

Increasing Hand Hygiene Compliance Among Registered Nurses
and Certified Nursing Assistants Caring for Clostridium difficile
Infected Patients on a Medical Surgical Unit Through Education

By

John D. Klein

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John Klein

has been approved

11/26/19

Approved: *Sarah Silvest-Guevara DNP RN*
(DNP Project Team Chairperson name, credentials & date)

Approved: *Kristina Strupp MSN, RN, AGCNS-BC, APNP, CQRN*
(DNP Project Team Member name, credentials & date)

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Abstract

Aim: This evidence based practice initiative was conducted to identify the correlation between hand hygiene compliance among Certified Nursing Assistants (CNAs) and Registered Nurses (RNs) when exiting a Clostridium difficile isolation patient room and an in-service educational offering. *Methods:* This study was conducted on two nursing units, 3CD and 3EF, at a large metropolitan hospital. This study was based on the evaluation of 192 total encounters of CNAs and RNs entering C. diff isolation patient rooms, 101 encounters prior to in-service education and 91 encounters after in-service education. In-service education was provided to 47 CNAs and RNs. In-service education included scientific information regarding the C. diff bacteria, severity of C. diff infections, and previous nosocomial infection rates at the clinical site. *Results:* The collected data were analyzed by computing means, using a Chi-Square Test, where p-value of <0.05 were considered statistically significant. Overall hand hygiene compliance did increase by 6%, but this was determined to not be statically significant, $\chi^2(2, N = 192) = 0.7895$, $p = 0.374258$. *Conclusion:* This in-service educational offering did not improve hand hygiene compliance of nursing staff. Continued research with larger sample size is recommended. Continued research into different causes of poor hand hygiene, other than a lack of education, is also recommended.

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Chapter I: Introduction

Infection control is a major factor in the care of patients in the hospital setting. Hospital acquired infections account for increased length of stay for patients, increased cost to the hospital, and reflects negatively on the outcomes of the hospital. Infection prevention teams in the hospital setting perform a number of tasks to monitor, contain, and reduce the risk of hospital acquired infections. These infection prevention teams monitor for a number of contagious agents. One of these organisms is *C. diff*. *C. diff* is an anaerobic, spore forming, toxin producing bacteria that is a common hospital acquired infection (Lucado, Gould, & Elixhauser, 2009).

C. diff infections are a leading cause of morbidity and mortality in the hospital setting (Lamont, Kelly, & Bakken, 2018). In 2009, over 300,000 hospitalizations involved *C. diff* infections (Lucado et al., 2009). Cost of caring for *C. diff* infection ranges anywhere from \$13,000 to \$28,000 (Johnson, 2018). Infection prevention teams and medical staff are routinely monitoring for *C. diff* infections in their patients. Protocols are often in place to quickly identify, contain, and treat *C. diff* infections.

Prevention of the spread of *C. diff* infective organisms is the first and most important act of caring for *C. diff* infected patients. Donning personal protective equipment such as isolation gowns and gloves plays a major role in this, but proper hand hygiene is vital in preventing the spread of the infection. Hand hygiene research has shown that hand washing is the most effective tool for the prevention of the spread of infectious agents (Deochand & Deochand, 2016). Staff across the hospital are educated on proper techniques used to care for *C. diff* infected patients, including proper hand hygiene after caring for a patient with *C. diff*. Even though hand hygiene has proven effectiveness, compliance remains an issue in the hospital setting. The need for

implementation of educational programs is present, with the end goal of increasing hand hygiene compliance when caring for a C. diff infected patient in the hospital setting.

This project provided that educational need in the hospital setting. Staff members may already be able to state the protocol in regards to hand hygiene when caring for a patient with C. diff, but that does not necessarily mean they abide by the protocol. An educational offering emphasizing the high prevalence of C. diff bacteria in the hospital setting and high contractility risk of C. diff has the potential to increase hand hygiene compliance among staff caring for a C. diff infected patient.

This project was not aimed at altering hospital practice, but rather improving compliance with a practice that is already in place. If the educational offering increases hand hygiene compliance, there is an identified education need regarding hand hygiene when caring for patients with C. diff. The hospital would then have data to support improving the education offered to the staff.

Background and Significance

C. diff is a gram-positive anaerobic bacterium that is spore forming and toxin producing (Lamont et al., 2018). This bacterium infects a host through the fecal to oral route. C. diff infects the intestinal tract of its host, causing colitis and diarrhea. The normal flora of a GI tract is the main defense against this bacteria colonizing, but the use of antibiotics in the hospital setting disrupts this normal flora. This disruption of the normal flora allows C. diff an opportunity to infect its host.

Alcohol based hand sanitizers can be an effective hand hygiene tool for the elimination of bacteria. Unfortunately, alcohol hand sanitizers are not effective against C. diff. C. diff is a spore

forming bacteria; and these spores are resistant to alcohol (Anderson, 2018). *C. diff* requires hand washing with soap and water to reduce bacterial counts on hands. *C. diff* is even resistant to many antibacterial soaps, but the act of washing one's hands physically removes the bacteria from the hands.

Compliance with hand hygiene protocol is lacking, anywhere between 35-77%, even though hand hygiene has proven efficacy in the prevention of *C. diff* spreading in the hospital setting (Bernard et al., 2017). Hand hygiene compliance rates can vary depending on the site. Research conducted by Bernard et al. (2017), concluded that hand hygiene compliance ranges anywhere from 35-77%. This lack of compliance has many causative factors. A lack of hand-hygiene resources, lack of knowledge regarding when and how to clean hands, lack of motivation to comply with protocol, potential for skin irritation related to high frequency of washing hands, and a lack of adequate time to wash hands on a busy hospital unit are all reported reasons for not complying with hand hygiene protocols in a hospital setting (Wyeth, 2013).

This project will focus on the lack of knowledge regarding *C. diff* bacteria and hand hygiene practices in order to increase hand washing compliance rates when caring for *C. diff* infected patients. It is important for this work to be completed to reduce the risk of transferring *C. diff* bacteria from one patient to another in the hospital setting. Hospital acquired *C. diff* infections can be costly to the patient's health and also a financial burden to the hospital. As stated before, the cost of caring for a *C. diff* infection can be as costly as \$28,000 (Johnson, 2018).

Lack of hand washing also has a significant impact on the individual patient. Lack of hand washing puts patients at a greater risk of contracting nosocomial infection. Hospital

acquired C. diff accounts for 66% of the total C. diff cases (Johnson, 2018). Furthermore, in 2007 it was estimated that 14,000 deaths occurred related to C. diff infections (Johnson, 2018).

Hospital acquired infections are seen in long-term care facilities as well as the acute care setting (Richards, & Stuart, 2018). Infection control teams are constantly working to improve the compliance with hand hygiene protocols through the use of continuing education, employee remediation, auditing, and statistical monitoring.

At the clinical site selected for this project, recent observational data collected through the Zero Patient Harm Campaign, showed a lacking in hand hygiene. This observation was specifically performed to assess the compliance rate regarding the protocol of using alcohol based hand sanitizer when entering and exiting a patient room. This was completed using direct observation of all hospital staff. Compliance among certified nursing assistants (CNAs) and registered nurses (RNs) was 79% and 82% respectfully. The observational data collection completed at the clinical site shows the gap between the current hand hygiene practices and the desired 90% compliance with protocol in regards to hand hygiene. The infection prevention team at the clinical site established this goal (See Appendix A).

Needs Assessment

This topic is worth exploring due primarily to the resistive strength of C. diff bacterium. Per standard protocol, hospital rooms are cleaned and disinfected daily. A study has shown that a high bacteria count can still persist after disinfection of a room. Out of 2,529 sites within hospital patient rooms, 22.9% came back positive for C. diff prior to terminal cleaning. 10.6% of the sites remained positive after terminal cleaning, and 4.4% remained positive after hydrogen peroxide cleaning (HCPro, 2018).

This resistive strength of *C. diff* presents a difficulty with eradicating the *C. diff* bacterium and spores in the hospital setting. The resistive strength of *C. diff* over-emphasizes the need to perform hand hygiene at the proper time per protocol when caring for a *C. diff* infected patient. As stated before, hand hygiene compliance rates in a hospital setting vary between 33-77% (Bernard et al., 2017). This lack of compliance is also seen in the presence of nursing students. A literature review of 19 articles completed by Labrague, McEnroe-Petitte, van de Mortel, and Masirudeen (2018) showed a suboptimal knowledge and compliance to hand hygiene among nursing students. With nursing education being the foundation in which these caregivers begin to form their practice, a lack of compliance with hand hygiene presents an uphill battle for infection prevention teams in a hospital setting. These nursing students will graduate, pursue employment in a hospital, and bring poor hand hygiene practices that originated in their education into the hospital setting.

At the proposed site of this project, hand hygiene audits showed a similar trend, with a lack of hand hygiene compliance. An audit completed in February of 2018 showed a hand hygiene compliance per protocol of 82% among RNs, and 79% among CNAs. This need to improve hand hygiene was identified through the use of a Gap Analysis (See Appendix B).

The implementation of an educational offering regarding *C. diff* bacterium and proper hand hygiene has the potential to increase hand hygiene compliance in a medical surgical unit. A SWOT analysis was performed to identify the strengths, weaknesses, opportunities, and threats to the proposed project (See Appendix C). A key strength for this project is a strong desire for at least 90% hand hygiene compliance by the RNs and CNAs at the proposed clinical site, which is the goal of this project. A key weakness identified in the SWOT Analysis is poor hand hygiene

as a habit for caregivers. Irrelevant of the level of education a caregiver may have, he or she may be in a poor habit of not performing proper hand hygiene. The key opportunity seen in the SWOT Analysis would be the reduction of *C. diff* infections in the hospital setting. Michelle Brown RN, BSN, an Infection Preventionist at the clinical site stated that in 2018, the medical/surgical units included in this evidence-based practice initiative accounted for nine of the ninety-six total nosocomial *C. diff* infections that occurred at the clinical site. One unit successfully had zero nosocomial *C. diff* infections. The unit with the highest number of nosocomial *C. diff* infections had five. (personal communication, March 15, 2019). Lastly, a threat to the project may be lack of sustainable efficacy of the project. The educational offering may see an initial increase in hand hygiene compliance, but compliance may drop back down over time.

Problem Statement

C. diff contributes to increased morbidity, mortality, and healthcare cost (Johnson, 2018). Even though hand hygiene is one of the most affordable and simplest forms of infection prevention, poor compliance has been seen among health care professionals (Kelcikova, Skodova, & Straka, 2011). Lack of hand hygiene compliance to proper protocol has been shown to increase the risk of transmission of *C. diff* to patients in a hospital setting. (Deochand & Deochand, 2016). This project was aimed at increasing compliance with hand washing when exiting a *C. diff* isolation patient room through the use of an educational offering. Hand hygiene has proven to be a low cost, yet highly effective method of containing pathogens, especially in the hospital setting (Ejemot-Nwadiaro, Ehiri, Arikpo, Meremikwu, & Critchley, 2015).

Project Aim

This project attempted to determine if an educational offering focusing on proper hand hygiene techniques and severity of *C. diff* infections given to RNs and CNAs on Medical-Surgical units 3CD and 3EF at the clinical site is a cost-effective method to increase hand washing prior to leaving *C. diff* isolation patient room. The objective for this project was to increase hand washing among RNs and CNAs prior to leaving *C. diff* isolation patient rooms to 90% compliance within 3 months.

This objective is specific because it focused on hand washing when exiting the *C. diff* isolation patient room. This project was measurable in the fact that hand hygiene compliance was recorded in a percentage format. This objective is attainable due to the fact that recent audits conducted at the clinical site showed 79% and 82% compliance regarding general hand hygiene among CNAs and RNs respectively (See Appendix C). This suggests that hand washing prior to leaving a *C. diff* isolation room may be similar. This project is relevant because *C. diff* prevention is a universal goal seen in the hospital setting and proper hand hygiene is required by CNAs and RNs (Anderson, 2018). Finally, this project was timely due to the fact that the pre-intervention audit, educational offering, and a post-intervention audit was completed within the span of two months.

The project involved three phases; a pre-intervention audit, an educational offering, and a post-intervention audit. A pre-intervention audit was completed to establish a baseline of hand washing compliance. Direct observation of 100 caregiver/patient interactions was performed and recorded with the use of the Hand Washing Audit Tool (See Appendix D).

The educational offering focused on proper hand washing technique, severity of C. diff infections, and ease of transmission of C. diff bacteria. Proper hand hygiene technique was emphasized with the use of Germglow and a black light. These tools were used to show staff members the bacteria count on their hand prior to hand washing and then after proper hand washing. Severity and ease of transmission of C. diff was shown with the use of recent data collected globally, but also specific data collected at the clinical site. If caregivers know how many hospital acquired C. diff infections occur in their own hospital each year, they may feel a personal responsibility to perform proper hand washing.

Finally, a post-intervention audit was conducted to assess the efficacy of the educational offering. The same audit tool that was used for the pre-intervention audit was used here. This is to provide direct simple data that correlates to the pre-intervention audit. The goal of this project was to see an increase in hand hygiene compliance according to protocol in regards to exiting a C. diff infected patient room. The percentage goal of acceptable compliance is 90%.

Clinical Question

In RNs and CNAs on Medical-Surgical units, how does implementation of an educational program effect the compliance to hand hygiene protocol when exiting a Clostridium difficile isolation room?

Congruence with Organizational Strategic Plan

This project is in congruence with the strategic plan of the proposed clinical site. The mission statement of the proposed clinical site states that it “is dedicated to delivering innovations to provide the best possible care today, and to define the best care for tomorrow” (Comparability, 2018). Reduction of C. diff infections in the hospital are an obvious element of

providing the best possible care today. This is also the goal of this project. The congruence is also seen in the Zero Patient Harm Campaign currently underway at the proposed clinical site. This hand hygiene campaign has a goal of hand sanitizing with alcohol to attain 90% per protocol. This project will use the same benchmark of 90% as a goal to achieve with hand washing prior to leaving a C. diff infected room.

Hospitalized patients are particularly at risk of contracting C. diff (Kelly, Lamont, Bakken, 2018). 3CD and 3EF are the primary surgical units at the proposed clinical site. The majority of these surgical patients are placed on broad-spectrum antibiotic therapy after surgery, during their hospital stay. Broad-spectrum antibiotic therapy disrupts the normal intestinal flora, allowing for an opportunistic infection, such as C. diff, to occur (Kelly, Lamont, Bakken, 2018). These units are the primary admitting units for C. diff infection admissions which is another reason why these units were selected. The RNs and CNAs need to pay particular attention to hand hygiene when leaving a C. diff isolation patient room due to the high vulnerability of the patients on these units to contracting C. diff infections.

Synthesis of Evidence

Literature for this review was obtained via multiple sources. Through the Bradley University Library, the following databases were used: Cochrane Library, PubMed, Cumulative Index to Nursing and Allied Health Plus, and Health Source-Nursing/Academic Edition. Google Scholar and UpToDate were also used as online databases. Selection criteria included systematic reviews, cross sectional data collections, quasi-experimental studies, and integrative literature reviews. Search terms included “Clostridium”, “difficile”, “hand”, “hygiene”, “washing”, “infection”, “control”, and “prevention”. Inclusion criteria required that the articles be written in

English, focused on hand hygiene by healthcare professionals, and contained research from 2009 at the oldest. Articles were excluded if the publication year was 2008 or older, did not focus on healthcare professionals, or were not written in English. These inclusion and exclusion criteria were used in order to utilize recent data collected and newly found research, to ensure the articles were legible as well as pertinent to the healthcare field. Twenty-two articles were reviewed for the literature review of this project.

C. diff is of great concern due to its prevalence, difficulty to treat, and high levels of transmission. *C. diff* spores have a profound ability to survive outside of a host and are commonly found in the healthcare setting (HCPro, 2018; Johnson, 2018; Crews, Kaplan, & Tochia, 2018). This high prevalence of bacteria has led to a rise in incidence of health care associated *C. diff* infections (Lamont, Bakken, & Kelly, 2018; HCPro, 2016; Lucado, Gould, & Elixhauser, 2009; McDonald & Kutty, 2018). *C. diff* is also a significant cause of morbidity and mortality (Lamont, Kelly, & Bakken, 2018).

C. diff poses a particularly high challenge for infection control professionals. The challenge to infection control professionals is the fact that *C. diff* has a high level of resistance to alcohol, antibiotics, and disinfectants, which leads to the necessity of proper hand hygiene when caring for *C. diff* infected patients (Anderson & Friedman, 2018; Anderson & Kanafani, 2018; Alzyood, Jackson, Brooke, & Aveyard, 2018; Deochard & Deochand, 2016). Unfortunately, a lack of hand hygiene has been well documented (Bernard et al., 2017; Anderson, 2018).

Washing hands with soap and water is the preferred method of hand hygiene when caring for the *C. diff* infected patient. Since *C. diff* spores are resistant to alcohol based hand sanitizers and are ineffective (Kelly, Lamont, & Bakken, 2018). The act of washing hands does not

necessarily kill the *C. diff* bacterium, but physically removes it from the hands of the caregiver, leading to a reduction of bacterial counts on hands and therefore reducing the risk of transmission to other patients (CNA Training Advisor, 2016). Hand hygiene is the most effective method in prevention of the spread of nosocomial infections (Kelcikova, Skodova, & Straka, 2011; Marchaim, Harris, & Baron, 2018; Ejemot-Nwadiaro, Ehiri, Arikpo, Meremikwu, & Critchley, 2015). Even with the proven efficacy of hand hygiene in reducing the risk of *C. diff* transmission, compliance with hand hygiene practices remains an issue.

Education has the potential of increasing compliance with hand hygiene practices in the hospital setting. Kelcikova et al. (2011) researched hand hygiene education in the nursing school setting. Their research saw a low level of knowledge and practical skills in relation to hand hygiene. These results show an educational gap in regard to hand hygiene that if resolved, may result in an increase in hand hygiene compliance. These authors went on to state that this lack of knowledge and skills regarding hand hygiene among students would translate to the clinical setting without the implementation of proper education. Similar results were found in research conducted by Labrague et al. (2018), where 19 studies were reviewed to determine hand hygiene knowledge and compliance by nursing students. This study showed a lack of knowledge and lack of compliance to hand hygiene among nursing students. Education is the cornerstone to increasing hand hygiene compliance in the hospital setting (Richards & Stuart, 2017).

For hand hygiene compliance to increase to an acceptable rate, medical staff need to be educated on the ease of transmission of the bacteria and efficacy of washing one's hands (Farhoudi et al., 2016). When caring for *C. diff* infected patients, proper hand hygiene can greatly reduce the risk of transmission to fellow patients in the hospital setting (Wilson, Jacob, &

Powell, 2011). Research has shown that even with proven efficacy, hand hygiene compliance remains a problem in the hospital setting. Various reasons for not performing hand hygiene include lack of resources, lack of knowledge, lack of motivation, or lack of time (Wyeth, 2013). With a better knowledge regarding C. diff, caregivers will overcome these barriers in order to keep their patients safe.

An Evidence Evaluation Table containing 22 articles was performed to guide literature review and validate supportive data and submitted as a separate document to this paper.

Conceptual Framework

Lewin's Change Management Model was selected as the foundation theory for this educational intervention to improve hand hygiene compliance when caring for the C. diff infected patient. Lewin's Change Management Model is a three-step process of change. Kurt Lewin, the author of the model, used the analogy of managing change in comparison to the changing shape of a block of ice (Hussain, Lei, Akram, Haider, & Hussain, 2016).

The first stage is Unfreezing. In this stage, an organization must accept the need for change. This involves admitting that the current status is unacceptable and a desire to change must be present (Hussain, Lei, Akram, Haider, & Hussain, 2016). The proposed clinical site has already begun this process with the Zero Patient Harm Campaign. Low hand hygiene compliance rates have been identified. This project will also identify the current hand hygiene compliance rates in pre-intervention data collection and presenting this data in the educational offering. Showing the RNs and CNAs the audit results of themselves will provoke a personal need and desire to improve.

The second phase of the Lewin Change Management Model is the Change phase. The individuals subject to the change must be willing to be part of the change, but uncertainty regarding the future is commonly seen immediately after the Unfreezing phase (Hussain, Lei, Akram, Haider, & Hussain, 2016). Members of an organization see the need to change, but do not know how. This is where the Change phase comes in. The Change phase presents a new way of thinking or performing in order to increase productivity or improve results. In this project, the increased knowledge in regards to C. diff and the necessity to comply with hand hygiene protocol was the change. The change was RNs and CNAs being more apt to ensure the safety of their patients by following infection control protocols.

Lastly, the final phase of the Lewin Change Management Model is the Refreeze phase (Hussain, Lei, Akram, Haider, & Hussain, 2016). This phase is ready to occur once the organization has embraced the new change. Individuals must embrace the change and make it part of how they practice. In this project the post-intervention audit will evaluate the staff's willingness to refreeze (Hussain, Lei, Akram, Haider, & Hussain, 2016). The post-intervention audit will occur approximately one to two weeks after the educational offering has been given to the unit staff. This will allow time for the change to occur within each individual.

Chapter II: Methodology

Project Design

This is a non-experimental, evidence based practice initiative. This project is non-experimental due to the fact that no new policy or procedure is being used to improve the hand hygiene compliance among RNs and CNAs. This project was aimed at improving compliance with already established hand hygiene protocol. This project was considered an evidence based

practice initiative, due to the research supporting the efficacy and necessity of hand washing with soap and water prior to leaving a C. diff isolation room. This evidence supports the need to increase compliance with hand washing protocol to an acceptable percentage in order to reduce the risk of C. diff transmission.

Setting

This non-experimental, evidence based practice initiative took place at an urban medical center in Milwaukee, WI, on two Medical/Surgical Units, 3CD and 3EF. This medical center is a private, tertiary hospital with 919 patient beds. The two Medical Surgical units, 3CD and 3EF, are two units that contain 49 patient beds. These units are “sister units”, meaning they are two separate units but share a single nurse’s station and share the same patient population. The patient population for the units is primarily surgical patients ranging from gastrointestinal, genitourinary, reproductive, and vascular surgery. The staff and leadership of these two hospital units have shown a desire to change the culture of the unit to emphasize the importance of hand hygiene.

This location was selected for this evidence-based initiative for a number of reasons. First, these units are the primary units for gastrointestinal medical problems and have a high percentage of the hospital’s patients that are in C. diff isolation. 3EF and 3CD accounted for almost 10% of the total nosocomial C. diff infections at the clinical site (M. Brown, personal communication, March 15, 2019). These units also accounted for 247 of the total 2478 stool samples collected to test for active C. diff infections (M. Brown, personal communication, March 15, 2019). Second, being “sister units”, there is a higher number of beds as opposed to

any other one unit in the hospital. With these two facts, there was more instances of RNs and CNAs leaving C. diff isolation patient rooms leading to more available data for the analysis.

Population

The population for this evidence based practice initiative consisted of RNs and CNAs that are employed at an urban medical center on the units 3CD and 3EF. The 3CD unit consists of 15 RNs and 13 CNAs. The 3EF unit consists of 18 RNs and 15 CNAs. Sampling procedure will consist of those RNs and CNAs that enter a C. diff isolation patient room while the data is being collected. Inclusion criteria include the fact that the employee must be a CNA or RN and work on 3CD or 3EF. Exclusion criteria includes staff members of other departments, such as medical doctors, nurse practitioners, transporters, or procedural technicians.

Tools and Instruments

The tool used to document the observed data collected at the clinical site is the Hand Washing Audit Tool (See Appendix D). This audit tool was created by the doctoral student. This audit tool was used to collect such data as the date and time of the patient/caregiver interaction, patient room number, the shift that the interaction occurred, caregiver title, caregiver name, isolation status of the patient, and if hand washing was performed prior to leaving the patient room. This data was collected to primarily identify the overall compliance percentage with hand washing prior to leaving a C. diff isolation room.

Secondarily, data was collected to identify possible trends in the data such a particular shift, day of the week, or type of caregiver, CNAs or RNs that are poor with compliance resulting in not meeting the project target. Permission for the use of this tool to conduct this evidence based initiative was granted by the Patient Care Mangers of 3EF and 3CD.

The Hand Hygiene Audit Tool was created on the framework of a hand hygiene audit tool produced by the Health Services Advisory Group under contract of the U.S. Department of Health and Human Services (Health Services Advisory Group, 2017). Retained portions of this audit tool into the Hand Hygiene Audit tool used for this evidence-based initiative were the discipline of the employee, if the hand hygiene opportunity was successfully carried out, date, shift, and location. These elements were retained for the Hand Hygiene Audit Tool because they were directly related and in congruence with this evidence-based initiative. Portions of this tool that were omitted were the hand hygiene opportunity section and the description of the missed event.

Project Plan

Prior to initiating the project, the doctoral student meet with the Patient Care Manager of 3EF. This individual was also acting as the Patient Care Manager of 3CD, due to 3CD being without a manager throughout this evidence based practice initiative. This meeting included a verbal summary of how the project was implemented, the potential benefits of this project, and the cost-efficient efficacy of this project (See appendix E).

This was a three-part project; pre-intervention assessment, intervention, and post-intervention assessment. The pre-intervention assessment was an observational data collection of the RNs and CNAs on hand washing prior to leaving C. Diff isolation patient rooms. These rooms where identified by the “Special Precaution Isolation Sign” that is placed on the patient room door. The Hand Washing Audit Tool was used to collect this data (See Appendix D). This data include the date and time of the interaction, the patient room number, the shift the interaction occurred in, the title of the employee, the isolation status of the patient, and if hand

washing was performed by the caregiver. At minimum, 100 patient/caregiver interactions and eight hours of observation on each work shift, 24 hours total, were planned and recorded in the pre-intervention assessment.

The second phase of the project is the intervention. An educational offering was provided to the RNs and CNAs of 3CD and 3EF. The education was also given to Patient Care Manager. This education took the form of “pop-up in-service education”. This style of education was selected over providing the education in a staff meeting due to the fact of low staff attendance at staff meetings. This style was also selected over a “read and sign” style offering in fear of the staff not reading the education provided.

The pop-up in-service education was provided throughout the course of a day and on multiple days in order to cover as much of the RNs and CNAs as possible. The RNs and CNAs that were present for the pop-up in-service education signed a sign in sheet in order to record attendance (See Appendix F). The education was limited to five minutes due to the nature of providing education while the RNs and CNAs are mid-shift. The education provided and handout showed information regarding *C. diff* bacteria, the impact *C. diff* infections have nationwide, and the impact *C. diff* infections have at the clinical site (See Appendix G). The doctoral student also provided the CNAs and RNs an opportunity to use the Germ Glow lotion and blacklight to see the volume of bacteria currently on their hands. Pop-up in service education attendance goal was set at 75% of total CNAs and RNs on staff. 75% was established to allow for staff members that not working the days the education is provided.

The final section of this evidence-based initiative is the post-intervention assessment. The same Hand Washing Audit Tool was used as in the pre-intervention assessment (See Appendix

D). Utilizing the same audit tool resulted in clear data that can be compared and analysed in comparison to the data collected in the pre-intervention assessment.

The objective to be measured was the increase in hand washing compliance among CNAs and RNs prior to leaving C. diff isolation patient rooms with a goal of 90% compliance. Data collected in the Hand Washing Audit Tool identified sub-groups within the RNs and CNAs of 3CD and 3EF who perform low or high compliance rate with hand washing when exiting a C. diff isolation room.

The doctoral student had primary responsibility to collect the data. Eliminating other people from collecting data eliminated inter-rater variability of the data collected. No data collection training was necessary, due to the nature of the observation data collection. Data was collected via visual observation of the RNs and CNAs while exiting a C. diff isolation patient room. Data was collected at random times of day and days of the week. Data was then recorded to the Hand Washing Audit Tool (See Appendix D). The doctoral student was responsible to keep completed Hand Washing Audit Tools. Patient privacy remained intact due to no patient identifiers being collected, recorded, or observed. Barriers to data collection included a low occurrence of C. Diff isolation patients on 3EF and 3CD as well as RNs and CNAs being aware that the doctoral student was collecting data. The sinks in the patient room's can be visualized from the hallway, not impeding the observational data collection.

The planned timeframe for this project was to complete pre-intervention data collection by April 21, 2019, provide initial pop-up in-service education between May 1, 2019 and May 10, 2019, collect initial post-intervention data by May 20, 2019, and continue monthly post-intervention data collection through October of 2019 (See Appendix H).

Sustainability focused on maintaining the 90% compliance rate of hand washing prior to leaving a C. diff isolation patient room continually after the initiation of the educational offering. This included regular post-intervention auditing by the doctoral student. The project plan called, for a repeat educational offering if any monthly post-intervention audits show an overall hand washing audit compliance rate of less than 90%.

Data Analysis

The data collected in the pre-intervention data collection and post-intervention data collection was transferred from the Hand Hygiene Audit tool to excel spreadsheet by the doctoral student, with the use of a personal computer, a 2018 Apple iMac. Data was transcribed twice to ensure no human mistakes occurred during transcription. This excel spreadsheet was used to generate the results of the data in percentage form. Data included room number, shift, RN or CNA, and lastly if hand washing was performed prior to leaving the C. diff isolation patient room. This data was then analyzed using the statistical significance equation to establish whether or not a statistical significance is present in the data as a result of the intervention. Statistical significance was established with a *p*-value of 0.05.

Institutional Review Board and Ethical Issues

Patient privacy was maintained throughout the project. No patient identifiers were collected such as patient name, medical record number, date of birth, or medical diagnosis. The privacy of the RNs and CNAs was maintained in the fact that personal names will not be reported. Completed audit tools were retained by the doctoral student, at his personal residence in lockable desk drawer. No other ethical concerns were present in this evidence based practice initiative.

The Aurora Research Subject Protection Program at the clinical site required the submission of the Human Subject Research Determination Form prior to applying for IRB approval. This form is to determine if IRB approval is needed for research to be conducted at the clinical site. The doctoral student submitted the Human Subject Research Determination Form to the Aurora Research Subject Protection Program at the clinical site on February 11, 2019 (See Appendix I). This form was returned to the doctoral student on February 21, 2019. Per the Aurora Research Subject Protection Program, this evidence based initiative does not constitute human subject research and therefore an IRB research application is not required at the clinical site.

Upon successfully passing the DNP Defense, the doctoral student submitted the Bradley University Committee of Use of Human Subjects in Research Application (CUHSR). This was submitted on February 11, 2019 (See Appendix H).

Chapter III: Organizational Assessment and Cost Effectiveness

Organizational Assessment

Anticipated barriers for this evidence based practice initiative included a lack of patients who are in C. diff isolation at the clinical site. This lead to more time needed to collect sufficient data. A second barrier was RNs or CNAs not willing to participate in the in-service educational offering. Anticipated facilitators to implement this evidence based practice initiative where the Patient Care Managers of 3CD and 3EF. These are the nursing leaders of 3CD and 3EF. They are entrusted to hold the staff accountable for their practice, which includes following hand hygiene protocols.

A potential risk was that the RNs and CNAs may alter their regular hand hygiene practices prior to leaving a C. diff isolation patient room knowing their actions are being recorded. An unintended consequence of the evidence-based practice initiative was a high percentage of hand washing compliance found on the pre-intervention data collection. This would lead to a difficulty gaining a statistical significance in the post-intervention data collection as a result of the in-service education. Another unintended consequence of the evidence based practice initiative was a lack of statistical significance from the pre-intervention data collection in comparison to the post-intervention data collection. This would draw the conclusion that the in-service education did not produce the desired result of increasing hand hygiene compliance when exiting a C. diff patient room. This could infer that the education was poor or that a lack of education is not the root problem of the poor compliance.

Cost Factors

The overall cost for this project was limited. Pre-intervention data collection and post-intervention data collection incurred no cost. The doctoral student collected the data at no additional cost. The doctoral student's personal computer was used to transcribe data from the Hand Washing Audit Tool to Excel spreadsheets, leading to no cost. The in-service education was provided mid-shift on the nursing units leading to no additional time paid for education, therefore there was no cost in work hours for those employees. Educational handouts were generated on the doctoral student's personal computer. There was \$20.00 budgeted in the printing of educational handouts and Handwashing Audit Tools, this officially cost \$16.78. The blacklight and Germ Glow used in the in-service education was purchased online for \$19.21.

\$20.00 was budgeted for this item. Total budgetary cost for the project was \$40.00. Actual cost for this project was 35.99 (See Appendix J).

Chapter IV: Results

Analysis of Implementation Process

The implementation process of the evidence based practice initiative did not proceed according to the initial timeline proposed (See Appendix H). This was due to a lack of data. The DNP student found that there were a limited number of patients who were under C. diff isolation on the nursing units at the clinical site. Also, when the DNP student was at the clinical site, fewer nursing staff entered the patient room than expected. This led to a delay in data collection and modification in the project design. The proposed plan called for monthly in-service education to be provided to nursing staff and monthly observational data collection until a 90% compliance with hand washing was achieved. Due to time constraints generated by a lack of data, the plan was adjusted with the recommendation by the DNP project chairperson to have one educational offering and one post-intervention data collection. Pre-intervention data collection occurred between 6/29/19 and 8/5/19. Educational in-service occurred on 8/26/19. Post-intervention data collection occurred between 9/15/19 and 9/24/19. A key lesson learned from this is the importance of time to collect a sufficient volume of data to support a project hypothesis.

Analysis of Project Outcome Data

The pre-intervention data collection resulted in 101 total encounters (See Appendix K). Likewise, the post-intervention data collection resulted in 91 total encounters (See Appendix L). This data was analyzed and formatted into percentage format. Pre-intervention and post-intervention data showed an overall hand washing compliance of 71% and 77% respectively.

This resulted in a 6% increase in hand washing compliance. A chi-square test of independence was performed to examine the relation between the pre-intervention data collection to the post-intervention data collection and hand washing compliance. The relation between these variables was not significant, $X^2(2, N = 192) = 0.7895, p = 0.374258$. The educational offering did not increase hand washing compliance among nursing staff when exiting C. diff isolation patient rooms to a value that would be statistically significant.

Pre-intervention Data Analysis

Group	Number of encounters	Hand washing Compliance rate	Hand Washing Compliance Rate (Percentage Format)
RN	45	37/45	82%
CNA	56	35/56	63%
AM Shift	48	32/48	64%
PM Shift	45	33/45	73%
Night Shift	8	7/8	88%
Diagnosed with C. diff	91	64/91	70%
Rule Out C. diff	10	8/10	80%
Total	101	72/101	71%

Post-intervention Data Analysis

Group	Number of encounters	Hand washing Compliance rate	Hand Washing Compliance Rate (Percentage Format)
RN	41	32/41	78%
CNA	50	38/50	76%
AM Shift	50	38/50	76%
PM Shift	32	26/32	78%
Night Shift	9	7/9	78%
Diagnosed with C. diff	66	50/66	76%
Rule Out C. diff	25	20/25	80%
Total	91	70/91	77%

Chapter V: Discussion

Findings

The initial objective of this evidence base practice initiative was to increase hand washing among RNs and CNAs prior to leaving C. diff isolation patient rooms to 90% compliance within three months. This objective was not achieved. 77% hand hygiene compliance was achieved at the end of this evidence based practice initiative. This fell far short of the 90% compliance goal. There was an increase in hand hygiene when compared to pre-intervention data, but this was established to not be statistically insignificant.

A success of the project would be the evidence to support that a lack of education is not the source of the problem with a lack of hand hygiene in a hospital setting. Other research has supported this as well. Wilson, Jacob, & Powell (2011) stated that “education and training are important for increasing knowledge about hand hygiene, but have generally not been effective at improving compliance” (p. 119). With this knowledge that education is not the source of the problem hand hygiene compliance can be reviewed and analyzed in a different mindset. One can review this concern as an organizational culture problem as opposed to an educational problem.

As stated before, the major difficulty with the evidence based research initiative was the lack of data. Fewer patients were in C. diff precautions than expected and there were fewer instances of nursing staff entering these rooms than expected. This led to the alterations of the project timeline and elimination of follow up post-intervention data collections.

As proven by the chi-square test, the intervention did not produce statistical significance. The chi-square test resulted in a p value of .374258, which is above that established p value of .05 as statistically significant. Post-intervention hand hygiene compliance was 77%. The goal hand hygiene compliance was 90%.

Limitations

Limitations discovered through the process of this evidence-based practice initiative were small sample size, the project design flow, lack of leadership on the nursing units, and loss of nursing staff. Due to the lack of nursing staff entering C. diff isolation patient rooms, a lack of data collection opportunities occurred. This project planned for 100 interactions per data collection. It took much longer to reach this 100 interactions than expected, resulting in not collecting follow up post-intervention data. More time to collect more data would solidify the

results of the data analysis. The project design flow did not match the time necessary to collect sufficient data. With the recommendation of the project chairperson, the project was altered to accommodate this. The project timeline should have been significantly longer to accommodate for the slow collection of data. This evidence based practice initiative was conducted on two nursing units, 3CD and 3EF. Throughout the duration of this evidence based practice initiative, 3CD was without a nursing manager and the nursing manager for 3EF retired during the process. With the lack of nursing leadership at the clinical site, it was difficult to communicate with staff, coordinate times to be on the unit, and relay results to the nursing staff. There was also turnover of nursing staff throughout the duration of this evidence based practice initiative. This led to nursing staff not being present for all three phases of the project: pre-intervention data collection, in-service education, and post-intervention data collection.

Besides the fact that this evidence based practice initiative did not produce the desired results, the sustainability of the results would be questionable. The initial project plan called for monthly data collections after the in-service education to evaluate this sustainability. This was not established due to the lack of data and time to collect the necessary data. To improve future performance, the project plan could be altered. Increasing the number of nursing units involved would increase the data volume of nursing staff entering C. diff isolation patient rooms. This also would necessitate more data collectors, other than the DNP student. The project plan is generalizable and transferable. This project could be carried out at any hospital setting in which nursing staff cares for C. diff isolation patients. This project could also be easily altered to accommodate the use of hand sanitizer when exiting any patient room.

This evidence based practice initiative opens opportunities for interdisciplinary collaboration between inpatient nursing staff, research staff, and infectious disease staff. Opportunities include alterations to this project plan for improvement, utilizing the results of the evidence-based research initiative to guide future research, or utilizing the results of this research to formulate hand hygiene improvement protocols for inpatient nursing. A potential research question that could be proposed from the results of this research is the following: If a lack of education is not the source of poor hand hygiene compliance, what is? The data and information resulted from this research was shared with the nursing staff of the clinical site. The results of the this evidence based practice initiative was shared with the acting Patient Care Manager of the nursing units to share with the nursing staff.

Implications

Practice

Even with the goals of this evidence based practice initiative not being achieved, there is still a significant impact it can have on nursing as a whole. A suggestion for improving hand hygiene compliance in a hospital setting would be a hand hygiene improvement plan that focused on cultural changes. This may include moving hand washing sinks to the entrance of the patient room. On the units of the clinical site, the sinks were not in the entrance way, forcing the nursing staff to go out of their way to wash their hands. Having the sink in the entrance way would make it convenient for the nursing staff to wash their hands. Nursing education could also address this as a cultural issue and focus on this as part of the curriculum. A curriculum idea could be as a part of entering lecture, all nursing students must wash their hands or use hand sanitizer as they

enter the lecture hall. This would establish a culture of good hand hygiene prior to entering the hospital setting.

Future research

This evidence based practice initiative supports that a lack of education is not the source of the problem of poor hand hygiene compliance. This has the ability to produce alterations in future hand hygiene research, hand hygiene protocols, and hand hygiene improvement action plans. This DNP student suggested that poor hand hygiene compliance is a result of something other than a lack of education, such as culture or lack of motivation.

Nursing and Health Policy

A relevant health care policy within a hospital would obviously have been hand hygiene protocols shared among all staff that work at the hospital. Knowing that there is a falling out in regards to maintaining this policy among staff, infection control departments are actively working to meet or exceed protocol to reduce the risk of contamination and infection. Development of hand hygiene improvement plans can focus on cultural issues that result on a lack of hand hygiene as opposed to educational issues. This could involve collaboration and idea sharing with outside healthcare agencies. This can result in sharing ideas on establishing a culture where staff actively participate in hand hygiene practices for the safety of their patients.

Chapter VI: Conclusion

Value of the Project

In conclusion, this evidence-based practice initiative did not achieve the stated goal of achieving 90% hand hygiene compliance among nursing staff when exiting a C. diff isolation patient room through the use of education. Even though this was not achieved, positive results

can still be found. The data collected suggests that alternate methods of improving hand hygiene compliance may prove to be more effective as opposed to education in regards to improving hand hygiene. This information may prove useful to infection control departments, nursing leaders, or healthcare policy makers looking to improve hand hygiene among nursing or hospital staff. Further research is recommend in the field of hand hygiene compliance in regards to alternative sources of the poor compliance.

DNP Essentials

All of the DNP Essentials were utilized in guiding the formation, implementation, and evaluation of this evidence-based research initiative. DNP Essential I: Scientific Underpinnings for Practice was met by the unitization of science-based theories to determine the nature of the healthcare delivery system of hand hygiene. DNP Essential III: Clinical Scholarship and Analytical Methods of Evidence Based Practice was met by the critically appraising existing literature on hand hygiene and C. diff. DNP Essential VII: Advanced Nursing Practice was met by the designing, implementation, and evaluation of this DNP project based on nursing science (American Association of Colleges of Nursing, 2006).

Plan for Dissemination

Dissemination of this project was completed by providing the Patient Care Manager of the nursing units with the statistical findings of the evidence based practice initiative. The information will also be shared with the DNP project mentor, Infection Control Department of the clinical site, and Research Department of the clinical site.

Attainment of Personal and Professional Goals

The main personal goal learned through the process of completing this DNP project was an improvement of self-education in regards to research. The DNP student is much more able to read and interpret medical research article to establish validity within these research articles. Lessons learned through this process will aid the DNP student throughout his career at a Family Nurse Practitioner.

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Appendix A

Zero Patient Harm Campaign Data

Feb-18			
Hand Hygiene Observation			
	Compliance Rate	Total Number	Total Observed
Environmental Services	57%	26	46
Food Services	72%	64	89
Lab	76%	41	54
MD, PA, NP, CRNA, CNM, Med Student	66%	287	432
NA, CNA, PCA	79%	523	666
Nutrition Services	86%	6	7
Other	95%	242	254
Patient Access/Admitting	100%	2	2
Pharmacy	100%	7	7
PT, OT, ST	95%	485	504
Radiology	92%	100	109
Respiratory Therapy	82%	47	57
RN, LPN	82%	1078	1308
Surgery Technician	66%	21	32
Transportation	67%	65	97
Volunteers	75%	9	12
Total	82%	3038	3717

Appendix B

Gap Analysis

Current State	Desired State	Identified Gap	Planned Intervention	Outcome Measure
Only 79% of CNAs and 82% of RNs perform proper hand hygiene when needed per protocol. (Not specifically when leaving C. diff isolation patient rooms)	90% Hand Hygiene Compliance	21% of occasions for hand hygiene were not used by CNAs, and 18% in respect to RNs	Create and implement an educational offering regarding C. diff bacteria and proper hand hygiene practices for RNs and CNAs	Outcome will be measured by direct observation of the CNAs and RNs caring for C. diff infected patients. Compliance rates will be recorded.

Appendix C

SWOT Analysis

Objective:
Improve hand hygiene compliance in RNs an CNAs caring for C. diff infected patients.

Internal Factors	
Strengths (+)	Weaknesses (-)
<ol style="list-style-type: none"> 1. Desire to have 90% hand hygiene compliance 2. Infection Control Department actively working on hand hygiene compliance 3. Caregivers driven to improve patient care 	<ol style="list-style-type: none"> 1. Already established low compliance rate 2. Poor hand hygiene habits already formed by caregivers 3. Poor hand hygiene can easily go unseen by leadership

External Factors	
Opportunities (+)	Threats (-)
<ol style="list-style-type: none"> 1. Reduction in C. diff infection rates 2. Reduction in healthcare cost 3. Improve patient outcomes 	<ol style="list-style-type: none"> 1. Positive results of one time educational offering may decrease over time 2. Benefits may not have long sustainability 3. Funding to support project

Evaluation of Objective:
There is strong facility support in regards to the project that is driven to improve compliance as well as data that supports the given intervention.

Appendix E

Project Outline

- Pre-Interventional Assessment
 - Observational data collection by doctoral student
 - 100 observations of CNAs or RNs entering C. diff isolation patient rooms
 - Record data on Hand Washing Audit Tool (See Appendix D)
- Educational Offering
 - In-service education
 - Limited to five minutes
 - Attendance taken (See Appendix F)
 - Focused on impact of C. diff on patients and hospital
 - Focused on impact hand washing has on reduction of C. diff transmission
 - Germ Glow demonstration
- Post-Interventional Assessment
 - Observational data collection by doctoral student
 - 100 observations of CNAs or RNs entering C. diff isolation patient rooms
 - Record data on Hand Washing Audit Tool (See Appendix D)
 - Repeat monthly for 6 months
- Goal: 90% compliance with handwashing prior to leaving C. diff Isolation patient room
- Benefit: decrease nosocomial C. diff infection rates
- Cost: \$40 (See Appendix I)

Appendix G

Educational Handout



Handwashing

When Leaving a C. diff Isolation Patient Room

- **Resistant to soap**
(HCPro, 2016)
- **Resistant to hand sanitizer**
(Anderson, 2018)
- **Approx. 1 out of 4 rooms have C. diff even after cleaning**
(Hospital Safety Center, 2018)

- **336,600 hospitalizations nationwide**
(Lucado, Gould, & Elixhauser, 2012)
- **14,000 deaths nationwide**
(HCPro, 2016)
- **\$13,000 to \$28,000 per case**
(Johnson, 2018)

- **9 nosocomial C. diff cases on 3CD and 3EF in 2018**
(M. Brown, personal communication, March 15, 2019)
- **96 nosocomial C. diff cases house wide in 2018**
(M. Brown, personal communication, March 15, 2019)

Wash your hands every Time!!!

Appendix G (Continued)

Educational Handout

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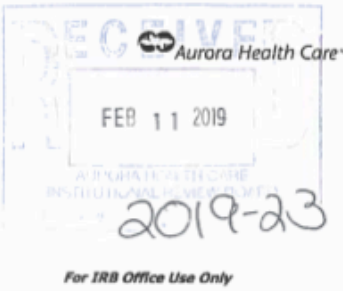
Appendix H

Project Timeline

International Review Board Submission.....	March 31, 2019
Bradley University CUHSR Application.....	March 31, 2019
Meet with Patient Care Managers to discuss project.....	April 21, 2019
Pre-intervention Data Collection.....	April 21, 2019
Initial In-service Education (Intervention).....	May 1-10, 2019
Initial Post-intervention Data Collection.....	Prior to May 20, 2019
2nd Post-intervention Data Collection.....	Prior to June 20, 2019
3rd Post-intervention Data Collection.....	Prior to July 20, 2019
4th Post-intervention Data Collection.....	Prior to Aug. 20, 2019
5th Post-intervention Data Collection.....	Prior to Sep. 20, 2019
6th Post-intervention Data Collection.....	Prior to Oct. 20, 2019

Appendix I

Human Subject Research Determination Form

<p style="text-align: center;">AURORA RESEARCH SUBJECT PROTECTION PROGRAM</p> <p style="text-align: center;"><i>Human Subject Research Determination</i></p>	 <p style="font-size: small; text-align: center;">For IRB Office Use Only</p>																				
<p>Sometimes it is difficult to discern whether a proposed activity constitutes research or human subject research. When uncertainty exists, the Aurora Research Subject Protection Program ("RSPP") will make a determination whether the activity is Human Subject Research. The information provided will be reviewed to determine whether the proposed activity would require review and approval by the Aurora IRB. See Aurora System Policy 811 (<i>Research Involving Humans or their Identifiable Data or Biospecimens</i>) for guidance.</p> <p>Instructions:</p> <ul style="list-style-type: none"> If question 1 is answered as YES, this form should be submitted to research.preauthorization@aurora.org (RAP) before review by the RSPP office will begin.. If question 1 is NO, submit this form to the Aurora RSPP office via e-mail to irb.office@aurora.org. Please allow a minimum of 2 weeks for RSPP review and determination. 																					
SECTION I: GENERAL INFORMATION																					
<table border="1" style="width: 100%; border-collapse: collapse; font-size: x-small;"> <tr> <td colspan="4">Project Title: <i>Increasing Hand Hygiene Compliance Among RNs and CNAs Caring for Clostridium difficile Infected Patients on a Medical Surgical Unit Through Education</i></td> </tr> <tr> <td>Requestor (including degrees):</td> <td>John Klein RN</td> <td>Department/Organization:</td> <td>ASLMC 3EF and 3CD</td> </tr> <tr> <td>Mailing Address:</td> <td colspan="3">9226 West National Ave. West Allis, WI, 53227</td> </tr> <tr> <td>Telephone:</td> <td>414-254-6010</td> <td>E-mail:</td> <td>john.klein@aurora.org</td> </tr> <tr> <td>Sponsor or funding source (Identify all source(s) of funding for the project):</td> <td>Bradley University</td> <td>Is this project federally funded?</td> <td>No</td> </tr> </table>		Project Title: <i>Increasing Hand Hygiene Compliance Among RNs and CNAs Caring for Clostridium difficile Infected Patients on a Medical Surgical Unit Through Education</i>				Requestor (including degrees):	John Klein RN	Department/Organization:	ASLMC 3EF and 3CD	Mailing Address:	9226 West National Ave. West Allis, WI, 53227			Telephone:	414-254-6010	E-mail:	john.klein@aurora.org	Sponsor or funding source (Identify all source(s) of funding for the project):	Bradley University	Is this project federally funded?	No
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Sponsor or funding source (Identify all source(s) of funding for the project):	Bradley University	Is this project federally funded?	No																		
SECTION II: STUDY INFORMATION																					
<ol style="list-style-type: none"> 1. Will an Aurora caregiver/employee be surveyed as a participant in the conduct of the project? No If YES send this completed form and any associated surveys/questionnaires to research.preauthorization@aurora.org. 2. Is the project designed to contribute to generalizable knowledge, which means the results of the activity are expected to: (a) supplement an established body of knowledge or information; (b) be distributed in order to influence behavior, practice, theory or future research design; (c) be applied beyond the subject population or site of data collection to other settings; (d) be replicated in other settings; or (e) inform public policy. Yes NO 3. Describe the reasons for conducting the proposed project: This is a DNP Project through Bradley University. This project hopes to gain a higher compliance rate with hand washing prior to leaving a C. diff isolation room, per hospital isolation protocol. 4. Provide a brief synopsis of the project, including objective(s): The project is three fold. <div style="margin-left: 20px;"> <p>First, I plan on collecting data on hand washing practices of CNAs and RNs as they leave a patient room that is under Contact and Special Precautions Isolation due to C. diff. My objective in this is to establish a baseline of hand washing compliance rate as stated in the isolation protocol. I have attached a copy of my audit tool that I will use to collect the data.</p> <p>Second, I plan on offering an educational offering regarding C. diff and hand hygiene. This education will be provided to the CNAs and RNs on 3CD and 3EF during their time at work. The education will be created after my initial data collection.</p> <p>Third, I plan on re-observing the nursing staff if they wash their hands after leaving a C. diff room to see if the educational offering increased compliance with hand washing.</p> </div> 5. Describe the proposed methods and procedures; include details about whether/how the data/specimens will be identified or coded: 																					
v.1/23/19	Aurora Health Care Research Subject Protection Program/IRB Office tel 414.219.7744 / e-mail: IRB.office@aurora.org www.aurora.org/irb																				

Appendix I (Continued)

Human Subject Research Determination Form

The method of this project is to collect observational data through direct observation, record and analysis the data to identify if education regarding C. diff plays a role on hand hygiene compliance.

6. Describe the subject population/type of data/specimens to be studied. Indicate whether the data/specimens will be identifiable, entirely de-identified or whether the data/specimens will be linked by any code or identifiers (e.g., name, medical record number, date of birth, zip code, etc.):

Name and title of the caregiver will be recorded. This project will focus on CNAs and RNs that work on the unit being studied. Any other caregiver that enters the patient room will not be recorded or part of the research. As stated above, I have attached the audit tool that I will use to record data.

- By checking this box and submitting this document electronically, you are attesting that the above information is representative of the proposed activities and that you will notify the Aurora RSPP of any significant changes that may affect the Aurora RSPP determinations. The Aurora RSPP acknowledges this and accepts it in lieu of your actual signature.

Appendix I (Continued)

Human Subject Research Determination Form

SECTION III: AURORA IRB DETERMINATIONS FOR IRB OFFICE USE ONLY

1. Is the activity RESEARCH?
 Does the activity meet the definition of a **Systematic Investigation**, as defined by Aurora system policy 811?
 YES / NO
 Is the primary purpose of the systemic investigation to contribute to **Generalizable Knowledge**, as defined by Aurora system policy 811?
 YES / NO

2. Does the activity involve HUMAN SUBJECTS?
 Does the activity include a living individual(s), their data/information, and/or their specimen? YES / NO
 IF YES to the above and one of the following is YES, this project involves Human Subjects.
 Does the investigator obtain information or biospecimens through Intervention or Interaction¹ with the individual, and uses, studies or analyzes the information or biospecimens (e.g. prospective data collection, interviews, surveys, physical procedures, manipulations of the subject's environment, private or limited access internet sites, or any other direct contact or communication with an individual)?
 YES / NO *education*

Does the investigator obtain, uses, studies, analyzes, or generate Identifiable Private Information or Identifiable Biospecimens (e.g. chart reviews, lab studies on existing tissues or specimens, information from data or tissue repository) (if coded and investigator has access to the code, then response should be YES)? YES / NO

Is the individual a recipient of an article being tested or as a control? YES / NO *not FTI identifiable s. of caregivers*

The proposed activity, as described, **DOES NOT** constitute Human Subjects Research. Submission of an Aurora IRB research application is not required.

The proposed activity, as described, **DOES** constitute Human Subjects Research. Submission of an Aurora IRB research application IS REQUIRED. Aurora IRB approval must be obtained before the investigator begins their research.

Brooke M. Meehan

 Aurora IRB Chair or designee

2/21/19

 Date

¹ For research conducted or funded by the Department of Defense (DOD): When there is an intervention or interaction with a living individual for the primary purpose of obtaining data regarding the effect of the intervention or interaction the data are considered to be about the living individual

Human Subject Research Determination Page 3 of 3

Appendix J

Budget

	Budgeted	Actual Cost
Pre-intervention data collection	\$0.00	\$0.00
Post-intervention data collection	\$0.00	\$0.00
In-service educational offering	\$0.00	\$0.00
Paper and ink for educational handout	\$20.00	\$16.78
Black light and Germ glow	\$20.00	\$19.21
Total	\$40.00	\$35.99

Appendix K

Pre-Intervention Data

Date	Room #	Shift	RN or CNA	Diagnosis or Rule Out	Hand Washing Performed?
6/29/19	C3103	PM	RN	Diagnosis	Yes
6/29/19	C3103	PM	CNA	Diagnosis	Yes
6/29/19	C3103	PM	CNA	Diagnosis	No
6/29/19	C3103	PM	RN	Diagnosis	Yes
6/29/19	C3103	PM	CNA	Diagnosis	Yes
6/29/19	C3103	PM	CNA	Diagnosis	Yes
6/29/19	C3103	PM	CNA	Diagnosis	Yes
6/29/19	C3103	PM	RN	Diagnosis	Yes
6/29/19	C3103	PM	CNA	Diagnosis	Yes
6/29/19	C3103	PM	CNA	Diagnosis	Yes
6/30/19	D3119	AM	RN	Diagnosis	Yes
6/30/19	D3119	AM	CNA	Diagnosis	Yes
6/30/19	D3119	AM	CNA	Diagnosis	Yes
6/30/19	D3119	AM	RN	Diagnosis	Yes
6/30/19	D3119	AM	RN	Diagnosis	Yes
6/30/19	D3119	AM	RN	Diagnosis	Yes
6/30/19	D3119	AM	CNA	Diagnosis	Yes
6/30/19	D3119	AM	CNA	Diagnosis	Yes
6/30/19	D3119	AM	RN	Diagnosis	No
6/30/19	D3119	AM	CNA	Diagnosis	Yes
6/30/19	D3119	AM	CNA	Diagnosis	No
6/30/19	D3119	AM	RN	Diagnosis	Yes
6/30/19	D3119	AM	CNA	Diagnosis	No
6/30/19	D3119	AM	CNA	Diagnosis	No
6/30/19	D3119	AM	CNA	Diagnosis	Yes
7/1/19	D3119	PM	CNA	Diagnosis	No
7/1/19	D3119	PM	CNA	Diagnosis	No
7/1/19	D3119	PM	RN	Diagnosis	Yes
7/1/19	D3119	PM	CNA	Diagnosis	Yes
7/1/19	D3119	PM	CNA	Diagnosis	Yes

Appendix K (Continued)

Pre-Intervention Data

7/1/19	D3119	PM	RN	Diagnosis	Yes
7/1/19	D3119	PM	RN	Diagnosis	No
7/1/19	D3119	PM	CNA	Diagnosis	Yes
7/1/19	D3119	PM	RN	Diagnosis	No
7/1/19	D3119	PM	RN	Diagnosis	Yes
7/1/19	D3119	PM	CNA	Diagnosis	Yes
7/26/19	C3103	AM	CNA	Diagnosis	No
7/26/19	C3103	AM	CNA	Diagnosis	No
7/26/19	C3103	AM	RN	Diagnosis	Yes
7/26/19	C3103	AM	CNA	Diagnosis	No
7/26/19	C3103	AM	CNA	Diagnosis	No
7/26/19	C3103	AM	RN	Diagnosis	Yes
7/26/19	C3103	AM	CNA	Diagnosis	Yes
7/26/19	C3103	AM	CNA	Diagnosis	Yes
7/26/19	C3103	AM	RN	Diagnosis	Yes
7/26/19	C3103	AM	RN	Diagnosis	No
7/26/19	C3103	AM	RN	Diagnosis	Yes
7/26/19	C3103	AM	CNA	Diagnosis	Yes
7/27/19	C3103	AM	RN	Diagnosis	Yes
7/27/19	C3103	AM	RN	Diagnosis	Yes
7/27/19	C3103	AM	CNA	Diagnosis	No
7/27/19	C3103	AM	CNA	Diagnosis	Yes
7/27/19	C3103	AM	CNA	Diagnosis	Yes
7/27/19	C3103	AM	RN	Diagnosis	Yes
7/27/19	C3103	AM	CNA	Diagnosis	No
7/27/19	C3103	AM	RN	Diagnosis	Yes
7/27/19	C3103	AM	RN	Diagnosis	Yes
7/27/19	C3103	PM	RN	Diagnosis	Yes
7/27/19	C3103	PM	RN	Diagnosis	Yes
7/27/19	C3103	PM	CNA	Diagnosis	Yes
7/27/19	C3103	PM	CNA	Diagnosis	No
7/28/19	C3103	PM	RN	Diagnosis	Yes
7/28/19	C3103	PM	CNA	Diagnosis	No

Appendix K (Continued)

Pre-Intervention Data

7/28/19	C3103	PM	CNA	Diagnosis	No
7/28/19	C3103	PM	RN	Diagnosis	Yes
7/28/19	C3103	PM	CNA	Diagnosis	No
7/28/19	C3103	PM	CNA	Diagnosis	Yes
7/28/19	C3103	PM	RN	Diagnosis	Yes
7/28/19	C3103	PM	RN	Diagnosis	Yes
7/28/19	C3103	PM	CNA	Diagnosis	Yes
7/28/19	C3103	PM	RN	Diagnosis	No
8/3/19	C3107	PM	RN	Rule Out	Yes
8/3/19	C3107	PM	RN	Rule Out	Yes
8/3/19	C3107	PM	CNA	Rule Out	No
8/3/19	C3107	PM	RN	Rule Out	Yes
8/3/19	C3107	PM	CNA	Rule Out	No
8/3/19	C3107	PM	CNA	Rule Out	Yes
8/3/19	C3107	PM	CNA	Rule Out	Yes
8/3/19	C3107	PM	RN	Rule Out	Yes
8/3/19	C3107	PM	CNA	Rule Out	Yes
8/3/19	C3107	PM	RN	Rule Out	Yes
8/3/19	C3107	PM	CNA	Rule Out	Yes
8/3/19	C3107	PM	RN	Rule Out	Yes
8/4/19	C3107	AM	CNA	Diagnosis	Yes
8/4/19	C3107	AM	CNA	Diagnosis	Yes
8/4/19	C3107	AM	RN	Diagnosis	No
8/4/19	C3107	AM	CNA	Diagnosis	No
8/4/19	C3107	AM	CNA	Diagnosis	Yes
8/4/19	C3107	AM	RN	Diagnosis	Yes
8/4/19	C3107	AM	RN	Diagnosis	No
8/4/19	C3107	AM	CNA	Diagnosis	Yes
8/4/19	C3107	AM	RN	Diagnosis	Yes
8/4/19	C3107	AM	CNA	Diagnosis	No
8/4/19	C3107	AM	RN	Diagnosis	Yes
8/4/19	C3107	AM	RN	Diagnosis	No
8/5/19	E3233	Night	CNA	Diagnosis	Yes
8/5/19	E3233	Night	CNA	Diagnosis	Yes
8/5/19	E3233	Night	RN	Diagnosis	Yes

Appendix K (Continued)

Pre-Intervention Data

8/5/19	E3233	Night	CNA	Diagnosis	Yes
8/5/19	E3233	Night	RN	Diagnosis	Yes
8/5/19	E3233	Night	CNA	Diagnosis	Yes
8/5/19	E3233	Night	CNA	Diagnosis	No
8/5/19	E3233	Night	RN	Diagnosis	Yes

Appendix L

Post-Intervention Data Collection

Date	Room #	Shift	RN or CNA	Diagnosis or Rule Out	Hand Washing Performed?
9/15/19	D3117	AM	RN	Rule Out	Yes
9/15/19	D3117	AM	RN	Rule Out	Yes
9/15/19	D3117	AM	CNA	Rule Out	Yes
9/15/19	D3117	AM	CNA	Rule Out	Yes
9/15/19	D3117	AM	RN	Rule Out	Yes
9/15/19	D3117	AM	RN	Rule Out	No
9/15/19	D3117	AM	CNA	Rule Out	Yes
9/15/19	D3117	AM	RN	Rule Out	Yes
9/15/19	D3117	AM	CNA	Rule Out	Yes
9/15/19	D3117	AM	RN	Rule Out	Yes
9/15/19	D3117	AM	RN	Rule Out	No
9/15/19	D3117	AM	CNA	Rule Out	Yes
9/15/19	D3117	AM	CNA	Rule Out	Yes
9/15/19	D3117	AM	RN	Rule Out	Yes
9/16/19	C3111	AM	RN	Diagnosis	Yes
9/16/19	C3111	AM	RN	Diagnosis	Yes
9/16/19	C3111	AM	CNA	Diagnosis	No
9/16/19	C3111	AM	CNA	Diagnosis	Yes
9/16/19	C3111	AM	RN	Diagnosis	Yes
9/16/19	C3111	AM	CNA	Diagnosis	Yes
9/16/19	C3111	AM	CNA	Diagnosis	Yes
9/16/19	C3111	AM	CNA	Diagnosis	No
9/16/19	C3111	AM	RN	Diagnosis	No
9/16/19	C3111	AM	RN	Diagnosis	No
9/16/19	C3111	AM	CNA	Diagnosis	Yes
9/17/19	C3111	PM	RN	Diagnosis	Yes
9/17/19	C3111	PM	CNA	Diagnosis	Yes
9/17/19	C3111	PM	RN	Diagnosis	Yes
9/17/19	C3111	PM	CNA	Diagnosis	Yes

Appendix L (Continued)

Post-Intervention Data Collection

9/17/19	C3111	PM	CNA	Diagnosis	Yes
9/17/19	C3111	PM	RN	Diagnosis	Yes
9/17/19	C3111	PM	CNA	Diagnosis	No
9/17/19	C3111	PM	CNA	Diagnosis	No
9/20/19	F3253	PM	RN	Rule Out	Yes
9/20/19	F3253	PM	CNA	Rule Out	Yes
9/20/19	F3253	PM	CNA	Rule Out	No
9/20/19	F3253	PM	RN	Rule Out	Yes
9/20/19	F3253	PM	RN	Rule Out	Yes
9/20/19	F3253	PM	CNA	Rule Out	Yes
9/20/19	F3253	PM	RN	Rule Out	Yes
9/20/19	F3253	PM	RN	Rule Out	Yes
9/20/19	F3253	PM	RN	Rule Out	No
9/20/19	F3253	PM	CNA	Rule Out	No
9/20/19	F3253	PM	RN	Rule Out	Yes
9/20/19	F3257	PM	RN	Diagnosis	Yes
9/20/19	F3257	PM	CNA	Diagnosis	Yes
9/20/19	F3257	PM	CNA	Diagnosis	Yes
9/20/19	F3257	PM	CNA	Diagnosis	Yes
9/20/19	F3257	PM	RN	Diagnosis	Yes
9/20/19	F3257	PM	RN	Diagnosis	No
9/20/19	F3257	PM	CNA	Diagnosis	Yes
9/20/19	F3257	PM	RN	Diagnosis	Yes
9/20/19	F3257	PM	CNA	Diagnosis	Yes
9/20/19	F3257	PM	RN	Diagnosis	Yes
9/20/19	F3257	PM	RN	Diagnosis	No
9/20/19	F3257	PM	CNA	Diagnosis	Yes
9/20/19	F3257	PM	CNA	Diagnosis	Yes
9/22/19	C3101	Night	RN	Diagnosis	Yes
9/22/19	C3101	Night	CNA	Diagnosis	Yes
9/22/19	C3101	Night	RN	Diagnosis	No
9/22/19	C3101	Night	RN	Diagnosis	Yes
9/22/19	C3101	Night	CNA	Diagnosis	Yes

Appendix L (Continued)

Post-Intervention Data Collection

9/22/19	C3101	Night	CNA	Diagnosis	Yes
9/22/19	C3101	Night	CNA	Diagnosis	No
9/22/19	C3101	Night	RN	Diagnosis	Yes
9/22/19	C3101	Night	CNA	Diagnosis	Yes
9/24/19	D3114	AM	RN	Diagnosis	Yes
9/24/19	D3114	AM	CNA	Diagnosis	Yes
9/24/19	D3114	AM	CNA	Diagnosis	No
9/24/19	D3114	AM	CNA	Diagnosis	Yes
9/24/19	D3114	AM	CNA	Diagnosis	Yes
9/24/19	D3114	AM	RN	Diagnosis	Yes
9/24/19	D3114	AM	CNA	Diagnosis	Yes
9/24/19	D3114	AM	CNA	Diagnosis	Yes
9/24/19	D3114	AM	RN	Diagnosis	No
9/24/19	D3114	AM	RN	Diagnosis	Yes
9/24/19	D3114	AM	CNA	Diagnosis	No
9/24/19	D3114	AM	CNA	Diagnosis	Yes
9/24/19	D3121	AM	RN	Diagnosis	Yes
9/24/19	D3121	AM	RN	Diagnosis	Yes
9/24/19	D3121	AM	CNA	Diagnosis	Yes
9/24/19	D3121	AM	RN	Diagnosis	Yes
9/24/19	D3121	AM	CNA	Diagnosis	Yes
9/24/19	D3121	AM	RN	Diagnosis	Yes
9/24/19	D3121	AM	CNA	Diagnosis	Yes
9/24/19	D3121	AM	CNA	Diagnosis	Yes
9/24/19	D3121	AM	CNA	Diagnosis	Yes
9/24/19	D3121	AM	RN	Diagnosis	No
9/24/19	D3121	AM	CNA	Diagnosis	No
9/24/19	D3121	AM	CNA	Diagnosis	Yes
9/24/19	D3121	AM	CNA	Diagnosis	No