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Title: A Collaborative, Systemwide Approach to Reducing Healthcare Onset Clostridium Difficile (HOC-diff)

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Purpose: Healthcare Onset Clostridium Difficile (HOC-diff) is one of the most common healthcare associated infections (HAIs), within the United States. It has a negative impact on patients by increasing their hospital length of stay by 2.7 days, has an associated mortality rate of 10%, and negatively impacts the citizens in our community (Dubberke et al., 2014). Healthcare onset C-diff also increases the cost to the organization by $15,000 per episode (Dubberke et al., 2014). In reviewing our processes and knowledge base across the system, a team of subject matter experts (SMEs) identified several areas for improvement. Variations within clinical practice and lack of evidence-based policies and procedures were found to be top contributors to the increase in HOC-diff rates within the system. A review of antibiotic usage revealed the need to implement antimicrobial stewardship programs at each facility. Major differences in practices were identified in the cleaning of the environment and equipment between facilities by environmental services (EVS). A knowledge deficit, a lack of standardized tools and workflow across the system, and communication between nursing staff and EVS regarding daily cleaning were also discovered. A lack of standardization in EVS cleaning, compliance in cleaning between c-diff patients, and insufficient validation of hand hygiene compliance among the clinical staff was revealed in the outpatient setting. The hospital system failed to meet its fiscal year 2016 C-diff goal rate of 6.89 per 10,000 patient days, ending with a rate of 8.86. This unachieved outcome prompted a new goal of reducing the HOC-diff rates for FY17 by 20%, with a target rate of 7.09. The purpose of this multidisciplinary team approach was to standardize our clinical practices across the system, implement evidence-based policies and procedures related to c-diff, identify and correct practices that contribute to HOC-diff cases. All actions were aimed at decreasing the rate of HOC-diff cases, decreasing patient's length of stay, decreasing organizational expenses associated with HOC-diff, reducing mortality, and decreasing the impact on our community.

Methods: The Health System consists of 5 legacy hospitals and 6 new facilities as of April 1, 2016. The C-diff taskforce consisted of multidisciplinary teams brought together to reduce HOC-diff. The teams were antimicrobial stewardship, education, EVS, Clinical Inpatient, Clinical Ambulatory, Clinical Community, Information Technology (IT), and Communication/Marketing. A project manager, executive sponsors, operational leaders, and executive leaders led the taskforce and helped to facilitate the removal of barriers by to creating a more cohesive group with clear cut goals. The Antimicrobial Stewardship (AMS) team conducted a retrospective review of HOC-diff cases that revealed an overuse of agents shown to be associated with HOC-diff and delays in microbiological identification of pathogen, which caused prolonged empiric

antimicrobial therapy. The team worked with IT to implement best practice advisories (BPAs) for additional diarrhea-inducing medication and these target agents which prompted providers to consider other antibiotics. The Education team stratified a teaching plan based upon the needs of each employee type to address infection prevention and isolation precautions. A computer based learning module and competency check off was created and finalized to validate competency amongst new and current employees. EVS discovered there was a lack of standardization in cleaning of the environment and equipment. Standardized competencies were developed and reviewed by EVS leads with the support of Infection Prevention (IP) and organizational learning. The result was standardized education and simulation lab for all new and existing team members. An equipment cleaning policy was developed and piloted at one of the legacy facilities, in an effort to formulate a plan for system implementation. The Clinical Inpatient team finalized a system wide c-diff nurse driven protocol. They collaborated with the Professional Practice department and/or leaders at each facility and Organizational Learning to roll out education on the Nurse Driven Protocol and strategies to prevent the spread of infections, respectively. Several tools were implemented as job aides to assist in hardwiring the process changes. Communication tools were also implemented to provide clarification on proper high touch cleaning and accessing reports that would provide needed information when evaluating whether or not to test. The Clinical Ambulatory team reviewed their practices and identified patients' risks of transmitting c-diff through surface areas within the examine rooms to their staff, patients, and vendors. They also discovered multiple EVS contracts in place at various locations, along with an unclear knowledge of their cleaning practices or insight of healthcare cleaning protocols. The Clinical Community team focused their attention on the skilled nursing facilities, home health agencies, retail pharmacies, clinics and affiliated detention center as patients are routinely received and transferred to and from these areas, creating a high risk for transmission. Their goal was to create a communication tool to utilize during patient transitioning, therefore, allowing them to share information in a timely manner. The information technology team found opportunities to enhance the electronic medical record to support communication between the RN and care partners (CPs) by providing CPs with the ability to document stool consistency as well. They also improved the ease of documenting when labs and/or specimens had been collected and sent to lab. The Communication and Marketing team identified a lack of infection prevention education and communication for the staff when interacting with families and patients. This included c-diff and the basic isolation policy, all of which are crucial in preventing the spread of infections. The teams worked to develop scripting for hospital staff when interacting with compliant and noncompliant visitors of patients in isolation. They created new color-coded infection prevention "contact precaution" room signage to differentiate between c-diff contact and all other contact isolations. They also created system communications, developed PPE educational brochures, and standardized the check-in process for visitors on isolation patients. The six new facilities reported their contributing factors to HOC-diff cases as a lack of hand hygiene, a lack of compliance with the c-diff Nurse Driven Protocol, lack of understanding regarding terminal cleaning, timing and collection of stool specimens for c-diff orders, lack of antimicrobial stewardship, and poor compliance with PPE in contact precaution rooms. The countermeasures included establishing a transdisciplinary c-diff team, adopting, education, and implementing the nurse driven protocol, educating the staff on stool samples, implementing secret shoppers to observe contact precaution compliance, training on terminal cleaning for the EVS staff, and educating the providers.

Results: The FY17 YTD rate for the legacy facilities is 6.97, so far achieving our target rate of 7.09 per 10,000 patient days. AMS was unable to meet their initial goal reduction with the identified target agents. However, the number of interventions submitted doubled when compared to data from the previous year. Meanwhile, AMS continues to monitor antibiotic consumption, HOC-diff rates, along with implementing new BPAs. The Education and Clinical inpatient teams successfully completed the education roll out of all new initiatives. However, after the initial roll out, it was discovered not all employees were captured. A second education roll out plan was initiated with better success. Through staff interviews, a better understanding of the appropriateness of when and how to test was discovered. The EVS team has completed the system policies and procedures roll out for legacy and newly added facilities. A three day training and simulation lab was instituted and completed for new hires and existing employees. Leader orientation was implemented, along with the use of Oxycide in all clinical areas. The team has had 100% completion of environmental services training and simulations with 3 out of the 5 legacy facilities and 50-100% completion in 3 out of 6 of the new facilities. Standardized cleaning between patients was implemented at all facilities. C-diff CBL training and the process of handling c-diff patients within the outpatient clinical setting was not extended to employees of the newer facilities. However, current and new employees at all facilities receive this training during new hire orientation. Hand hygiene observations are currently in the works in the legacy practices. Plans for the newer practices are still in the decision phase. AMS will be incorporated at both legacy and newly acquired outpatient practices. EVS standardization still needs to be assessed at the newer practices.

Conclusion: An evaluation of our c-diff initiatives was conducted using a lean value stream methodology. Several of the positive tests were found to be that of carriers or previously positive patients who were retested, instead of new HOC-diff cases. The double check process yielded significant lower rates in September 2016, verifying staff competency and compliance to the protocol. The taskforce meets biweekly to evaluate their progress and develop action plans to address new or current issues. They continue to conduct root-cause analyses on all positive tests, evaluate compliance with the testing protocol, monitor cleaning, and hand hygiene compliance. Antimicrobial stewardship continues to aim at decreasing the excessive use of broad-spectrum antibiotics and will transition consumption monitoring to days of therapy to benchmark with other organizations. The taskforce is evaluating the best utilization of adjunct cleaning technology, piloting the use of probiotics, improve hand hygiene compliance, and fully incorporate the newer facilities into the system wide strategic plan to reducing HOC-diff.

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