

# Employing proactive surveillance using an Electronic Health Record-based screening technology for *Clostridioides difficile* to mitigate Healthcare-associated infections

Mary Rose Payumo, MPH, CIC, CPHQ; Judy Chun, MLS(ASCP)<sup>CM</sup>, CIC

## Background

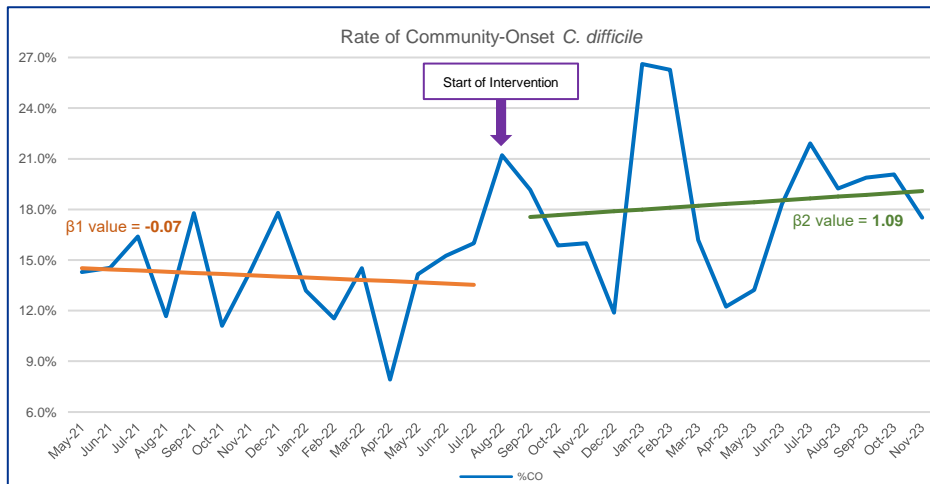
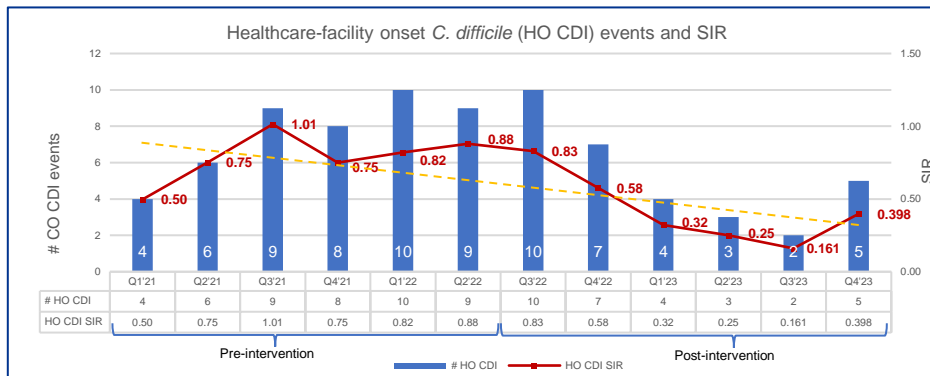
*Clostridioides difficile* (*C. difficile*) is an increasingly common pathogen, both within and outside of the hospital setting, which can cause significant morbidity and mortality among patients. Individuals with *C. difficile* can be asymptomatic or can have symptoms ranging from mild diarrhea to severe and life-threatening inflammation of the colon. Early detection, isolation with contact precautions, environmental cleaning, and appropriate antibiotic treatment greatly decreases the rate of morbidity and mortality and can prevent further spread to other patients, decreasing the overall clinical and economic impact. Nurse-driven protocols have shown significant improvements in the amount of time to receive a test result in comparison to requiring physician approval. Even with such protocols in place, patients with a high index of suspicion for *Clostridioides difficile* are missed or not tested until a more acute presentation occurs.

## Methods

In this study, a proactive surveillance system leveraging an electronic health records-based screening algorithm was implemented to identify patients at increased risk for *Clostridioides difficile* infection. This system facilitated prompt testing and initiation of appropriate infection prevention strategies, when applicable, to impede transmission. The intervention was deployed across all patients admitted to a 463-bed acute care facility, averaging 2,400 monthly admissions, for a 15-month period. Segmented regression analysis was employed to compare the incidence of community-onset *Clostridioides difficile* infection during the intervention period with the baseline 15 months prior to implementation. The standardized infection ratio for Healthcare-associated *Clostridioides difficile* was compared between the pre- and post-implementation periods using the National Healthcare Safety Network Statistics Calculator.

## Acknowledgments

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- Valeria Gonzalez, BSHA



## Results

Using a segmented regression analysis, the community-onset *C. difficile* data for the 15-month period pre- and post-implementation:

- $\beta 1$  value = **-0.07**; standard error (SE) of 0.03, p-value < 0.05
- $\beta 2$  value = **1.09**; SE of 0.29, p-value < 0.001

Standardized Infection Ratio (SIR) for healthcare-associated *Clostridioides difficile* infections (CDI):

- Pre-intervention: SIR 0.803, p-value of 0.1687, 95% confidence interval (CI) of (0.576, 1.1091)
- Post-intervention: SIR 0.400, p-value of 0.0000, 95% CI of (0.260, 0.591).

The relative ratio, per NHSN Statistics Calculator, was 0.498 with a p-value of 0.0077 and a 95% confidence interval of (0.293, 0.834).

## Discussion

The study revealed a statistically significant change in community-onset *C. difficile* infections. The baseline rate prior to intervention showed a statistically significant downward trend ( $\beta 1 = -0.07$ ,  $p < 0.05$ ). Post-implementation analysis revealed a significant increase in the rate of community-onset *C. difficile* infection ( $\beta 2 = 1.09$ ,  $p < 0.001$ ). This finding suggests a potential positive effect from the intervention, namely the early identification of community-onset *C. difficile* infections.

The study demonstrated a statistically significant decrease of 50.187% between the pre- and post-intervention SIRs for healthcare-associated *C. difficile* infections (CDI). The decline in CDI incidence post-intervention can likely be attributed to the early identification of community-onset *C. difficile* cases and the implementation of appropriate infection prevention strategies upon patient admission, both of which were facilitated by the intervention.

The initiative for proactive surveillance for early identification of patients at increased risk for *C. difficile* infections was launched due to not meeting internal CDI goals nor the Centers for Medicare & Medicaid Services (CMS) Value-based Purchasing Achievement Threshold in 2021-2022. This study provides evidence of a correlation between the launch of the proactive surveillance intervention and a decrease in the incidence of CDI events post-intervention. Furthermore, there were positive financial implications as well, since the hospital achieved both its own internal, facility-specific goals, as well as the CMS value-based purchasing achievement threshold SIR of 0.520 for CY 2023.