) for CDI is an investigational, non-antibiotic approach to prevent recurrences in patients with multiple CDI. In controlled trials, efficacy rates of 62-76% have been reported with a single FMT, and up to 90% with multiple FMTs. This study evaluated real-world outcomes in patients undergoing FMT, most of whom had a single FMT.

Methods. Data from the Optum de-identified Integrated Claims-Clinical data set were extracted for patients with a first-observed CDI diagnosis between 4/2011 and 3/2018 that occurred within ±7 days of initial CDI antibiotics. Each patient had a > 4-year look-back period with no CDI claims prior to the index episode. rCDI was defined as a subsequent antibiotic prescription between 7 and 365 days after the prior CDI episode. The proportion of patients with rCDI, use of FMT, and recurrences after FMT were reported.

Results. Of the 98,895 patients included in the analysis, 71,189 (72.0%) had a CDI episode, 27,706 (28.0%) had > 1 rCDI, and 10,233 (10.4%) had multiple rCDI. The mean age was 64.2 years (56% > 65 years), and 61% were female. Medicare was used by 48% of patients, and commercial insurance was used by 32%. A total of 522 (0.5%) patients (mean age, 61.9 years) received a total of 541 FMT procedures. 36% of the FMT procedures occurred after the first observed CDI episode, 22% after the first rCDI, and 42% after the second and/or subsequent rCDI episode. Of those who received FMT, 71.4% (n = 373) of patients had no subsequent CDI events by 3/2018.

Conclusions. As an investigational procedure, only a very small proportion of patients with CDI were identified as undergoing FMT, and the timing of the procedure for some patients may not have aligned with current guidance. This study provides data on real-world efficacy outcomes after a single FMT, with an efficacy rate of 71.4%, which is consistent with results reported in controlled trials. A small number of patients received more than one FMT procedure, potentially due to treatment failures. Further research is needed to examine potential improvements in efficacy with multiple FMTs.

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2437. First-line Fidaxomicin Use in High-risk Inpatients Reduces Recurrence Rates
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Session: 254. HAI: C. difficile - Treatment
Saturday, October 5, 2019: 12:15 PM

Background. Fidaxomicin is recommended by the 2018 Infectious Diseases Society of America (IDSA) guidelines as a first-line treatment in adult patients with uncomplicated Clostridioides difficile infection (CDI). Carilion Roanoke Memorial Hospital (CRMH) implemented a clinical decision order set directing providers to initiate fidaxomicin for CDI patients at high risk of recurrence. The purpose of this study was to examine the impact of fidaxomicin (VAN) as first-line therapy for high-risk negative CDI patients.

Methods. This quasi-experimental study included adults with a first episode or first recurrence of CDI before and after order set implementation. Patients receiving laxatives within 24 hours of testing and those with fulminant CDI were excluded. Pre-implementation was defined as May 2017 to November 2017 and post-implementation as May 2018 to November 2018. The primary endpoint was recurrence (diarrhea and a positive GDH with toxin or PCR within 30 days post-treatment). Secondary endpoints were clinical cure (resolution of symptoms within 2 days of completing therapy), global cure (cure with no recurrence at 3 months), mortality, and readmissions. Partial courses of fidaxomicin (i.e., patients discharged on another agent) were also evaluated.

Results. A total of 282 patients were included. In the pre-group, 59.1% received metronidazole, 39.6% oral vancomycin, and 1.3% fidaxomicin. In the post-group, fidaxomicin use increased to 52.3% and oral vancomycin was 44.5%. There was a significant improvement in recurrence (30.2% vs 17.1%, P = 0.019). Global cure and CDI upon readmission also improved in the post-group (Table 1). In patients receiving partial courses of fidaxomicin, recurrence (9.3% vs 25%, P = 0.19), global cure (86% vs 75%, P = 0.44), and infection on readmission (25.6% vs 37.5%, P = 0.67) were similar.

Conclusion. Fidaxomicin as first-line agent in high-risk CDI patients decreased recurrence and increased global cure.

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2438. Using Artificial Neural Networks to Predict Intra-Abdominal Abscess Risk Post-Appendectomy
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Session: 255. HAI: Epidemiology Methods
Saturday, October 5, 2019: 12:15 PM

Background. Applying Artificial Intelligence techniques to healthcare data is gaining momentum. Early identification of patients at risk of surgical site infections is a major clinical goal. Our objective for this study was to determine whether deep learning AI techniques could identify patients at risk of intra-abdominal abscess development post-appendectomy using clinical data for pediatric patients undergoing appendectomy.

Methods. A dataset of 1,574 patients classified by surgeons as negative (1,328) or positive (246) for Intra-Abdominal Abscess Post-Appendectomy for Appendicitis were selected from a database containing 6,127 patients less than 19 years-old who had appendectomy at our institution between 2009-2018. Demographic, clinical, and surgical information were extracted. 34 Independent variables were identified to be useful for the study. Using Random Forest methodology 12 variables with the highest influence on the outcome were selected for the final dataset. Data imputation (MICE algorithm) was used to replace missing data points. Two “Reproducible” Artificial Neural Networks with different architectures were developed to predict the risk of developing Intra-Abdominal Abscess Post-Appendectomy: Model (1) 12 Inputs, 3 hidden layers with 12 Neurons each, and 1 Output. The University of Texas Health Science Center at Houston, Houston, Texas; UT Health McGovern Medical School, Houston, Texas

Results. For the 1,574 patients (80%-20% used as training and test sets), Model (1) achieved Accuracy of 89.84%, Sensitivity of ~ 70%, and Specificity of 93.61% on the test set while Model (2) achieved Accuracy of 84.13%, Sensitivity of 81.63%, and Specificity of 93.61% on the 1,574 patients (80%-20% used as training and test sets), 1,574 patients classified by surgeons as negative (1,328) or positive (246) for Intra-Abdominal Abscess Post-Appendectomy for Appendicitis were selected from a database containing 6,127 patients less than 19 years-old who had appendectomy at our institution between 2009-2018. Demographic, clinical, and surgical information were extracted. 34 Independent variables were identified to be useful for the study. Using Random Forest methodology 12 variables with the highest influence on the outcome were selected for the final dataset. Data imputation (MICE algorithm) was used to replace missing data points. Two “Reproducible” Artificial Neural Networks with different architectures were developed to predict the risk of developing Intra-Abdominal Abscess Post-Appendectomy: Model (1) 12 Inputs, 3 hidden layers with 12 Neurons each, and 1 Output. Model (2) 12 Inputs, 2 hidden layers with 18 Neurons each, and 1 Output. For the 1,574 patients (80%-20% used as training and test sets), Model (1) achieved Accuracy of 89.84%, Sensitivity of ~ 70%, and Specificity of 93.61% on the test set while Model (2) achieved Accuracy of 84.13%, Sensitivity of 81.63%, and Specificity of 93.61% on the test set.

Conclusion. Fidaxomicin as first-line agent in high-risk CDI patients decreased recurrence and increased global cure.

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2439. The role of positive externalities in economic evaluations of new antibiotics: modeling the impact of reduced transmission in healthcare facilities
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**Session:** 255. HAI: Epidemiology Methods
Saturday, October 5, 2019: 12:15 PM

**Background.** Positive externalities - beneficial spillover effects enjoyed by individuals who are not the primary consumers of a good - are rarely considered in cost-effectiveness analyses (CEAs) of antimicrobial drugs that could reduce person-to-person transmission of the target pathogen. We developed a compartmental model to simulate the effect of 2 hypothetical antibiotics targeting carbapenem-resistant Enterobacteriaceae (CRE) among hospital inpatients: one that treats bloodstream infections (BSIs) and one that decolonizes carriers. We assessed the contribution of positive externalities to the results of CEAs of these 2 antibiotics in the model.

**Methods.** Our model tracked patients according to CRE carriage, clinical infection, and detection status. Rates of CRE acquisition depended on transmissibility of carriers in different states and were calibrated to data from long-term acute care hospitals. For the BSI treatment scenario we assumed the new drug would decrease the death rate and transmissibility of patients after CRE BSI onset. For the decolonization scenario we assumed the new drug would increase clearance of CRE carriage after clinical detection. For each scenario, we quantified the drug's effect on the number of BSIs and deaths among patients receiving the drug (direct effect) and among all patients (total effect, i.e., direct plus indirect effect) compared with usual care. For the CEAs, the effectiveness outcome was life-years (LYs) gained and we assumed the new drug cost of $4,000 per dose and cost of a CRE BSI of $24,788.

**Results.** For both the BSI treatment and decolonization scenarios, the total effect of introducing the new drug was greater than the direct effect alone, indicating the existence of positive externalities. Relative to usual care, the new drug led to a decrease in incremental cost and an increase in incremental effectiveness (see Figures 1 and 2).

**Conclusion.** The inclusion of positive externalities in CEAs can have important effects on whether these new antibiotics are deemed cost-effective, due to their potential for interrupting chains of transmission. In our model, the inclusion of these effects reduced the incremental cost and increased the incremental effectiveness of these antibiotics.

![Figure 1](image1.png)

**Figure 1:** Results from cost-effectiveness analysis of treating drug vs. usual care including only direct effects and both direct and indirect effects under different assumptions of % of patients importing CRE

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2440. Using a geospatially explicit agent-based model of a regional healthcare network to assess varied antibiotic risk on Clostridioides difficile infection incidence
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**Session:** 255. HAI: Epidemiology Methods
Saturday, October 5, 2019: 12:15 PM

**Background.** Different antibiotic classes are associated with different Clostridioides difficile infection (CDI) risk. The impact of varied antibiotic risk on CDI