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Secondary Prophylaxis for *Clostridium difficile* Infection: A Physician Practice Assessment

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identify medicine patients at high risk of CDI on admission. Further research is needed to determine whether this tool can reduce primary CDI incidence and healthcare costs.

Table 1. Five-Point CDI Clinical Risk Tool and Predicted Risk.

5-Point CDI Clinical Risk Tool	Points	Predicted CDI Risk based on 5-point Tool			
		Total Points	Model-Predicted Risk	True Positive (%)	False Positive (%)
Age group					
70 and under (reference)	0				
Over 70	1				
Modified Horn's Index					
Low (reference)	0	0	0.0038	100.0	100.0
Moderate	1	1	0.0109	100.0	100.0
Major	2	2	0.0303	91.7	57.9
Extreme	3				
Antibiotic within previous 3 months		3	0.0816	74.5	31.8
No (reference)	0				
Yes	1	4	0.2016	36.7	5.7
Total	7/5	5	0.4180	5.7	0.6

Figure 1. Receiver operating characteristic (ROC) curve for CDI risk prediction model

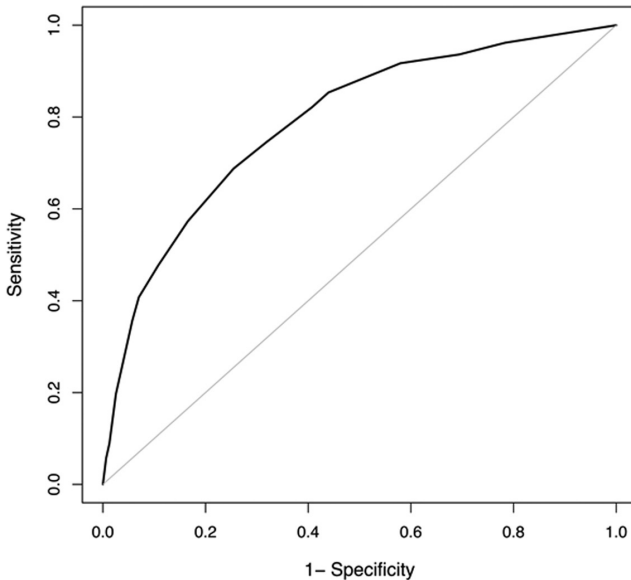
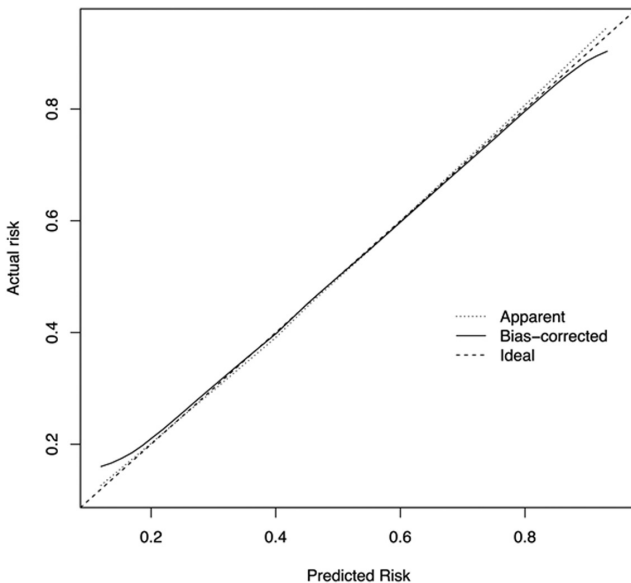


Figure 2. CDI risk prediction model calibration plot. *Clostridium difficile* infection risk prediction model calibration plot showing agreement between observed and predicted risks. Dashed line shows perfect agreement; lines above the dashed line indicate the predicted risks are lower than the actual risk.



Disclosures. All authors: No reported disclosures.

494. Use of a Clinical Prediction Tool to Predict *Clostridium difficile* Infection

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Background. *Clostridium difficile* is a pathogen that may be a component of normal microbiota. In 2011, there were an estimated 453,000 cases of CDI in the United States and 29,300 deaths. Diagnosis of CDI is often accomplished through nucleic acid amplification testing (NAAT) for *C. difficile* toxin genes, which carries a risk of false-positive results. In 1996, Katz et al. created a screen for CDI that was positive if the patient had significant diarrhea and either abdominal pain or prior antibiotic usage. Today, we believe that this tool is worth revisiting with increased incidence of CDI and improved testing methods. Our aim is to determine the current usefulness of the Katz et al. 1996 clinical decision tool for CDI.

Methods. We conducted a retrospective cross-sectional chart review at a Midwestern teaching hospital. All patients tested for CDI between June 1, 2016 and May 31, 2017 were initially eligible. Participants were excluded from data collection on the basis of missing information, a previous positive CDI test in the last 8 weeks or age <18 years. Charts were reviewed for age, sex, diarrhea, abdominal pain, antibiotic use, prior positive testing for CDI, and length of hospitalization. Data were analyzed using SAS Software.

Results. Of the initial 432 charts analyzed, 202 (46.8%) had no documented amount of diarrhea and 16 more were missing other data points, leaving 214 of 432 (49.5%) charts that included all data to be used for analysis. Of these 18 of 214 (8.4%) were positive results. The Katz screen was positive in 85 of 214 (40.2%) cases. The sensitivity, specificity, positive predictive value, and negative predictive value, respectively, were 61, 62, 13, and 95.

Conclusion. Katz et al. found a sensitivity, specificity, positive predictive value and negative predictive value of 80, 45, 18 and 94, respectively. The differences between these values and our own may be due to changes in the testing methodology and prevalence of CDI compared with a 1992 study population. The negative predictive value remains a strength. If this screening tool had been applied to our population, there may have been 128 (59.8%) fewer tests, but seven (38.9%) missed positive results.

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495. Predictors of *C. difficile* Infection and Impact of Primary Prophylaxis Among Asymptomatic *C. difficile* Colonized Patients: A Cross-Sectional Study

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Background. Patients who are colonized with *C. difficile* are at risk of developing *C. difficile* infections (CDI), but factors associated with disease onset are poorly understood. The objectives of this study were to identify predictors of hospital-onset CDI (HO-CDI) among asymptomatic *C. difficile* colonized patients and explore the potential benefit of primary prophylaxis to prevent CDI.

Methods. We performed a retrospective cross-sectional study of *C. difficile* colonized patients admitted to a tertiary academic institution in Quebec City between November 2013 and January 2017. Colonization status was determined upon hospital admission through a systematic screening program by detecting the *TcdB* gene by PCR on a rectal swab. Primary prophylaxis was defined as the preventive use of ≥ 1 dose of oral vancomycin or metronidazole in a patient without diarrhea. The choice and dosing of prophylaxis were left to the discretion of the treating physician. Univariate and multivariate logistic regression analyses were used to determine independent predictors of HO-CDI.

Results. Of 513 *C. difficile* colonized patients, 39 (7.6%) developed a HO-CDI, with a 30-day attributable mortality of 18%. We found that an increased length of hospital stay (adjusted odds ratio [aOR] per day, 1.03; $P = 0.006$), exposure to multiple classes of systemic antibiotics (aOR per class of antibiotic, 1.45; $P = 0.03$), the use of opioid analgesics (aOR, 2.70; $P = 0.01$) and cirrhosis (aOR, 5.57; $P = 0.007$), were independently associated with an increased risk of HO-CDI in multivariate analysis, whereas the use of laxatives was associated with a lower risk of CDI (aOR, 0.36; $P = 0.01$). Among the antimicrobials, B-lactam with B-lactamase inhibitors (OR, 3.65; $P < 0.001$), first-generation cephalosporins (OR, 2.38; $P = 0.03$), and carbapenems (OR, 2.44; $P = 0.03$) correlated with the greatest risk of HO-CDI. In contrast, patient age, exposure to proton pump inhibitors, and the use of prophylaxis were not significantly associated with occurrence of HO-CDI in this specific population.

Conclusion. This study identifies several variables that are specifically associated with the development of CDI among *C. difficile* colonized patients. Whether modifying these risk factors could help prevent CDI should be further investigated.

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496. Secondary Prophylaxis for Clostridium difficile Infection: A Physician Practice Assessment

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Background. Recurrent *Clostridium difficile* infection (CDI) is associated with significant morbidity, mortality and healthcare related costs. Up to 30% of CDI cases recur, resulting in 83,000 cases of recurrent CDI per year. Although agents for primary and secondary prophylaxis for CDI including the use of probiotics, antibiotics, fecal microbiota transplantations, and newer therapies such as bezlotoxumab have been reported, there is no consensus guidelines regarding their use. The purpose of this study was to assess physician practices regarding secondary prophylaxis for CDI.

Methods. This cross-sectional study using Qualtrics electronic survey (24 questions) assessed physician practice preferences. The survey was distributed through institutional emails and through the Infectious Disease Society of America "IDea Exchange" forum. Responses were collected and analyzed using descriptive statistics.

Results. A total of 246 surveys were completed. Physicians were surveyed from greater than 100 locations (see Figure 1). Most (229, 93%) of the physicians practiced in an inpatient setting. Respondent specialties were primarily infectious diseases (138, 56%) followed by internal medicine (72, 29%). Most physicians (173, 71%) use secondary prophylaxis for CDI prevention (see Figure 2). Vancomycin (121, 70%) and probiotics (114, 66%) were most commonly used for CDI secondary prophylaxis, (see Figure 3). Of 164 physicians who used secondary prophylaxis half of them (89, 54.2%), used prophylaxis only for patients with a history of recurrent CDI receiving antibiotics and about a third, (49, 29.9%) utilized it for patients with a history of CDI who were receiving antibiotics. ID physicians were more likely to prescribe secondary prophylaxis as compared with non-ID physicians (85% of 127 respondents vs. 75% of 85 respondents, $P = 0.052$). The use of secondary prophylaxis was similar among private practice and academic physicians (84% of 39 vs. 80% of 157 respondents, $P = 0.591$).

Conclusion. The majority of the physicians who responded to this survey use secondary prophylaxis to prevent recurrent CDI, hence future CDI guidelines need to address the role of secondary prophylaxis in clinical practice.

Figure 1: Map representing distribution of participants.
 *Intentional locations not represented on map: Abu Dhabi, United Arab Emirates; Florianópolis, Brazil; Beirut, Lebanon; Mexico.



Figure 2: Physician perceptions regarding use of secondary prophylaxis of CDI. Results are expressed as number of responses and percentages. Total number of responses N=243.

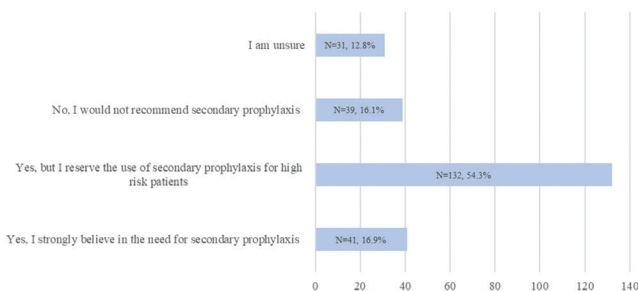
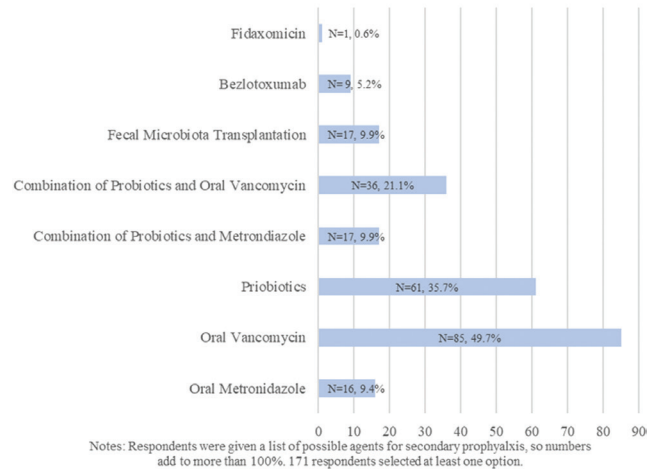


Figure 3: Agents Utilized for Secondary Prophylaxis of CDI. Results are expressed as number of responses and percentages. Total number of responses N= 171



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497. Identification of Patients at Risk of Clostridium difficile Infection for Enrollment in Vaccine Clinical Trials

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Background. Vaccine efficacy trials against *C. difficile* infection (CDI) require a study population with an observed event rate that supports feasibility and timely study completion. The goal of this study was to develop a predictive algorithm to identify patients at high risk of developing CDI over the next 2–12 months for enrollment in a vaccine clinical trial.

Methods. We conducted a two-stage retrospective study of patients within the US Department of Veterans Affairs Health system between January 1, 2009 and December 31, 2013. Included patients were age 50 years or older, had at least one visit in each of the 2 years (2007 and 2008) prior to the study, and had no CDI in the 12 months prior to and the first month of the study. In stage 1, we used a case-cohort design to identify factors (patient-month level) for predicting the risk of CDI in months 2–12. The stage 1 algorithm was then applied to the VA population and a calculated risk score generated at each patient visit (inpatient or outpatient). Patients were included in the stage 2 cohort at the first time their stage 1 risk score crossed the designated risk threshold. The stage 2 algorithm incorporated additional factors including medications and laboratory variables. Multivariable logistic regression with elastic net regularization was used to select final predictors in both stage 1 and stage 2 algorithms. The final algorithm consisted of sequential application of predictive algorithms in stage 1 and 2. Performance was measured using the positive predictive value (PPV) and the area under the curve (AUC).

Results. Risk factors in the final algorithm included baseline comorbidity score, acute renal failure, sepsis, UTI or pneumonia in the current month, UTI in the previous month, having an albumin or hematocrit test performed, high-risk antibiotics in the previous 3 months, hemodialysis in the last month, race, and the number and duration of acute and long-term care visits in the last month. The final algorithm resulted in an AUC of 0.69 and a PPV of 3.4%, largely enriching for the risk of CDI in months 2–12.

Conclusion. We developed a predictive algorithm to identify a patient population with increased risk of CDI over the next 2–12 months. Predictive models have the potential to improve enrollment and feasibility of clinical trials.

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