

1. Background: Currently, there are limited treatment guideline recommendations for primary and secondary *Clostridium difficile* (*C. diff*) prophylaxis during concomitant systemic antibiotic use. Therefore, in 2017, a best practice advisory (BPA) was created within our electronic medical record to identify patients at high risk for *C. diff* infection that provided prescribers a suggestion to consider *C. diff* prophylaxis. An improvement to that BPA was made in October 2019, offering options for ordering of *C. diff* prophylaxis within the BPA. The BPA that currently fires is: "Antibiotic and Probiotic Prophylactic for *C. diff* with *C. diff* history", and this appears when the patient has been admitted more than 3 days, has been on antibiotics 3 days or more, has a history of *C. diff*, has risk factors for *C. diff*, and does NOT have any of the following: on antibiotics to treat *C. diff*, existing probiotic consult, or on a probiotic. The medication options to order are: vancomycin orally twice daily or a probiotic. Our project seeks to determine the impact of the implementation of the BPA for *C. diff* prophylaxis utilization and if it reduced the number of hospital-acquired *C. diff* infections.
2. Methods: This study was determined to be exempt from the institutional review board. This study is retrospective, and eligible patients included in the study will be patients that have either tested positive for *C. diff* or patients that had the BPA fire within the electronic medical record at Mercy Hospital Joplin. All patients aged  $\geq 18$  years old, admitted for at least 3 days, received at least 3 days of systemic antibiotics, admitted to Mercy Hospital Joplin from January 1, 2015-December 31, 2016 (pre-BPA implementation period), admitted to Mercy Hospital Joplin from January 1, 2017-December 31, 2018 (initial post-BPA implementation period), admitted to Mercy Hospital Joplin from October 1, 2019-March 31, 2020 (post-updated BPA version implementation period), tested positive for *C. diff* pre-BPA implementation period or had an EMR BPA fire during hospitalization will be included in the study. Patients that completed treatment for *C. diff* infection within 15 days prior to admission date for hospitalization meeting study inclusion, if received antibiotics as outpatient therapy, not receiving antibiotics for at least 3 days prior to admission date for hospitalization meeting study inclusion, not receiving antibiotics at least 3 days while admitted to the hospital, concurrent use of drugs that have activity against *C. diff* documented prior to admission date for hospitalization meeting study inclusion and/or while hospitalized, concurrent use of probiotics documented prior to admission date for hospitalization meeting study inclusion, and absolute Neutrophil Count  $< 1000$  (if on a probiotic) prior to admission date for hospitalization meeting study inclusion and/or while hospitalized will be excluded from the study. The primary outcome is to determine the rates of hospital-acquired *C. diff* infections before and after implementation of an EMR best practice advisory for *C. diff* prophylaxis.
3. Results: For the primary outcome, I compared the total number of patients receiving prophylaxis and the standardized infection ratio values, and the p-values were 0.011 and 0.00536, respectively. For secondary outcomes, the hospital length of stay decreased during each time period. The main departments patients were admitted to

were internal medicine, ICU, infectious disease, and surgery. Antibiotics received most often while hospitalized were vancomycin, piperacillin-tazobactam, levofloxacin, and cefepime. The antibiotic duration while hospitalized decreased during each time period as well. The prophylactic agent utilized most often was lactobacillus and the average duration of prophylaxis was five days. Antibiotics most frequently prescribed prior to admission were vancomycin IV, doxycycline, Bactrim, levofloxacin, and Augmentin. For *C. diff* outcomes, there was a 5 % positive rate in BPA 1 and a 2% positive rate for BPA 2. In each group of patients, approximately 50% of patients were recently hospitalized and about 20% were residents in a congregate setting. Lastly, for BPA acknowledgement, there was a 48% acceptance rate in the BPA 1 group and 69% acceptance rate in the BPA 2 group.

4. Conclusions: There was a statistically significant difference of hospital-acquired *C. diff* rates before and after the implementation of a BPA based on the p-values being  $<0.05$ . Oral vancomycin is more effective than lactobacillus in preventing hospital-acquired *C. diff* infections because out of the 7 patients that tested positive for *C. diff*, 5 patients were on lactobacillus. Cefepime was the antibiotic most utilized in patients that tested positive for *C. diff*. For outpatient antibiotics, Bactrim, levofloxacin, and cefadroxil all led to positive *C. diff* outcomes. Overall, multiple factors can lead to a positive *C. diff* result, but prophylaxis with oral vancomycin is the best option in preventing infection.