A seven-year review of hospital-onset Clostridioides difficile infection reduction and the case for a multidisciplinary taskforce approach

Peggy Brown MPH, CIC
Michelle Charles MSN, RN-BC
Brittany S. Thorp MPH
Kristin Sims MPH CIC CPPS FAPIC
R. Scott Stienecker MD
A seven-year review of hospital-onset *Clostridioides difficile* infection reduction and the case for a multidisciplinary taskforce approach

Peggy Brown, MPH, CIC, Michelle Charles, MSN, RN-BC, Brittany Thorp, MPH, Kristin Sims, MPH, CIC, FAPIC, R. Scott Stienecker, MD, FIDSA, FSHEA, CIC

Abstract

**Background:** Hospital-onset *Clostridioides difficile* infection (HO-CDI) is a life-threatening disease that can prolong and complicate a patient’s hospitalization. To reduce HO-CDIs and ensure positive health outcomes with reduced cost, utilization of a multidisciplinary taskforce (MDT) is key to identify gaps, develop action plans, and implement and review interventions in the most efficient and effective manner.

**Methods:** Over the course of seven years, two rounds of interventions were executed consecutively across a nine-hospital healthcare system to reduce HO-CDI events. The first round (Round 1) driven solely by the Infection Prevention (IP) department spanned four years and consisted of three phases of interventions. The second round (Round 2) led by an MDT was comprised of ten disciplines and likewise had three phases of interventions. Tempas and interventions varied between all phases. Data reported to National Healthcare Safety Network (NHSN) covered from 2019Q3 to the end of taskforce in 2022Q2. The MDT utilized the PDSA evaluation model during the incremental reviews prior to moving onto the next phase. The MDT agreed that having 2 CDI testing options was problematic to follow good diagnostic stewardship and chose to pursue the elimination of the second test.

**Results:** NHSS HO-CDI event data was collected between quarter 3 of 2015 (2015Q3) through quarter 2 of 2022 (2022Q2). Round 1 lasted a total of four years and consisted of 572 total events reported to NHSN compared to events from Round 1. Furthermore, Phase 3 of Round 2 showed most successful accounting for only 6.3% (11/175, p=0.02) of all interventions from both rounds.

**Conclusion:** From the start of the MDT to its end, the healthcare system observed an overall HO-CDI reduction of 81.6%. The review of this healthcare system’s progress in improving outcomes due to HO-CDI reveals utilization of a MDT approach allows for key stakeholders to participate in decision making, consequently reinforcing ownership of interventions at each phase across the board for a more efficient and effective implementation to sustainable positive results.

Introduction

*Clostridioides difficile* (C diff) is a spore-forming bacteria that can cause life-threatening diarrhea. According to the Centers for Disease Prevention and Control (CDC) 2019 Antibiotic-Resistant Threats report, C diff affects thousands each year and is the most common healthcare-associated infection. Two methods of C diff acquisition during hospitalization include via facial oral transmission or gut dysbiosis primarily from antibiotic use in those previously colonized with C diff. Patients who acquire a hospital-onset C diff infection (HO-CDI) suffer physically, mentally, and financially due to extended length of hospitalization. Attributable costs due to HO-CDIs range from $14,257 to $21,792 within five years after the initial diagnosis.

To ensure positive health outcomes and reduce costs, a multidisciplinary taskforce (MDT) was formed. Multidisciplinary teamwork, also referred to as inter-disciplinary or multi-professional teamwork, is the collaborative process of individuals from various backgrounds who pool their knowledge and expertise together to achieve a joint or unified goal. The aim for our MDT was to reduce and sustain the HO-CDI standardized infection ratio (SIR) to less than 0.50 for the healthcare system by employing a strategic approach that allowed for identification of the most effective intervention(s) during the process improvement period.

Methodology

In 2015, the Infection Prevention (IP) department began a system-wide process improvement (PI) effort to reduce HO-CDI events. Prior to employing interventions, the healthcare system used one molecular test for all C diff screening and testing. A multidisciplinary standard care precautions for patients who tested positive. Over the next 4 years, IP-driven interventions were rolled out in three separate phases. The period consisting of IP-driven interventions will be referred to as Round 1. Following the third phase of Round 1, a multi-disciplinary taskforce (MDT) was formed in July 2019. The MDT consisted of ten disciplines to ensure any unforeseen gaps were identified and likewise rolled out interventions in three phases. The MDT period of interventions will be considered Round 2.

**Results:** The IP-driven interventions in Round 1 included development and implementation of Enhanced Contact Precautions in Phase 1, performance of root cause analysis and case review with nursing managers in Phase 2, and the go-live of a new 2 C diff toxin evaluation (PAS) molecular test in Phase 3 that was coupled with mass education of the screening and testing algorithms in Phase 3. The mass education was difficult to disseminate system-wide due to revolving staff changes within the healthcare system.

Upon the MDT’s formation in July of 2019, it was clear to the team that the first phase of interventions would involve building the screening and testing algorithm into the electronic medical record (EMR) using clinical decision support. During Phase 1, a 30, 60, and 90-day review was performed to identify gaps and issues in the screening and lab ordering processes. The MDT utilized the PAS evaluation model during the incremental reviews prior to moving onto the next phase. The MDT agreed that having 2 C diff testing options was problematic to follow good diagnostic stewardship and chose to pursue the elimination of the second test.

Although the initial 2-step testing was the most affordable option, its reflex portion was molecular-based. This allowed the standardized infection ratio (SIR) value for our hospitals despite seeing a reduction in HO-CDI events. The MDT members chose to reverse the testing method from toxin EIA to based product and compare the IP-only versus the MDT approach styles. Discipline participation was also tracked during Round 2 to provide an account of contributions to the PI project.

Discussion

The IP-driven interventions in Round 1 included development and implementation of Enhanced Contact Precautions in Phase 1, performance of root cause analysis and case review with nursing managers in Phase 2, and the go-live of a new 2 C diff toxin evaluation (PAS) molecular test method that was coupled with mass education of the screening and testing algorithms in Phase 3. The mass education was difficult to disseminate system-wide due to revolving staff changes within the healthcare system.

Upon the MDT’s formation in July of 2019, it was clear to the team that the first phase of interventions would involve building the screening and testing algorithm into the electronic medical record (EMR) using clinical decision support. During Phase 1, a 30, 60, and 90-day review was performed to identify gaps and issues in the screening and lab ordering processes. The MDT utilized the PAS evaluation model during the incremental reviews prior to moving onto the next phase. The MDT agreed that having 2 C diff testing options was problematic to follow good diagnostic stewardship and chose to pursue the elimination of the second test.

Although the initial 2-step testing was the most affordable option, its reflex portion was molecular-based. This allowed the standardized infection ratio (SIR) value for our hospitals despite seeing a reduction in HO-CDI events. The MDT members chose to reverse the testing method from toxin EIA to based product and compare the IP-only versus the MDT approach styles. Discipline participation was also tracked during Round 2 to provide an account of contributions to the PI project.

Conclusion

To our knowledge no previous study has been able to compare strategy types and interventions for HO-CDI event reductions. The collaborative efforts of an MDT for PI projects is known to be highly effective in producing positive results. Participation among key stakeholders is key to moving the project forward in an efficient fashion. From the start of the MDT in 2018Q3 to the implementation of the final and most successful intervention in 2021Q2, two years had lapsed. While our initial focus was on the system’s larger urban hospitals, the MDT observed the smaller community hospitals experiencing an increase in HO-CDI events. An oversight we realized during Phase 3 was the unintended exclusion of our community hospitals and other hospital partnerships that had been negatively impacted by the interventions. Key stakeholders from those locations were promptly contacted and the MDT is currently assisting with educational and communication efforts in their respective hospitals. By these efforts, the community hospitals that were experiencing a rise in events were able to reverse course to sustainable low rates and SIRs.

References


Disclosure statement: Nothing to disclose