



# Delayed diagnosis and treatment of *C. difficile* in the hospital and preventable nosocomial spread Quality Improvement

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## Introduction

*Clostridium difficile* (*C. diff*) is associated with a significant increase in health threat with delayed diagnosis and treatment. Undiagnosed *C. diff* in the hospital setting increases morbidity and mortality of patients with nosocomial spread. As per the CDC, based on surveillance for *C. difficile* infection from 2011 to 2017, approximately 29,000 cases had fatal outcomes within one month of initial diagnosis and 15,000 deaths were estimated to be directly attributable to *C. difficile* infection (CDC, 2017). To prevent the spread of *C. diff*, the American College of Gastroenterology recommends automatically reflex testing for *C. diff* in patients who experience three loose stools within 24 hours without a known cause (American College of Gastroenterology, 2020).

At GVMC, a small community hospital, there has been a significant increase in *C. diff* infections from 2021 to 2022. Any delay in diagnosis can pose a risk to patient health and expose healthcare workers to the potential spread of infection. Acute care hospitals are also required by the Centers for Medicare and Medicaid Services (CMS) to report hospital-acquired infections, and a hospital's payment from CMS may be negatively impacted if there is an increase in these infections (CMS, 2016). To address the increase in *C. diff* infections at GVMC, it may be necessary to review and improve protocols using evidence-based guidelines to prevent the spread of infection and protect both patients and healthcare workers (APIC, 2013).

## Case Presentation

A 73-year-old male with a past medical history of non-insulin-dependent diabetes mellitus type 2, hypertension, coronary artery disease s/p CABG x1, obstructive sleep apnea, systolic congestive heart failure, aortic stenosis s/p valve replacement, and end-stage renal disease with nightly peritoneal dialysis presents with a weakness for 2 weeks and had 4-8 loose bowel movements per day. Admitted for sepsis secondary to *Rhodotorula* fungal peritonitis, initially treated with antifungal but 3 days later the stool culture returned positive for *C. diff*. The patient was started on oral vancomycin and discharged home upon improvement in diarrhea. The above case happened in Sept 2021. This case leads to further investigation into hospital protocol.

## Background

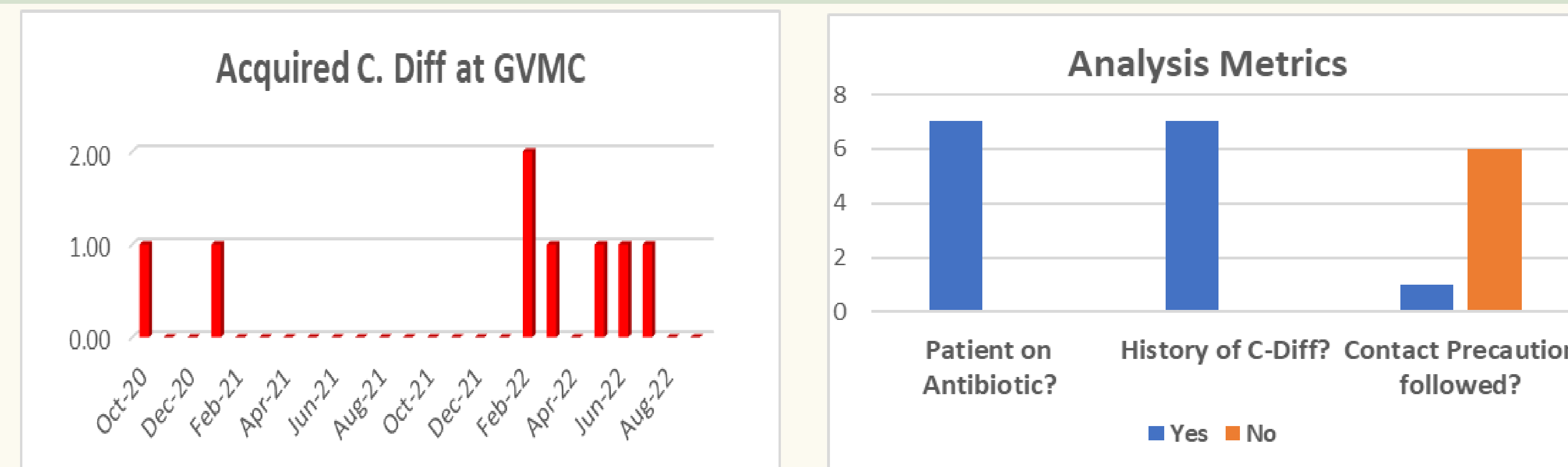
*Clostridioides difficile* (*C. diff*) is a type of bacteria that can cause serious infections, particularly in healthcare settings. It is transmitted through the fecal-oral route and can be found in a variety of environments, including water, air, feces, hospital surfaces, and soil. It thrives at a temperature of 37 degrees Celsius and can survive on hard surfaces for up to five months (APIC, 2013). *C. diff* infections are a major health threat, with a significant increase in morbidity and mortality when left undiagnosed or untreated. This also has a significant economic impact, costing an average of \$35,000 to treat and care for a hospitalized patient with *C. diff* (APIC, 2013) and added a \$4.8 billion burden in healthcare costs for acute care (Lessa et al, 2015). In recent years, there has been an increase in the number of *C. diff* infections in healthcare settings, with approximately 500,000 cases reported in 2011 (Lessa et al, 2015). In the United States from 2011 to 2017, approximately 29,000 cases had fatal outcomes within one month of initial diagnosis and 15,000 deaths were estimated to be directly attributable to *C. difficile* infection (CDC, 2017).

A detailed assessment of prior nosocomial cases of *C. diff* at a particular healthcare facility was conducted and it was found that there was a significant increase in the number of *C. diff* cases from September 2021 to July 2022 compared to the 15 months prior. Specifically, there was only one reported case of *C. diff* out of two cases of hospital infections from May 2020 to August 2021. In comparison, from Sept 2021 to July 2022 there were a total of six *C. diff* confirmed nosocomial cases out of twelve cases of hospital infections. This increase in *C. diff* cases warrants further investigation to understand the root causes and implement appropriate interventions to prevent the spread of infection.

## Method

- The Plan-Do-Study-Act (PDSA) cycle was used to address the issue of *C. diff* infections at GVMC through a systematic and evidence-based approach, aiming to improve patient outcomes and reduce the spread of *C. diff* infections.
- During the "Plan" phase, a Retrospective Review and analysis was conducted to understand the root causes of *C. diff* infections at GVMC
- Data was collected and current protocols were reviewed and compared to clinical guidelines
- Based on the analysis, a quality improvement project was developed as part of the "Do" cycle to reduce the incidence of *C. diff* infections at GVMC
- The "Study" cycle involved following up on the outcomes of the change every month for the first six months, comparing pre-intervention *C. diff* rates with post-intervention rates to evaluate the success of the change
- The "Act" cycle provided evidence to sustain, cancel, or restart the change as implemented, with modifications made if necessary and follow-up every month if changes were made or every three months if no changes were needed

## Data Analysis Outcome



### Findings from the data analysis:

- After Sept 2021, there was a 75% increase in nosocomial cases of *C. diff* when compared year over year.
- Most *C. Diff* cases were identified on day 10 of admission. The second worst offenders were days 2 & 5. It was noted that all the patient's had been prescribed broad spectrum antibiotics during their admission.
- Out of 12 cases, 6 were in the ICU, with the remaining four cases found on the general medical floors.
- During the chart review, out of 12 cases, Contact Precautions were ordered only once.
- No conclusive evidence or tracking method has been identified to indicate that Employees follow proper hand wash protocol
- The Electronic medical record did not properly record the number of loose bowel movements.

## Consideration for Quality Improvement Initiative

To reduce the *C. diff* infection at the hospital, a Quality Improvement initiative has been proposed with following recommendations:

- Reflex "Contact-D Isolation" protocols when *C. Diff* PCR is ordered.
- Provide nursing alerts through EHR implementation for reminder of uncollected stool samples.
- Reflex discontinuation of antiperistaltic agents for all patients in whom a *C. Diff* PCR test is outstanding.
- Maintain Contact-D isolation precautions for 48 hours after diarrhea has ceased.
- Vinyl glove use has been demonstrated to lead to a significant decline per 1000 discharges. These should be considered in patients with active CDI or outstanding *C. Diff* PCR testing.
- Implementation of 4% chlorhexidine (gluconate) antiseptic hand wash decreases *C. Diff* shown to persist on the hands of personnel to 1 of 7. This is down from 14 of 16 who use regular soap and water.
- Reinforce the necessity to use gown and gloves to nursing staff/personnel with patient contact on each instance of patient contact.
- Increased provider training on the most common causative agents including clindamycin, cephalosporins and fluoroquinolones, as well as multi-drug regimens.

## Discussion

There is a risk of delayed diagnosis and exposure to healthcare workers due to an increase in new *Clostridioides difficile* (*C. difficile*) infections. To contain the spread of *C. difficile*, a number of measures will be implemented, including adhering to contact isolation protocols, using certain types of gloves and hand wash, and providing training on common causes of *C. difficile* infections and proper infection prevention measures. These measures are being taken as part of a quality improvement (QI) effort to address the issue.

The hospital's protocol for handling *C. difficile* infections should be compared to the recommended guidelines from the American College of Gastroenterology in order to identify areas for improvement and reduce the spread of the infection. One potential cause for *C. difficile* outbreaks in the hospital could be a failure to properly monitor bowel movements and follow hand washing protocols. To address this, the hospital should establish and monitor protocols such as monitoring daily bowel movements in high-risk patients and providing infection resource guides to medical staff for awareness and early detection of *C. difficile*.

The Centers for Medicare and Medicaid (CMS) requires acute care hospitals that participate in the Inpatient Perspective Payment System to report *C. difficile* infections through the National Health and Safety Network. This network allows hospitals to track real-time data and view statistics on hospital-associated infections. Hospitals' payments from CMS are based on their performance in terms of hospital-acquired infections, which could financially impact small, acute care hospitals if they fail to meet federally mandated targets for nosocomial infections.

By understanding the relationship between the body, mind, and spirit, and by identifying modifiable risk factors such as recent antibiotic use, healthcare staff can use an osteopathic approach to identify and treat infectious diseases such as *Clostridioides difficile* (*C. difficile*). This approach focuses on restoration of the normal structure of the gut microbiota and the immune system and may include the use of probiotics and specific prebiotic foods. The goal is to reduce the risk of further spore germination and improve the patient's quality of life.

## Conclusion

The hospital is experiencing an outbreak of *Clostridioides difficile* (*C. diff*) infections and is implementing various measures to address the issue, such as adhering to contact isolation protocols and providing training on common causative agents. The hospital is also considering factors such as proper hand washing and monitoring bowel movements as potential causes for the outbreak and is providing resources to medical staff for awareness and early detection. Hospitals are required to report *C. diff* infections to the Centers for Medicare and Medicaid (CMS) through the National Health and Safety Network, and failure to meet infection targets can have financial consequences. An osteopathic approach, which focuses on understanding the body, mind, and spirit, can be used to identify modifiable risk factors for *C. diff* and implement interventions such as probiotics and specific prebiotic foods to restore gut microbial structure and function.

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