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A Quality Improvement Project to Reduce the Incidence of Clostridium difficile Infection through Implementation of Evidence-Based Terminal Clean Procedures

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by

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DEDICATION

To my daughter, Marisa, for whom all my education was meant to invest in. I hope you always strive to learn more, to become more. You are the biggest part of who I am and my greatest joy. My husband, for your unwavering support and encouragement. Your confidence in me is amazing. You are my whole heart. My parents, who have taught me the value of education and for giving me the aspiration to keep learning and becoming who you always knew I'd be. Your love has always been abundant. My committee, for their dedication to helping me succeed and being the voice of reason. I am grateful for you. Your wealth of knowledge and guidance will never be forgotten.

ABSTRACT

Hospital-acquired infections (HAIs) are a huge economic burden and threat to patient health and outcomes. *Clostridium difficile* is the most common HAI. Effective hand hygiene and proper environmental cleaning procedures are significant to preventing the spread of *C. difficile* infections. The research question used to guide this project is: Does the use of a monitoring system for post *C. difficile* isolation terminal clean procedure reduce the rate of hospital-acquired *C. difficile* in the acute care population? A thorough organizational assessment was performed and directed this project to identify causes that may contribute to the recurrences of *C. difficile* infections. The findings led to further investigation on how isolation rooms are cleaned since patient rooms are recognized as a critical source of contamination. A multi-dimensional monitoring system was implemented to reduce the occurrence of *C. difficile* in the facility. Since implementation of the monitoring system, the incidence of *C. difficile* has decreased. The number of occurrences of *C. difficile* were 12 in 2015 to 11 in 2016. The total number of other HAIs have decreased from 33 in 2015 to 26 in 2016. This suggests that a monitoring system to improve the thoroughness of cleaning procedures contribute to a decrease in *C. difficile* and possibly other HAIs.

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CHAPTER 1

INTRODUCTION

Patients receiving medical care are vulnerable and susceptible to hospital-associated infections (HAIs). Hospital-associated infections include central line-associated bloodstream infections (CLABSI), catheter-associated urinary tract infections (CAUTI), surgical site infections (SSI), *Clostridium difficile* (C. difficile), and methicillin-resistant *Staphylococcus aureus* (MRSA) bacteremia. According to the Centers for Disease Control and Prevention (CDC) (2014), an estimated 722,000 infections of hospitalized patients occur each year in the United States, averaging one infection for every 25 patients. Hospital-associated infections are costly and lead to increased length of hospitalization. In 2009, approximately 99,000 deaths attributable to HAIs resulted in an economic burden of $6.5 billion (World Health Organization [WHO], 2009). Hospital acquired infections can be life-threatening and difficult to manage and treat (CDC, 2014). Hospital infections are preventable and unnecessary.

The infection most often associated with medical care is *Clostridium difficile*. *Clostridium difficile* also stated as *C. difficile*, is a gram positive, spore-forming bacteria causing diarrhea and intestinal problems (Association for Professionals in Infection Control and Epidemiology [APIC], 2013). *C. difficile* is shed in feces and can be spread via direct or indirect contact. Surfaces contaminated with feces serve as a source for the *C. difficile* spores to spread the infection. It is the most common HAI in the United States and cost $4.8 billion in acute care (Lessa, et al, 2015). The cost for treating and caring for

a hospitalized patient with *C. difficile* averages more than $35,000 (APIC, 2013). In 2011, *C. difficile* caused almost 500,000 infections (Lessa, et al, 2015). In 2009, there were 7,285 reported deaths related to *C. difficile* infections, equating to 2.2 deaths per 100,000. Of those deaths, 92% were greater than 65 years of age, making it the nineteenth leading cause of death in this age population (APIC, 2013). Between 2013 and 2014, South Carolina hospitals reported a 14% increase in *C. difficile* infections (CDC, 2015). Along with those receiving inpatient care, those taking antibiotics and the elderly are at a higher risk for acquiring *C. difficile*. *C. difficile* infection rates are unacceptable and are costly to healthcare.

Significance of *C. difficile*

The two sources responsible for spreading *C. difficile* infections among patients are human hands and inanimate objects (APIC, 2013). Effective hand hygiene and proper environmental cleaning procedures are significant to preventing the spread of *C. difficile.* *C. difficile* spores can live on hard surfaces for up to five months (APIC, 2013). The ability of *C. difficile* spores to live on surfaces for an extended amount of time requires diligence to the recommended cleaning guidelines in preventing the spread of infection. Recurring *C. difficile* infections may be an indicator for "poor adherence to environmental sterilization and other infection prevention measures" (APIC, 2013, p. 26). The mode of transmission of *C. difficile* can occur via healthcare environment and patient care activities. Surveillance of *C. difficile* is ongoing. The Centers for Medicare and Medicaid (CMS) require acute care hospitals that participate in the Inpatient Perspective Payment System to report *C. difficile* infections through the National Health and Safety Network (Centers for Medicare and Medicaid [CMS], 2016). The National Health and

Safety Network allows facilities to track real time data and view data about hospital associated infections (CDC, 2015). Hospitals receive payment from CMS determined by their performance based on how often patients get a hospital-acquired infection. (CMS, 2016). This could impact an acute care hospital financially for poor performance on patients who get *C. difficile* while in the hospital.

Description of the Problem

Clostridium difficile is a preventable risk to patient care and health. An organizational assessment of a 200 bed, acute care facility located in the southeast United States was performed. Nine of the 15 total hospital-acquired conditions documented since January 2016 (60%) were identified as *C. difficile*. Nine *C. difficile* infections in eight months are alarming and indicates an infection control problem.

The initial quality improvement project was to identify hand hygiene compliance among healthcare professionals in the acute care setting and reduce hospital-acquired infections. Forty-nine randomly selected healthcare professionals were surveyed and asked to identify barriers to hand hygiene. The results varied with the almost half, 41% stating time as a barrier, 18% reported not having the appropriate tools to perform hand hygiene and 10% stated knowledge deficit as a barrier. Among the healthcare professionals who participated in the survey, 55% were nurses, 8% were environmental services staff and 10% were physicians including medical students, physician assistants and nurse practitioners. Hospital-acquired infection data was requested from the quality department. There were 15 hospital-acquired infections identified from January to August 2016. Of the 15 hospital-acquired conditions, nine were designated as *C. difficile.* The results from the data redirected this project to identify causes that may contribute to the

recurrences of *C. difficile* infections. After performing chart audits, one commonality identified among the patients who acquired *C. difficile* is an operating room. Two patients who acquired *C. difficile* had been assigned and used the same surgical room. This finding initiated further investigation in how isolation rooms are cleaned since patient rooms are recognized as a critical source of contamination.

Background

C. difficile infection is often carried on the hands of healthcare provider's hands following patient care (CDC, 2015). Common antimicrobial agents such as alcohol rub for hand hygiene are not active against *C. difficile* spores (APIC, 2013). The use of soap and water is beneficial and effective in killing and removing the spores from hands (APIC, 2013). Handwashing practice is being addressed by the facility via a hand hygiene campaign that began in January 2016. Initial hospital-wide hand hygiene compliance average was less than 30%. Various interventions including handwashing education, replacing battery operated dispensers to manual dispenser, safety coaches on each unit, handwashing competencies, and displaying performance data on each unit have been implemented to increase hand hygiene compliance. As of September 2016, hand hygiene compliance rates have increased to an average of 77%.

Transmission of hospital-associated infections is also attributed to unclean environment surfaces (Boyce, 2010). A terminal clean is defined as a physical cleaning process following a patient discharge. Improved cleaning procedures prove to reduce contamination in the environment (APIC, 2013). The facility has a cleaning policy for patients with *C. difficile*, which serves as a guide to cleaning procedures (Appendix A). The facility policy states a hypochlorite (bleach) solution will be used to clean surfaces in

patient's room. Current CDC (2008) guidelines recommend using sodium hypochlorite (also known as household bleach) where high rates of *C. difficile* are present or during a breakout. The facility policy follows the CDC recommended guidelines for cleaning procedures of *C. difficile* patient rooms. Due to the variations in staff cleaning the environment, the effectiveness of the clean may differ. Studies indicate that it is not unusual for bacteria residue to remain after a clean (Dimmit, 2014). Evaluation of the current facility policy revealed the policy did not include surveillance measures, such as a checklist for monitoring improvement. The recurring incidence of *C. difficile* infections in the facility suggests that a monitoring process should be implemented for more effective cleaning.

PICO question

The PICO format is used to assist researchers in articulating a clinical question. It is defined as "P: population of interest, I: intervention of interest, C: comparison of interest, and O: outcome expected" (Melnyk & Fineout-Overholt, 2015, p. 25). The PICO question used to direct this project was: Does the use of a monitoring system for post *C. difficile* isolation terminal clean procedure reduce the rate of hospital-acquired *C. difficile* in the acute care population. The (P) population of interest is inpatient direct acute care. The (I) intervention of interest is to implement a monitoring system with immediate feedback of terminal clean post *C. difficile* isolation room, revise the cleaning policy and utilize the CDC checklist for terminal cleaning. The (C) comparison of interest is current terminal clean practices. The (O) outcome is reduction of the occurrence of hospital acquired *C. difficile* infections. The purpose of this quality improvement project

is to examine terminal clean practices and implement strategies to decrease the incidence of HAI to include *C. difficile* via an unclean environment.

Framework

The framework used to guide this study was the Plan-Do-Study-Act (PDSA) cycle (Taylor, McNicholas, Darzi, Bell & Reed, 2013). This model is commonly used in healthcare settings for the implementation of quality improvement. The PDSA method uses a four step cyclic approach to modify change focused on improvement. The method was originated by Edward Deming in 1986 used in the manufacturing industry and was later modified for use in healthcare (Taylor, et al., 2013). The "plan" cycle is the developing stage of change for improvement. In this stage, we reviewed the number of HAIs and identified *C. difficile* as problematic. The plan for change was initiated by collecting data, performing chart audits to search for commonalities among those who acquired *C. difficile.* It is followed by the "do" cycle which carries out the plan of change. The intervention for change included institution of a monitoring system for a terminal clean, policy change and education on *C. difficile* infections. The solutions for change were assessed and include cost-effective and practical approaches for improvement. The "study" cycle examines the result of the plan. Comparing pre intervention *C. difficile* rates with post intervention rates allowed us to evaluate the success of the change. The "act" cycle provides the evidence to sustain the change as implemented, cancel it or restart the cycles. Modifications can be made to improve or adjust the interventions introduced. New changes or revisions can be applied and the cycle will be restarted. The PDSA model was utilized for this quality improvement project by implementing change for terminal cleaning processes following *C. difficile* infections.

Contaminated environmental surfaces play an important role in the transmission of *C. difficile* infections. The CDC provides guidelines in environmental cleaning and disinfection of surfaces in the hospital setting. Studies have indicated that interventions are needed to improve effective cleaning practices. Efforts to improve cleaning practices should focus on thoroughness and effectiveness rather than solely on the type of cleaning disinfectants or products utilized. Evidence from the organizational assessment led to further examination of cleaning practices in the facility and the need to improve cleaning procedures.

Definitions

Cleaning- the removal of visible soil (e.g., organic and inorganic material) from objects and surfaces and normally is accomplished manually or mechanically using water with detergents or enzymatic products (CDC, 2008).

Hand hygiene- an action taken to reduce contaminants via handwashing or hand disinfection (Pittet, 2001).

Hospital-acquired infection (HAI)-an infection attained by someone or something while being treated in the hospital for something different (Boyce, 2007).

Terminal clean- a cleaning method used in healthcare settings to control the spread of infection. A physical cleaning process following patient discharge (APIC, 2013).

CHAPTER 2

REVIEW OF LITERATURE

Disinfecting environmental surfaces contribute greatly to reducing the incidence of hospital-acquired infections (CDC, 2003). Healthcare cleaning is for the multi-purpose of cleanliness and infection prevention (Markkanen, Quinn, Galligan, & Bello, 2009). Due to drug resistant organisms, control and prevention is complex. CMS reimbursement reductions for certain HAIs have contributed to a greater awareness of HAI risk and more diligent prevention efforts in many facilities (Makkanen, et. al., 2009). Cleaning, the preparation of the environmental surface for disinfection, is the first process in a terminal clean. The removal of microorganism is accomplished through physical scrubbing of the surface with a disinfectant. Surfaces not prepped efficiently compromise the disinfection process. *C. difficile* is capable of survival on an environment via its spores. Contamination of surfaces in direct exposure to this organism is indicated as a source of infection (CDC, 2003). Transmission of the infection is most often carried through healthcare workers hands. Isolation practices are to reduce the contamination of healthcare worker hands, patient belongings and surfaces (CDC, 2003). Handwashing is the most important intervention to reduce transmission of HAIs. The use of gloves is another measure used to cut down the risk of transmission. The CDC's recommendation for cleaning an environment post *C. difficile* patient is cleaning followed by disinfection with hypochlorite.

Search Strategy

The literature search to locate current evidence relevant to terminal cleaning procedures was conducted through the University of South Carolina library databases including CINAHL Complete, Academic Search Complete, and Medline with full text. A search was performed using all the databases simultaneously. Search limiters were set to full text articles with a published date between 2010 and 2016. The following keywords were used and the yielded results are in parenthesis: terminal clean (45), cleaning practice in hospital (26), hospital cleaning (729), and cleaning and Clostridium difficile (401). The article summaries and abstracts were reviewed using the PICO question and eliminated based on quality and relevance to the research question. Exclusion criteria for rejecting articles from the evidence analysis included studies evaluating settings other than acute care hospitals. Articles were included in the evidence analysis if cleaning procedures or practices were evaluated and discussed in the elimination of *C. difficile*. The 11 remaining articles were analyzed and placed in the evidence table (Appendix A). The evidence applied the CDC guidelines as the standard for environmental clean. From the CDC website homepage, a search was conducted using the phrase 'environmental clean'. This yielded 40 web links located within the CDC website. Thirty-three links were discarded due to relevance, not pertaining to *C. difficile*. The remaining seven links were reviewed and used for reference and practice recommendations.

Quality Rating and Evidence Strength

Critical appraisal of evidence utilizes rating scales to differentiate various strengths and qualities of the research. The evidence table uses the John Hopkins Nursing Evidence-based Practice (JHNEBP) method to define the strength and quality of the

presented research. JHNEBP defines the strength of evidence as level I, II, III, IV, or V with level I being the highest and V being the lowest (Dearholt & Dang, 2012). Evidence levels I through III use experimental studies, randomized controlled trials (RCTs), systematic reviews or a combination of these studies to determine its strength. (Dearholt & Dang, 2012). Level IV is centered on the opinion of experts based on scientific evidence and level V is experimental or non-research evidence such as literature reviews, case reports, or opinions based on evidence ((Dearholt & Dang, 2012). The strength of research is determined by the study design, quality including methods of evaluation and limitations and the directness or comparable interest (Dearholt & Dang, 2012). The grading of evidence is categorized as A, meaning high or good quality, B as good or C as low or poor quality. The quality grading is determined by the evidence type and evaluates the evidence with specific criteria from the JHNEBP model (Dearholt & Dang, 2012). The quality grading of the evidence on cleaning procedures in acute care settings on the elimination of *C. difficile* are considered to be good quality. Of the 12 articles, eight are measured as level A and one level B. The strength of the evidence used for this project is high. Ten articles have an evidence level of I, while the remaining 2 articles are a level III. The strength and quality of the evidence provides a strong foundation to help eradicate the transmission of *C. difficile* in the acute care setting.

Synthesis of Research

There are several environmental interventions being introduced to reduce the incidence of *C. difficile* infections in hospitals. Interventions focused on improving environmental cleaning practices include environmental services (EVS) staff education, monitoring of cleaning with feedback, and the use of checklists. Carling et.al. (2008)

found significant (P > .001) improvements in the cleaning process can be attained by using an approach that includes targeting high-touch surfaces and frequent performance feedback to EVS staff. A baseline for thoroughness of cleaning was measured at 48%, and increased to 77% after interventions and feedback to EVS staff (Carling et.al, 2008). Studies show that rooms are frequently not cleaned adequately but staff training, the use of checklists and florescent dyes to show missed areas improve efficacy of cleaning (Weber, D, Rutala, W., Miller, M., Huslage, K., Sickbert-Bennett, E. 2010). Evidence shows that intervention programs such as education, monitoring with feedback and the use of checklists significantly improve cleaning practices (Rutala & Weber, 2013). Checklists assist in confirming that each area has been cleaned and disinfected (APIC, 2008). Rutala and Weber (2013) stress the importance of adequate training and education for EVS staff with timely feedback on cleaning performance.

The thoroughness of traditional cleaning methods has been found inadequate. Studies have used a clear solution that fluoresces when exposed to ultraviolet light to determine the effectiveness of a clean. One study found that an average of 49% of surfaces were cleaned in 23 acute care hospitals (Rutala & Weber, 2013). Despite interventions, no study has reported greater than 85% of surfaces cleaned post intervention (Rutala & Weber, 2013). New technologies offer hope to improved disinfection and reduction in *C. difficile* infections. Traditional cleaning methods for post *C. difficile* environments require cleaning with a disinfectant followed by a bleach solution (CDC, 2003). More recently, alternative methods to traditional cleaning have been introduced as a result of inadequately cleaned patient rooms.

Cleaning Solutions

Two newer methods developed to disinfect against *C. difficile* infections and its spores are ultraviolet (UV) light and hydrogen peroxide (HP). These methods are used in conjunction with traditional cleaning practices. Both methods can be used as a terminal clean. They are not suitable for daily use of disinfecting, as the rooms need to be vacant. The UV light works by using wavelengths to break molecular bonds, which destroy the DNA of the pathogens (Rutala & Weber, 2013). Studies indicate UV light can effectively reduce *C. difficile* bacteria in 35-100 minutes. Objects and furniture must be removed from the wall and have direct light contact to have full efficacy. Studies show that *C. difficile* bacteria can be reduced by >1.7 to 4-$\log_{10}$ using the UV system (Rutala & Weber, 2013).

Hydrogen peroxide (HP) systems use vapor, dry mist or vaporized HP to decontaminate surfaces. The HP system produces oxygen molecules that attack and destroy the DNA of the organism. The average cleaning cycle time ranges from 140-177 minutes (Weber, Anderson, Sexton, & Rutala, 2013). HP systems show the greatest efficacy against drug resistant organism with a 64% reduction compared to tradition cleaning practices (Rutala & Weber, 2013). The HP system takes four times longer than traditional cleaning methods, which prolongs the time a patient room can be available.

Both methods have advantages and disadvantages in their uses. The shared advantages are their capability to decrease *C. difficile* spores and decontamination of all exposed surfaces in the environment (Rutala & Weber, 2013). The disadvantages for both systems are the expense of the equipment, or capital cost in purchasing the systems. The UV system averages $76,000 compared to the HP system costing around $31,000.

Considering the staff time to transport and monitor the systems, as well as physical cleaning process prior to use, the cost of a system may be greater than standard terminal cleaning by EVS personnel (Boyce et al, 2008).

Cleaning Processes

There are several methods and products being evaluated in the effectiveness against *C. difficile* spores. Rutala, Gergan, and Weber (2012) evaluated various disinfectants using six different methods on Formica surface sheets. The results indicated that wiping the surface twice improved the elimination of the *C. difficile* spores. Disinfectants such as QC-53, a multipurpose degreaser and A456-II were not effective against *C. difficile* spores. Hypochlorite, or bleach, is highly effective in eliminating *C. difficile* spores (Rutala, Gergan & Weber, 2012). Bleach is the gold standard for disinfection against *C. difficile* infection on patient room surfaces (APIC, 2013). There are many studies that have evaluated the effectiveness of cleaning methods and disinfectants against *C. difficile*. Traditional methods for cleaning are satisfactory for disinfecting the environment. However, during outbreaks of *C. difficile,* sodium hypochlorite is the preferred disinfectant. Continuous assessment of the cleaning process is important in reducing outbreaks.

Another method to eradicate organisms from the environment is known as self-disinfecting surfaces. Copper aids in reducing surface organisms but is not effective against *C. difficile* (APIC, 2008). Silver has been shown to be effective against organisms such as *Staph aureus* and *Pseudomonas aeruginosa* however there are no published data to determine its efficacy against *C. difficile* (APIC, 2008). Triclosan has been shown to decrease bacteria in the home setting but has not been tested in the healthcare setting

(APIC, 2008). Self-disinfecting surfaces bring some confidence to reducing organisms in the environment but lack usefulness against *C. difficile.* Newer products and technologies are paving the way for improved cleaning practices. Plans to improve cleaning practices in the hospital setting should be effective, cost efficient and beneficial in reducing and preventing *C. difficile* infections.

Recommendations

After analyzing the evidence in comparison to current terminal cleaning practices, the following interventions were recommended to the facility for improved terminal cleaning processes: (a) monitoring with immediate feedback of terminal clean post *C. difficile* isolation patient rooms, (b) revising the current terminal cleaning policy to include more specific procedures such as the use of a checklist during the terminal clean process and (c) improved training for EVS staff. A taskforce was necessary to organize policy revisions and execution of a checklist. The implementation of these interventions is cost effective, time efficient and require minimal implementation resources. The facility would be further advised that if *C. difficile* infections are not reduced with the implementation of improved terminal cleaning processes, in conjunction with ongoing efforts to improve hand hygiene, to consider newer technology such as HP or UV light systems.

Feasibility

Feasibility is determined by considering the value of a project and improvement outcomes (Dearholt & Dang, 2012). Melnyk and Fineout-Overholt (2015) discusses several questions to evaluate the feasibility of a study. Those questions address length of study, financial concerns, number of participants, setting, expertise from lead person,

ethical implications, and institutional resources (Burns & Grove, 2009; Melnyk & Fineout-Overholt, 2015). The quality improvement project was to implement effective strategies to reduce *C. difficile* infections by monitoring cleaning processes and improving cleaning procedures. Ethical considerations in this project were monitoring cleaning processes in the hospital environment. No patients were involved or exposed during this project. The goal of this project was to decrease the incidence of *C. difficile* infections via a more thorough cleaning process. Two issues that promoted feasibility in this project were the readiness of quality department leaders to implement effective strategies to reduce *C. difficile* infections in the facility and institutional support to reduce hospital acquired infections. A possible limitation to the feasibility of this project was the behavior and attitudes of environmental service staff concerning cleaning procedures. There were no financial barriers to implementation of this project.

CHAPTER 3

METHODOLOGY

The purpose of this project was to reduce *C. difficile* infection rates via effective environmental cleaning practices. The objectives were to review literature for terminal cleaning procedures against *C. difficile* by comparing current procedures with evidence-based practice and the CDC guidelines and determine any gaps in cleaning that may contribute to *C. difficile* transmission. The goals of this project were to explore evidence-based practice to guide change and implement interventions to improve current practice.

Setting and Population

The project was conducted at an acute care hospital located in the Southeastern part of the United States. The facility is a privately owned, 209 bed healthcare facility. The pre-intervention period was January 2016 through November 2016. The project was approved by the facility's quality department administration. This quality improvement project did not provide a risk to human subjects. Data collected for this project did not interfere with patient rights and no information was collected or reported that could potentially identify individual patients. The facility concluded there was no IRB approval needed for this project.

Project

An organizational assessment was performed to evaluate the incidence of hospital- acquired infections at the facility. The quality department provided HAI data for January 2016 to September 2016. Data analysis revealed that nine of the 15, (60%) of

HAIs were *C. difficile*. This finding led to the investigation of terminal cleaning procedures at the facility for *C. difficile* isolation rooms. It was determined that the facility lacked effective terminal cleaning practices. The facility's cleaning policy was incomplete and did not provide sufficient information regarding a terminal clean post *C. difficile* infection. Previously, there was not a monitoring process in place to evaluate the thoroughness of a terminal clean and or a defined method to assess adherence to the cleaning policy.

Interventions

The interventions proposed for this project were the creation of a taskforce for improving terminal clean procedures, the use of a monitoring system for accountability of a terminal clean, policy improvement to address gaps in cleaning procedures, and environmental service (EVS) staff education. A terminal clean taskforce was formed to discuss and implement strategies to evaluate the effectiveness of terminal clean practices. The taskforce included EVS staff personnel, the EVS supervisor and a nurse from the quality department who volunteered to participate. The work of the taskforce was to develop and implement a checklist for EVS staff to use during a terminal clean. The CDC Environmental Checklist for Monitoring Terminal Cleaning was utilized for this purpose (Appendix B). After reviewing the current cleaning policy, revisions and recommendations were presented to the taskforce. Policy revisions included the addition of a hypochlorite solution for cleaning patient room surfaces and the use of dedicated and/or disposable equipment for patient use. The taskforce mutually agreed with the policy revision. Implementation of the new policy was communicated to all nurse leaders who were responsible for communicating and educating policy changes to the nursing

staff. Nursing staff will be responsible for identifying and implementing *C. difficile* precautions per facility policy. The monitoring system includes the observation of EVS staff performing a terminal clean following discharge of a *C. difficile* isolation room. Random direct observations will be performed by an immediate EVS supervisor. The number of observations will vary depending on the number of *C. difficile* isolation patients in the hospital. The observer will provide feedback to the EVS staff following the cleaning process. Feedback is to be shared as an educational, rather than disciplinary, opportunity. Observations are used to ensure proper cleaning procedures are followed for a more effective terminal clean.

Another intervention was to educate all part time and full time EVS staff on the complexity of eradicating *C. difficile* spores from environmental surfaces and the recommended methods to adequately clean environmental surfaces. There were 3 EVS staff educational meetings scheduled on different days and shifts to facilitate reaching all EVS staff. Each meeting included a verbal and visual presentation using PowerPoint slides that provided a background of *C. difficile,* how it is transmitted, the CDC recommended guidelines for proper terminal clean, and how to use the checklist with procedures for turning it in. The presentation was adapted from information published by the Centers for Disease Control and Prevention. EVS staff responsibilities for terminal clean procedures and expectations were clearly defined. A mock patient room was used to demonstrate high-touch surfaces as indicated by a red tag. High-touch surfaces are touched most often by patients and should be a priority during a terminal clean. All educational meetings were executed by me with prior approval from the EVS director. Successful performance of observation evaluates the effectiveness of the education

provided. Supplemental education will be ongoing and provided as needed to fill in any gaps of understanding with increased number of observations.

Instruments

The instrument introduced for this project was the CDC Environmental Checklist for Monitoring Terminal Cleaning (Guh & Carling, 2010). The checklist is an objective measuring tool for ongoing monitoring of a terminal clean. It documents the type of cleaning solution used and the high-touch surfaces to be cleaned. The checklist results will be used internally for educational interventions and staff development. It will serve as a guide to monitor the cleaning of common high-touch surfaces. EVS staff will use the checklist when cleaning a post *C. difficile* isolation room and check off the surfaces once they have been cleaned. This will assist in making sure all common surfaces are cleaned appropriately and are not accidentally missed.

Plan for Evaluation

The evaluation plan included reviewing and comparing *C. difficile* rates post interventions beginning November 2016 through March 2017. Comparisons were made using the previous year data. Evaluation will be an ongoing process to improve cleaning procedures and reduce *C. difficile* infections. The interventions recommended in this project were used to optimize the thoroughness of a terminal clean process. These interventions will be a continual priority for the facility's Quality and Infection Control department. Regular terminal clean monitoring will be performed and evaluated. Point prevalence spot checks will confirm EVS staff are adhering to policy. The taskforce will be maintained for infection control purposes and quality patient safety. Handwashing data will continue to be reviewed and evaluated in conjunction with the facility hospital-

acquired infection reduction efforts. Using the PDSA cycle, interventions may not be feasible for the facility environment or staff. Therefore, the PDSA cycle will restart and new interventions could be implemented. If *C. difficile* infections in this facility rise or level out, the purchase of a newer technology machine may be beneficial and most cost effective. The taskforce will play an important role in the evaluation process for determining the next steps to reduce *C. difficile* infections.

Summary

Following an environmental assessment and examination of patient outcome data in the target setting, opportunities for improvement regarding prevention of HAIs, specifically *C. difficile*, were identified. A review of evidence related to terminal clean procedures resulted in recommendations for improvement in current practice. Subsequently, a plan for policy revision and implementation of evidence-based terminal clean procedures was developed. Evaluation included documentation of EVS staff adherence to the revised procedures and examination of patient outcome data for changes in HAI rates post-implementation. This project was implemented in conjunction with the organization's ongoing efforts to reduce the incidence of HAIs, especially *C. difficile*. The mission to reduce HAIs in this facility requires the involvement of all employees. The Quality and Infection Control department will continue to focus on hand hygiene compliance as one of multiple efforts to decrease HAIs.

CHAPTER 4

RESULTS

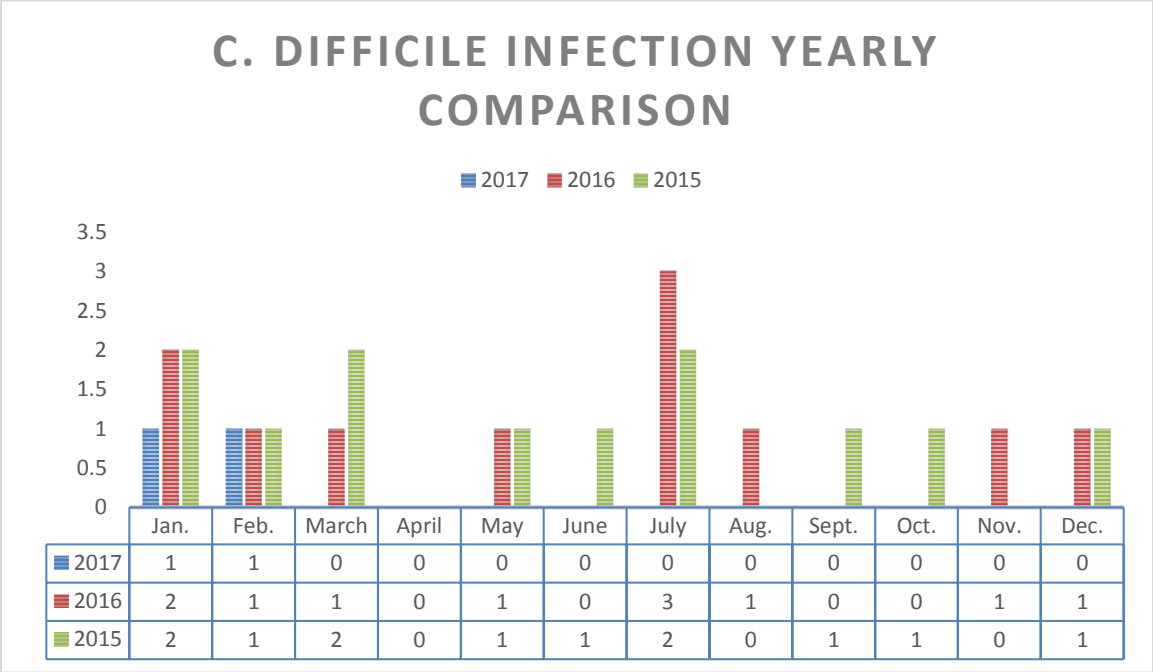
The purpose of this project was to reduce the incidence of *C. difficile* infection by improving the terminal cleaning process. A thorough organizational assessment was performed and indicated a gap in the terminal cleaning practices. *C. difficile* infection ratios in 2016 were 42% of the total hospital-acquired infections, which was an increase compared to 36 % in 2015 and provided the evidence needed for organizational change.

The results from the data showed small improvements. Interventions were initiated in November 2016. Beginning in November 2016, the facility policy was reviewed and compared with current CDC guidelines. In December 2016, the EVS taskforce was created. Following the creation of a taskforce, staff education was provided. In addition to terminal clean specific interventions, the quality department has been conducting an ongoing hand hygiene campaign started in January 2016 in a hospital-wide effort to reduce HAIs, including *C. difficile.*

Findings

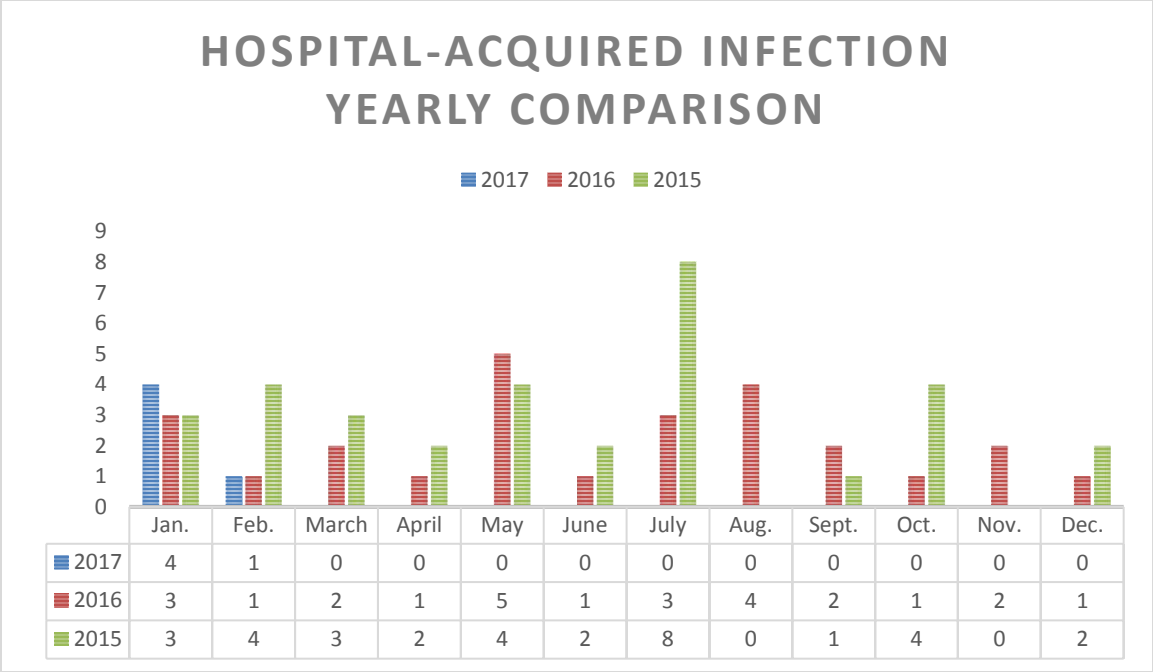
The facility had 12 occurrences of *C. difficile* in 2015, 11 in 2016 and three as of current 2017. There is a slight decrease in 2016 from 2015. A month by month comparison since initiation of interventions with perspective occurrences in parenthesis are: November 2015 (0) to 2016 (1), December 2015 (1) to 2016 (1), January 2016 (2) to 2017 (1), February 2016 (1) to 2017 (1) and March 2016 (1) to 2017 (0). The results suggest the improvements utilized in this project help reduce the occurrence of *C. difficile*

infections as well as HAIs. Figure 4.1 shows *C. difficile* infection comparisons from 2015 through 2017 and Figure 4.2 illustrates hospital-acquired infection comparisons from 2015 to 2017. The number of HAIs have decreased over the previous year from 33 to 26. Although the data for both *C. difficile* and HAIs is trending downward, continuous improvement via PDSA cycling and data monitoring by the taskforce will continue during 2017 to determine intervention success.



	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
2017	1	1	0	0	0	0	0	0	0	0	0	0
2016	2	1	1	0	1	0	3	1	0	0	1	1
2015	2	1	2	0	1	1	2	0	1	1	0	1

Figure 4.1 *C. difficile* infection yearly comparison



	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
2017	4	1	0	0	0	0	0	0	0	0	0	0
2016	3	1	2	1	5	1	3	4	2	1	2	1
2015	3	4	3	2	4	2	8	0	1	4	0	2

Figure 4.2 Hospital-acquired infection yearly comparison

Observations

Interventions for this project are multi-dimensional. The creation of a taskforce, incorporation of a monitoring system for the cleaning process, cleaning policy revision, and EVS staff education were implemented in an effort to reduce *C. difficile* infections in the facility. Each intervention was introduced at a different time to allow for adjustment between interventions.

Taskforce

A taskforce was created to monitor and evaluate methods of the terminal clean process. The taskforce is made up of four EVS staff members, the EVS director and a nurse from the quality department. The taskforce jointly agreed to implement the use of a checklist as a guide while performing a terminal clean post *C. difficile* patient room. The checklist implemented was adapted by the CDC. They also reviewed and revised the

cleaning policy to be consistent with the CDC guidelines. The revised policy was presented to the quality officer and was accepted. The new policy became effective October 2016. A copy of the new policy was posted on the hospital Intranet and emailed to all employees.

Monitoring system

A monitoring system was implemented to have all terminal clean rooms to be observed by an immediate supervisor following discharge of a post *C. difficile* isolation room. Depending on the occurrence of *C. difficile* in the facility, the number of observations will vary. Random observations of the cleaning process were also conducted. This allowed supervisors to provide immediate feedback to EVS staff for coaching. Supervisors view the monitoring system as a learning opportunity for staff to improve the thoroughness of a terminal clean. Four random observations occurred during the evaluation period between October 2016 and January 2017. The observed EVS staff performed well with minor mistakes. Of the four observations, areas missed were the interior bathroom door knob and a light switch behind the bed. The missed areas were listed on the checklist and used to reinforce the importance of cleaning such areas due to contamination.

Education

An important part of change is education. Educational meetings were held on various days and times in order to include all part time and full time EVS staff. The education involved the significance of *C. difficile*, its burden on healthcare, pathophysiology, transmission, and disinfection process. After the PowerPoint presentation, staff were taken to a mock patient room to identify high-touch surfaces.

During the meetings, staff asked many questions and were surprised about how and why hospital-acquired *C. difficile* was managed. They seemed to be empowered by the knowledge to perform a more thorough terminal clean.

Checklists

The use of the CDC checklist was implemented as a cleaning guide for post *C. difficile* isolation rooms. The checklist emphasizes high-touch surfaces to be cleaned. EVS supervisors have reported positive feedback from staff since its implementation. Staff have reported the usefulness of the checklist and believe that it has reminded them of areas that may have been overlooked.

The results look promising in reducing the burden of hospital-acquired *C. difficile.* A multi-dimensional intervention program can help reduce the occurrence of *C. difficile* infections in an acute inpatient setting. The decrease in HAIs lead to better patient outcomes. Complications from *C. difficile* can be serious causing further health problems such as colitis, colon perforation and sepsis. While this project focused on cleaning procedures and processes, the inclusion of other efforts such as infection control practices could have contributed to the project outcomes.

CHAPTER 5

DISCUSSION

The prevailing purpose of this project was to reduce the incidence of *C. difficile* infections, thereby improving patient outcomes and reducing costs to the facility. To accomplish this goal it became necessary to perform an organizational assessment to identify possible contributing factors in the rise of *C. difficile* infections. The facility had already implemented initiatives to improve hand hygiene compliance among staff and providers, following audits that demonstrated deficits in this regard. Despite documented improvement in compliance, HAIs continue to be a challenge. Proper terminal clean procedures and current evidence-based practice were established in the literature review and essential to recognizing the need for change. Fundamental steps were taken to identify the facility needs to help reduce *C. difficile* infections. These steps revealed gaps in the facility's terminal cleaning practices. Interventions were implemented to help close the gap and improve the terminal clean process. The creation of a taskforce and execution of a monitoring system were the strength of this project due to sustainability, ease of implementation and staff involvement. The PICO question used to drive this project was: In the acute care population, does the use of a monitoring system for post *C. difficile* isolation terminal clean procedure, compared to no monitoring system, reduce the rate of hospital-acquired *C. difficile* infections in the acute care population?

Hospital-acquired infections, including *C. difficile* are transmitted via the hospital environment. Effective environmental cleaning is important to controlling transmission to

patients. Reducing HAIs will contribute to lower healthcare cost, higher quality patient care and better patient outcomes. Prior to the educational and policy interventions, the *C. difficile* infections accounted for 60% of HAIs in the facility. This project focused on a multi-dimensional intervention program that contributed to significant improvements in reducing the transmission of *C. difficile* via the environment. The use of a monitoring system is necessary to improve the terminal clean process and ensure adherence to the cleaning procedures. This project focused on a monitoring system that provided staff education, performance feedback and the use of a checklist.

This project complements the collaboration of quality improvement initiatives in acute care settings. Behavioral change in healthcare is challenging, however this quality improvement project identified gaps in infection prevention and established a process to achieve improvements in environmental cleanliness by implementing an effective monitoring system. The results are encouraging in reducing the incidence of *C. difficile* infections, but HAIs are still problematic. The findings indicate an overall reduction in HAIs but not as many for *C. difficile* infections. Ongoing problems with reducing HAIs are staff by-in. Staff education has increased the awareness of HAIs, however not all staff are educated to know the health burden of HAIs and the impact of *C. difficile* to patient outcomes. Hand hygiene and adherence to isolation precautions are essential to controlling and reducing the rise in *C. difficile* infections. Healthcare staff must be attentive to personal and environmental cleanliness to prevent transmission of HAIs. Another factor that contributes to the problem are the aging population. The risk of *C. difficile* increase as the population ages. Improper use of antibiotics can also contribute to *C. difficile* infections and be another causative factor in reducing *C. difficile* infections.

An antibiotic program would help manage the use of antibiotics and avoid unnecessary administration of antibiotics.

Recommendations

Future recommendations should consider the benefits of the newer technology used to eradicate HAIs. Hydrogen Peroxide and Ultraviolet machines have a positive impact in reducing HAIs, including *C. difficile*. The utilization of a monitoring system will enhance the effectiveness of the terminal cleaning process, however may not be significant in reducing other HAIs. Hospital- acquired infections along with *C. difficile* are a concern and need to be combated as a whole.

Implications for Practice

A method to evaluate the thoroughness of a terminal clean is necessary to decrease HAIs in the acute care population. Continued assessment of the terminal clean process and evidence- based practice are essential to executing an effective monitoring system. A comprehensive monitoring system can be applied to any area for improvement. Nurses play an important role in reducing HAIs through prevention and early identification. Prevention measures are everyone's responsibility however nurses are usually the first-line caretakers. As the primary caretakers, nurses must be vigilant to hand hygiene and isolation precautions for patients with transferrable infections. Nurses negatively impact patient outcomes when they fail to adhere to infection control and prevention practices. Nurses are also the first to notice and identify symptoms of potential infections and can intervene early for better outcomes. Healthcare administrators can apply this information to support approaches to track and report infections and preventions efforts, ensure policies are adhered to, assess thoroughness of the cleaning

process and inform other healthcare agencies of infection during patient transfers and participate in local and regional prevention efforts. Infection control and prevention measures are the driving force to reduce HAIs.

Further Research

Ongoing efforts to provide a cleaner healthcare environment are necessary to reduce hospital-acquired infections. Further research could map the trends in the months with higher incidence of *C. difficile* with those of lower incidence to identify other precipitating factors contributing to *C. difficile* infections. Since the transmission of these infections are likely to occur via contaminated surfaces, the cleaning process for medical and nursing equipment should also be evaluated. A cost and time analysis of manual cleaning procedures versus a machine to determine efficiency and relevance in decreasing HAIs. Ongoing research and awareness will continue to build from the data and results discussed in this study. This project can serve as a guide for inpatient facilities as a global effort to reduce *C. difficile*. After completing a year of data monitoring post interventions, the results will be included in the discussion for publication. Efforts to expand this information to organizations locally, regionally and nationally include: a brief summary in the facility newsletter, presentation at local conferences related to acute care and infection control, abstract submissions for poster and presentation at national infection control and prevention conferences. The objective is to continue to improve and develop strategies to eradicate *C. difficile*. This aim would improve patient outcomes, prevent avoidable deaths, profit organizations and maximize revenue from payer sources.

The impact on reducing HAIs are healthcare cost, reimbursement and patient outcomes. Treatment for HAIs is costly and can be avoided. At a cost of $35,000 per

patient with hospital-acquired *C. difficile*, the organization would generate a savings of $385,000 based on 2016 data. There are incentives for hospitals who report a lower incidence of HAIs. Facilities with lower rates of HAIs will be reimbursed at a higher percentage than those with more episodes of HAIs. As HAIs decrease, the cost of healthcare decreases. This project evaluated the facility needs, and addressed them in the most efficient and cost-effective manner. Despite the positive results in reducing hospital-acquired infections that have been achieve through use of advancing technology, facilities need an established monitoring system to improve the thoroughness of a terminal clean. The goals and ideas from this project can be utilized in any setting where *C. difficile* is present. Reducing the rates of HAIs, especially *C. difficile* is a win-win for all patients, healthcare staff, and hospital administration.

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APPENDIX A – EVIDENCE TABLE

Brief Reference, Type of study, Quality rating	**Methods**	**Threats to validity/ reliability**	**Findings**	**Conclusions**
(Rutala & Weber, 2013) Systematic review Quality rating: A-high Evidence level: III	A review of cleaning disinfectants and methods against *C. diff.*	No threats	UV light reduced *C diff* on contaminated surfaces >2.4 log elimination of *C. diff* in 35-100 minutes. HP system shows significant reduction in incidence of *C. diff.* HP systems are more effective, yet more costly.	Decontamination systems reduce environmental contaminants after terminal cleans. Despite newer technologies, practices are needed to improve thoroughness of terminal clean.
Brief Reference, Type of study, Quality rating	**Methods**	**Threats to validity/ reliability**	**Findings**	**Conclusions**
(Vianna, Dale, Simmons, Stibach, & Licitra, 2016). Experimental study Quality rating: A-high Evidence level: I	A UV system was used on select *C. diff* rooms following terminal clean procedures including the use of bleach. The UV system was was placed in multiple positions throughout the room for 2-3 cycles at 5 minutes each.	Historical comparison data was used.	A significant reduction (41%) in *C diff* infections. (P=.01). The results included a 29% reduction in C diff, MRSA and VRE (P=.01).	Ultraviolet systems reduces *C diff* infection rates. Environmental disinfection is vital to reduce HAI.

Brief Reference, Type of study, Quality rating	Methods	Threats to validity/ reliability	Findings	Conclusions
(Carling, et. al., 2008) Prospective, quasi-experimental, (before-and-after), interventional trial Quality rating: A-high Evidence level: I	The use of a fluorescent targeting method to tangibly evaluate the thoroughness of terminal room disinfection cleaning before and after structured educational and procedural interventions.	Less than 1% of the U.S. hospitals participated and may impact the results generalability.	9,910 out of 20,646 (48%) of standardized environmental surfaces were cleaned at baseline. (95% CI) After feedback to staff, it was determined that 7,287/9,464 (77%) environmental surfaces were cleaned ($P < .001$).	Significant improvements in cleaning processes by using surface targeting with feedback to staff.
Brief Reference, Type of study, Quality rating	**Methods**	**Threats to validity/ reliability**	**Findings**	**Conclusions**
(Rutala, Gergen, Weber, 2012) Experimental study Quality rating: A-high Evidence level: I	Evaluated different disinfectants using 1 of 6 cleaning methods on Formica sheets.	A limitation of this study is the limited area cleaned by the wipes. A single surface material was used and may not represent all surface materials. Wipes could contaminate other surfaces with C. difficile spores.	Any cleaning that included wiping the Formica surface resulted in a greater than 2.90 log10 reduction in *C. diff* spores. Wiping with a non-germicidal product, QC-53, was effective in eliminating more than 2.90 log10 *C. diff* spores. Physical removal can eliminate 3 log10 *C. diff* spores from environmental surfaces.	*C. diff* can be eliminated from the environment by wiping, use of a sporicidal wipe, or by spraying a sporicide without wiping. The use of a wiping procedure with a sporicidal agent provides excellent removal and inactivation of spores and is an integral part of *C. difficile* control measures.
Brief Reference, Type of study, Quality rating	**Methods**	**Threats to validity/ reliability**	**Findings**	**Conclusions**
(Caroling, et. al, 2010)	The thoroughness of	No threat.	1748/ 3532 (49.5%) surfaces were cleaned after a	Significant improvements in ICU room

Prospective, multicenter, and pre- and post-interventional study Quality rating: A-high Evidence level: I	environmental cleaning was evaluated in 27 ICUs. A transparent, fluorescent solution was used to evaluate the thoroughness of disinfection by an ultraviolet light on objects in the patients room.		terminal clean. environmental in 260 intensive care unit rooms. After interventions, the thoroughness of cleaning improved to 82%.	cleaning can be achieved by monitoring cleaning methods and providing performance feedback to environmental service staff. With the rise in multi-resistant infections, improved cleaning provides an opportunity to enhance patient safety by improving the thoroughness of environmental cleaning.
Brief Reference, Type of study, Quality rating	**Methods**	**Threats to validity/ reliability**	**Findings**	**Conclusions**
(Boyce, Havill & Moore, 2011) Prospective observational study Quality rating: A-high Evidence level: I	An UV light was placed in 25 patient rooms following discharge. *C diff* colony counts were taken from five high-touch surfaces before and after UV light exposure.	No threats.	Stage 1 procedure, 90/100 (90%) surfaces were positive cultures compared to 44/100 (44%) surfaces were positive after UV light treatment. Stage 2 procedure, 25/100 (25%) surfaces were positive compared to 3/25 (12%) after UV treatment.	The UV light system significantly reduced *C. diff* contamination on high touch surfaces in patient rooms.
Brief Reference, Type of study, Quality rating	**Methods**	**Threats to validity/ reliability**	**Findings**	**Conclusions**
(Boyce et. al, 2008) A prospective before-after intervention study	Study was conducted using a pre and post intervention process in a 500 bed hospital. Five	*C. diff* rates were not determined on concurrent control units where traditional	Of the 5 units, the mean occurrence of *C. diff* decreased from 2.28 per 1,000 patient days to 1.28 per 1,000. (P =.047).	HPV decontamination was efficacious in eradicating *C. diff* from contaminated surfaces. Further studies of the

Quality relating: A- high Evidence level: I	units with higher incidence of *C. diff* were evaluated. The units were evaluated over 10 months pre and post intervention.	cleaning was performed. The trial was conducted at a single university affiliated hospital where affected by the epidemic of NAPI strain.	C. diff incidence decreased hospital wide from pre-intervention phase of 1.36 cases per 1,000 patient-days; P = .26) to 0.84 cases per 1,000 patient-days; P = .26) during intervention phase. Equating to a 39% reduction.	impact of HPV decontamination on nosocomial transmission of *C. diff* are warranted.
Brief Reference, Type of study, Quality rating	**Methods**	**Threats to validity/ reliability**	**Findings**	**Conclusions**
(Nagaraja et al., 2015) Comparative study Quality rating: A-high Evidence level: I	Comparison of pre UV light period and UV period of total C. diff rates (community and hospital acquired), length of stay and room occupancy at Westchester Medical Center.	The pre-intervention/ intervention period cannot exclude variables that may impact *C. diff* incidence.	Hospital acquired *C. diff* rates were 22% less (P=.06) between pre UV period and UV period. There was a 70% decrease on ICU units where more discharges occurred. (P=<.001).	UV light disinfection contributes to a reduction in *C. diff* rates and should be considered in adjunct with traditional cleaning practices. It also determined the importance of monitoring *C. difficile.*
Brief Reference, Type of study, Quality rating	**Methods**	**Threats to validity/ reliability**	**Findings**	**Conclusions**
(CDC Guideline for Disinfection and Sterilization in Healthcare Facilities, 2008) Quality rating: A-high	Review of evidence to develop an environmental infection-control guideline that reviews and implements strategies for the prevention of *C. difficile.*	No threats	Infection-control strategies and engineering controls, when consistently implemented, are effective in preventing opportunistic, environmentally-related infections in immunocompromised populations.	Compliance with environmental infection control measures will decrease the risk of health-care–associated infections among patients and health care workers.

Evidence level: I			Adherence to proper cleaning solutions and methods will reduce HAI including *C. difficile.*	
Brief Reference, Type of study, Quality rating	**Methods**	**Threats to validity/ reliability**	**Findings**	**Conclusions**
(APIC, 2013) Guide to preventing *Clostridium difficile* infections Quality rating: A-high Evidence level: I	Review effective methods and solutions to eradicate *C. difficile* infection in the healthcare environment.	No threats	A bundled approach to *C. difficile* prevention and control at the University of Pittsburgh included education, enhanced case finding, expanded infection control measures, the formation of a *C. difficile* management team, and implementation of an antimicrobial stewardship program.	Healthcare facilities should review their data and implement interventions to address their *C. difficile* situation. Interventions should include: • Early detection and recognition of *C. difficile* • Precautions • Monitoring system • Hand hygiene • Education • EBP for treatment and control • Antimicrobial stewardship • Education of healthcare workers • Administrative support
Brief Reference, Type of study, Quality rating	**Methods**	**Threats to validity/ reliability**	**Findings**	**Conclusions**
(Hacek, et. al., 2010) Intervention study Quality rating: B-good Evidence level: I	Implementing the intervention of replacing quaternary ammonium disinfectant with diluted bleach following discharge of	No threats	The average number of *C. diff* patients per 1,000 days decreased from 0.85 to 0.45, a (48%) reduction. A statistically significant (P=<.0001) decrease after implementing	Using bleach as a terminal clean process has an impact on reducing *C. diff* infection rates.

	C. diff patients.		bleach as terminal clean method.	
Brief Reference, Type of study, Quality rating	**Methods**	**Threats to validity/ reliability**	**Findings**	**Conclusions**
(Weber, D., Rutela, W., Miller, M., Huslage, K., & Sickbert-Bennett, E., 2010) Quality rating: B-good Evidence level: III	Systematic review of the role of surface contamination on health care associated infection transmission.	No threats.	Improved room disinfection leads to decreased rates of *C difficile*.	Studies show that room are not cleaned adequately but improved training, the use of checklists and florescent dyes improve cleaning.

APPENDIX B- CDC ENVIRONMENTAL CHECKLIST

CDC Environmental Checklist for Monitoring Terminal Cleaning

Date:	
Unit:	
Room Number:	
Initials of ES staff (optional):	

Evaluate the following priority sites for each patient room:

High-touch Room Surfaces	Cleaned	Not Cleaned	Not Present in Room
Bed rails / controls			
Tray table			
IV pole (grab area)			
Call box / button			
Telephone			
Bedside table handle			
Chair			
Room sink			
Room light switch			
Room inner door knob			
Bathroom inner door knob / plate			
Bathroom light switch			
Bathroom handrails by toilet			
Bathroom sink			
Toilet seat			
Toilet flush handle			
Toilet bedpan cleaner			

Evaluate the following additional sites if these equipment are present in the room:

High-touch Room Surfaces	Cleaned	Not Cleaned	Not Present in Room
IV pump control			
Multi-module monitor controls			
Multi-module monitor touch screen			
Multi-module monitor cables			
Ventilator control panel			

Mark the monitoring method used:

☐ Direct observation ☐ Fluorescent gel
☐ Swab cultures ☐ ATP system ☐ Agar slide culture

APPENDIX C- HOSPITAL CLEANING POLICY

Policy Title: Guidelines for Patients with Clostridium Difficile Policy

Audience: All Employees

References and Citations:

Association for Professionals in Infection Control and Epidemiology, Inc. (APIC). **Guide to Preventing *Clostridium difficile* Infections 2013**

PURPOSE:

To provide care for patients with Clostridium difficile infection and prevent transmission to other patients.

GENERAL GUIDELINES:

Clostridium difficile is a spore forming bacteria that can cause diarrhea and even more serious conditions like colitis. It is transmitted by contact with a contaminated patient or object. Symptoms include watery diarrhea, fever, loss of appetite, nausea, abdominal pain/cramping.

COMMUNICATION:

Laboratory will notify the nursing unit and Infection Prevention when the patient is diagnosed with positive Clostridium difficile culture.

Clinical unit and /or Infection Prevention will notify Environmental Services.

Clinical unit or Infection Prevention will notify Purchasing for Precaution cart,

PATIENT CARE:

Hand hygiene on room entry.

Explain Contact Precaution Special Enteric procedure and reason to patient and family. Educate on use of PPE and handwashing. NOTE: Handwashing is the best hand hygiene for C. Diff as waterless cleanser does not penetrate spores.

Use PPE as directed

Assist the patient with handwashing after each toileting.

If patient is in communal setting, (Rehab, Geropsych) he/she should be confined to room if diarrhea cannot be contained by continence or adult protective briefs. Assist patient to toilet in his own bathroom instead of communal bathroom.

Handwashing upon leaving the patient room.

CLEANING OF ROOM AND EQUIPMENT:

Environmental Services must use a hypochlorite solution for cleaning surfaces in the patient's room as the usual disinfectant is ineffective on the C. diff spores.

Dedicated equipment (stethoscope, temp-dots, blood pressure cuff) should be used in accordance with Contact Precaution Special Enteric. These items should be discarded upon the patient's discharge.

Leave the Precaution sign on door after patient discharge so EVS will know how to clean the room and protect themselves.

DISCONTINUATION OF PRECAUTIONS:

If hospital duration extends beyond 90 days and patient is no longer symptomatic; Infection Prevention or Infectious Disease MD can be contacted to determine if discontinuation of Precautions is appropriate. If patient is readmitted after 90 days of last C diff infection and is asymptomatic apply standard precautions.

Handwashing upon leaving the patient room.

Original Effective Date: 7/7/2008 Revision Date: 10/18/2016