Fall 9-28-2018

A Quality Improvement Project to Increase Hand Hygiene Opportunities for Anesthesia Providers

Brad Margherio

A QUALITY IMPROVEMENT PROJECT TO INCREASE HAND HYGIENE OPPORTUNITIES FOR ANESTHESIA PROVIDERS

by

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A Doctoral Project
Submitted to the Graduate School,
the College of Nursing and Health Professions
and the School of Leadership and Advanced Nursing Practice
at The University of Southern Mississippi
in Partial Fulfillment of the Requirements
for the Degree of Doctor of Nursing Practice

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December 2018

Published by the Graduate School

THE UNIVERSITY OF SOUTHERN MISSISSIPPI®

ABSTRACT

Hand hygiene is considered to be the far more superior method for preventing the spread of bacteria from a patient care provider to the patient (Allegranzi & Pittet, 2009; Rowlands et al., 2014; Tartari & Mamo, 2011). The addition of easily accessible hand hygiene devices to the anesthesia carts in the operating room may help to improve the opportunities for the anesthesia providers to perform hand hygiene. Hand sanitizer devices were placed on each of the eight anesthesia carts located in the surgery department of a rural hospital in south Mississippi. The devices were measured weekly for a two-week period of time, in order to determine if they were being utilized by the anesthesia providers. The final measurement was subtracted from the initial starting measurement to determine if they anesthesia providers were utilizing the devices. All eight of the hand sanitizer devices showed a decrease in the remaining contents. Email surveys were sent to the anesthesia providers to obtain feedback on this project. The anesthesia providers agreed that the hand sanitizer devices were able to improve the opportunities for them to perform hand hygiene.

ACKNOWLEDGMENTS

I would like to thank Dr. Marjorie Geisz-Everson for her guidance and motivation throughout this doctoral project. She provided encouragement and positive feedback throughout this project. I would have not been able to complete this project without her help. I would like to thank Dr. Mary Jane Collins for help with research and positive feedback on this project. Lastly, I would like to thank the CRNA who helped with the implementation of this project. She went above and beyond to ensure that this project was a success.

DEDICATION

I would like to thank my Lord and Savior for opening every door possible to put me in this position. I would not be here today if it were not for him. I would like to give a special thanks to my family. To my wife, I will never be able to repay you for all of the sacrifices you have made over the past 3 years. We have been through a lot together and you continue to impress me with your strength, love, and patience. To my children, I am very proud to be your father. You three are the reason why I started this journey, and I could not have finished it without you all.

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LIST OF ABBREVIATIONS

AACN	American Association of Colleges of Nursing
AANA	American Association of Nurse Anesthetist
ASC	Ambulatory Surgical Center
CAUTI	Catheter Associated Urinary Tract Infection
CDC	Center for Disease Control
CLABSI	Central Line Associated Blood Stream Infections
CRNA	Certified Registered Nurse Anesthetist
CDI	Clostridium Difficile
HAIs	Hospital Associated Infections
SSI	Surgical Site Infection
VAP	Ventilator-Associated Pneumonia
WHO	World Health Organization

CHAPTER I -INTRODUCTION

Problem Description

Nearly 1.7-2 million patients will acquire some form of hospital-associated infections (HAIs) yearly while in the hospital (CDC, 2016; Davis, Kao, Fleming, & Aloia, 2017). The five major hospital-associated infections with the greatest impact on the health care system are surgical site infections (SSI), central line-associated bloodstream infections (CLABSI), catheter-associated urinary tract infections (CAUTI), ventilator-associated pneumonia (VAP), and clostridium difficile (CDI). Approximately 90,000 patients will die as a result of these infections (Prielipp & Birnbach, 2018). The annual estimated cost for the 5 major hospital-associated infections is around $9.8 billion dollars (Zimlichman et al., 2013). As an anesthesia provider in the clinical setting, it became apparent there was a lack of adequately located resources for hand hygiene opportunities. This clinical site had hand sanitizer devices located near the doorways but not within reach of the anesthesia provider. The anesthesia provider's role in patient care requires the provider to take a position at the head of the bed, in order to manage the patient's airway during a surgical case. The anesthesia machine, drug cart, and the basic vital sign monitoring equipment are some of the devices located at the head of the bed that the anesthesia provider must utilize while providing anesthesia during a surgical procedure. Leaving the head of the bed in order to perform hand hygiene could potentially lead to the occurrence of a negative outcome and have a detrimental impact on the health and safety of the patient. A disconnection in the breathing circuit, the endotracheal tube being dislodged, or the development of a life threating cardiac arrhythmia are examples of situations that could arise easily while the anesthesia provider

is away from the head of the bed. Hand hygiene is considered to be the superior method for impeding the spread of antimicrobial resistant organisms and also minimizing healthcare-related infections (Allegranzi & Pittet, 2009; Rowlands et al., 2014; Tartari & Mamo, 2011).

One of the main concerns for the anesthetist is patient safety. Hand hygiene is a simple tool that can be utilized to help maintain patient safety. Standard IX of the American Association of Nurse Anesthetist (AANA) Standards for Nurse Anesthesia Practice requires that the certified registered nurse anesthetist (CRNA) verifies that there are infection control policies and procedures established for personnel and equipment within the practice setting (AANA, 2015). The aim of the standard is to minimize the risk of infection to the patient, CRNA, and other healthcare team members in the practice setting, by adhering to the established policies and procedures related to infection control (AANA, 2015). Anesthesia providers have many opportunities to touch contaminated surfaces and spread bacteria from patient to patient (Loftus et al., 2011). Hand hygiene is an integral part of patient safety but unfortunately, there are elements that may impede anesthesia providers from being able to sanitize their hands frequently. The positioning of hand sanitizer devices, operating room turn over time, and the frequency of contact between the anesthesia provider, contaminated surfaces, and the patient during induction and emergence of anesthesia are times that may impede proper hand sanitation (Koff et al., 2016; Munoz-Price et al., 2014b).

Improving the number of times an anesthesia provider is able to perform hand hygiene may help to decrease the spread of bacteria by the anesthesia provider. Anesthesia providers touch many surfaces that can facilitate bacteria and germ

growth while in operating room including the patient's armband, intravenous catheters, stopcocks, the adjustable pressure limiting valve, and the gas flow knobs (Biddle, 2009). Spreading bacteria is impossible to prevent if contaminated areas are not cleaned properly or the anesthesia provider is not able to perform hand hygiene during non-conventional times (Loftus et al., 2008; Munoz-Price et al., 2014a). A non-conventional time is when hand hygiene is appropriate or should be performed but because of the situation, the provider is unable to perform hand hygiene at that specific time. Two examples of non-conventional hand washing times include directly after endotracheal tube intubation or directly after removal of the endotracheal tube. In these two instances, the anesthesia provider's main focus is on the patient's airway and their safety, so leaving the head of the bed to perform hand hygiene could be detrimental to the patient's safety. Constant contact with contaminated surfaces requires anesthesia providers to clean their hands often while in a case. Providing a hand hygiene dispenser on the anesthesia supply cart may create more opportunities for the provider to perform hand hygiene while in a surgical case. Two smaller studies showed that decreasing the distance of the hand sanitizer devices from the anesthesia providers improves the hourly frequency the provider will perform hand hygiene (Loftus et al., 2008; Munoz-Price et al., 2014a).

Available Knowledge

The evidence used for this project was found using searches from peer-reviewed journal articles using multiple databases. The databases searched were EBSCO host, CINAHL with full text, MEDLINE, PUBMED, Google Scholar, and Cochrane Database of Systematic Reviews. Publications were limited to between January 1, 1995, and December 30, 2016. Key search terms for this project included: hand hygiene,

compliance, HAIs, nursing, anesthesia, infection control, financial impact, and surgery. Originally the search produced 303 articles. After narrowing down the articles by removing duplicates and articles that did not pertain to this project there were 13 articles of substance. The knowledge and perception of hand hygiene was a recurring theme in some of the articles. Hand hygiene compliance and barriers related to compliance was another important issue in the articles. The cost associated with infection and patient health outcomes were also topics of interest for this project. Due to the limited number of research articles related to anesthesia and hand hygiene, the majority of information used for this project were taken from 10 of the 13 articles. Organizational websites were also utilized to obtain important information to support this project.

Many organizations have created hand hygiene policies and guidelines. The American Association of Nurse Anesthetist (AANA, 2015) position statement on infection control, states that hands should be washed before and after patient contact and after removing gloves. The World Health Organization (WHO) (2006) started the "my five moments for hand hygiene initiative." The objective of this initiative was to identify, monitor, and track the key times when healthcare professionals should perform hand hygiene (Sax et al., 2007). The WHO identifies the key opportunities for hand hygiene as 1) prior to contact with a patient, 2) prior to performing a clean or an aseptic procedure, 3) after exposure to body fluid, 4) after contact with a patient, and 5) after contact with a patient's surroundings (Sax et al., 2007). On many occasions, there are missed opportunities for hand hygiene, that make being compliant difficult for the anesthesia provider (AANA, 2015). Missed opportunities for hand hygiene often occur after patient contact and contact with the anesthesia equipment. During induction of anesthesia,

Munoz-Price et al. (2014b) found the anesthesia providers had the most contact with environmental surfaces and the patient. Their study focused on the number of occurrences and missed opportunities anesthesia providers performed hand hygiene per hour. Anesthesia providers were only performing hand hygiene about one additional time more during the induction period in comparison to the maintenance phase of anesthesia when there is less contact with environmental surfaces and the patient (Munoz-Price, 2014b).

Multiple studies have been conducted related to hand hygiene over the years. A meta-analysis that examined 20 different studies on hand hygiene focused on identifying compliance issues and interventions for the purpose of improving hand hygiene and HAIs (Allegranzi & Pittet, 2009). Most of the studies showed an increase in compliance with hand hygiene when alcohol-based hand sanitizers were added to work areas and educational programs based on the WHOs guidelines for hand hygiene were utilized (Allegranzi & Pittet, 2009).

HAIs are responsible for an increase in mortality and morbidity, increased length of hospital stay, and an increase in spending for the cost associated with the treatment of the infection (Davis et al., 2017). Nearly one out of every 25 hospitalized patients or around 1.7–2 million hospitalized patients will develop some form of hospital-associated infections yearly (CDC, 2016; Davis et al., 2017). HAIs, contribute to roughly 90,000 deaths a year in the United States (Prielipp & Birnbach, 2018). The CDC (2016) reports the number of deaths related to HAIs per year is 99,000.

Research indicates that 14% to 16% of all HAIs are attributed to surgical site infections (SSI), resulting in 1 million extra days of hospitalization for patients with the

associated costs exceeding $1.6 billion (Owens & Stoessel, 2008). Scott (2009) reported that in 1992, the average number of HAIs for every 100 patients admitted to the hospital was around 4.5. In 2016, 1 out of every 25 acute care hospitalized patients developed a HAI (Schmier, Hulme-Lowe, & Semenova, 2016). The cost associated with HAIs in 1992 was estimated to be $4.5 billion, which correlates after adjusting for inflation to $6.65 billion in 2007 (Scott, 2009). However, the reported annual cost associated with the 5 major HAIs in 2016 was $4.24 billion (Schmier et al., 2016).

Zimlichman et al. (2013) conducted a meta-analysis related to the cost associated with HAIs. The estimated annual cost in 2013 for the combined 5 major hospital-associated infections was around $9.8 billion (Zimlichman et al., 2013). Zimlichman et al. (2013) estimated that the cost for a central line-associated bloodstream infection (CLABSI) is approximately $45,000 per case and the cost for SSIs is around $20,700 per case. They illustrate not only the rising cost associated with HAIs but also an increase in the number of patients who will develop an HAI while in the hospital.

The hand sanitizer dispenser devices range in size and price. The cost may range anywhere from two to eight dollars per device. The price will be on the higher end with larger devices and using a more popular brand. The benefits of preventing the spread of bacteria and the potential for a reduction in HAIs out weights the cost of the devices.

Rationale

The theoretical framework that will be used for this project will be a logic model. A logic model was used to facilitate in 1) planning, 2) implementing, 3) evaluating, and 4) communicating in a more effective manner (Taylor-Powell & Hernert, 2008). Logic models consist of three basic components: input, output, and outcomes (Taylor-Powell &

Hernert, 2008). The logic model is focused on the evaluation of the outcomes as opposed to just simple activities (Zaccagnini & White, 2017). A logic model is an optimal theoretical framework for this project because it lays out the desired path that the project must go through in order to reach the defined outcomes. The logic model used for this project is in Appendix B.

Specific Aim

The purpose of this collaborative quality improvement project was to determine if anesthesia providers would utilize easily accessible hand hygiene dispenser if they were placed on the anesthesia carts in the operating room. If the anesthesia providers used the devices, then there might be a decrease in the number of missed opportunities for them to perform hand hygiene. Increasing the number of hand hygiene opportunities might also decrease the spread of bacteria by the provider and may also reduce the risk of HAIs.

Summary

HAIs have proven to place a burden on resources needed for quality health care. Hand hygiene is a method that is considered to be the best way to decrease the spread of bacteria (Allegranzi & Pittet, 2009; Rowlands et al., 2014; Tartari & Mamo, 2011). This quality improvement project was performed to determine if anesthesia providers would utilize hand sanitizer devices if they are easily accessible. Placing hand sanitizer devices on the anesthesia machines will not only increase the opportunities the anesthesia providers have to perform hand hygiene, but the placement of hand sanitizer devices may also decrease the spread of bacteria from the provider to the patient.

CHAPTER II – METHODS

Context

The specific team involved in this project included the anesthesia staff at a rural hospital in Mississippi. The hospital was a 165-bed hospital that offers inpatient and outpatient surgical services for adult, geriatric, and pediatric patients. The staff for this project included the Certified Registered Nurse Anesthetists (CRNA) in this location. The CRNAs are the primary providers of anesthesia at this location. This project was approved by the lead CRNA and the director of surgical services at this location.

Because the anesthesia providers are part of the team during a surgical case, surgery site infection (SSIs) rates at this hospital had to be taken into account. Central line-associated bloodstream infections (CLABSI) are also relevant to anesthesia providers because the providers are often tasked to place these lines during complex surgical cases. According to Hospital Compare (2018), the hospital used for this project reported no significant difference from the national average in both SSIs and CLABSI. When compared to other hospitals in Mississippi, the hospital had a slightly higher incidence of CLABSI but had a lower incidence of SSIs than other hospitals in the state.

Intervention

The intervention process was started after IRB approval was granted by the university. Information was provided that identified times that hand hygiene should be performed by the anesthesia provider. Alcohol-based hand sanitizer devices were placed on the anesthesia supply carts in each of the 8 surgical suites at the implementation site.

The hand sanitizer that was placed on each cart were generic brand of 12-ounce gel hand sanitizer. The initial devices placed on the carts were labeled in accordance to

their room placement. Each device had a beginning mark placed to indicate the initial level of content in each device. One week after placement of the devices, a measurement was taken with a ruler and a new line and date were placed to mark the current level of sanitizer remaining in the device. The third and final measurement occurred on the last day of the two-week period. A two-week period of time was optimal for this project because of the large number of surgical cases being performed each week provided multiple opportunities for hand hygiene. If the anesthesia providers found the hand hygiene devices convenient and were utilizing them, the amount of content remaining in the container would be decreased. Measurements were taken and the devices were left on the carts for the anesthesia providers to continue to utilize.

After the third measurements had been taken from the dispensers the data was examined. A questionnaire was given to the anesthesia providers to evaluate the use of the hand sanitizer devices. The questionnaire asked the anesthesia providers if they felt the placement of the dispensers was beneficial for their hand hygiene practice. The questionnaire was emailed to the participants is located in Appendix C.

Study of Intervention and Measures

The hand sanitizer devices that were placed on the anesthesia carts were labeled and dated at the beginning of the intervention period. At the end of the intervention, a final measurement of the remaining contents of the hand sanitizer dispensers was taken. By comparing the individual contents and the measurements of each dispenser, a noticeable reduction in the contents from the original starting measurement was observed. The amount of alcohol gel in the dispenser at the end of the implementation phase had a direct correlation with the dispensers being utilized by the anesthesia providers.

Analysis

Descriptive statistical analysis and frequencies were utilized for this project in order to translate the final results. The data collection tool that was used for this project is located in Appendix E. Each hand sanitizer device was calculated independently from the others. The actual usage of each device was calculated by subtracting the final measurement from the initial measurement. Reduction of contents in each of the devices correlated with a use of the devices by the anesthesia providers.

Ethical Considerations

The anesthesia providers and their hand hygiene practice were the primary focus of this project. No human patients were being observed or involved in this project. No harm occurred to the anesthesia providers in this project.

Summary

Anesthesia providers have an obligation to ensure the safety of their patients. One method of ensuring safety is by performing hand hygiene in order to reduce bacterial spread. Easily accessible hand hygiene devices were placed on anesthesia carts in order to increase the opportunities anesthesia providers have to perform hand hygiene during a surgical case. The devices were measured periodically to determine if the providers would be willing to utilize the devices.

CHAPTER III - RESULTS

Results

The data collection part of this project started by measuring each alcohol-based hand sanitizer device with a ruler. In order to maintain consistency with each device, all eight devices were measured to a 4 and ½ inch mark on the neck of the devices. Some devices had content removed while others had content added so that all of the devices would have the same starting point of 4 and ½ inches. At the end of the first week, the devices were measured with the same ruler and another line was made to indicate the new level. All of the devices except the device in the Ambulatory Surgical Center (ASC) Cystoscopy room had content missing when the devices were measured. The results are shown in Table 1.

Table 1

Initial Measurements

Location	Staring amount	Week 1	Remaining
OR 1 anesthesia cart	4.50 inches	-0.25 inches	4.25 inches
OR 2 anesthesia cart	4.50 inches	-1.00 inches	3.50 inches
OR 3 anesthesia cart	4.50 inches	-0.25 inches	4.25 inches
ASC 1 anesthesia cart	4.50 inches	-0.37 inches	4.13 inches
ASC 2 anesthesia cart	4.50 inches	-0.25 inches	4.25 inches
ASC 3 anesthesia cart	4.50 inches	-0.25 inches	4.25 inches
ASC Cystoscopy anesthesia cart	4.50 inches	-0.00 inches	4.50 inches
ASC 3 anesthesia cart	4.50 inches	-0.25 inches	4.25 inches

The next step of the data collection occurred one week later. The devices were once again measured to determine how much content was used. Another line was made

on each device. A measurement was taken from the initial starting point and the final measurement point. This number was subtracted from the original starting point and also from the second measurement. The measurements were performed in this order to ensure consistency in the collection process. This time OR 3 had no change in the amount of content remaining in the devices, while the remaining 7 all showed content missing. The results for this part of the data collection are located in Table 2.

Table 2

Final Measurement

Location	Staring amount	Week 2	Week 2-initial
OR 1 anesthesia cart	4.50 inches	-0.50 inches	4.00 inches
OR 2 anesthesia cart	4.50 inches	-1.00 inches	3.50 inches
OR 3 anesthesia cart	4.50 inches	-0.25 inches	4.25 inches
ASC 1 anesthesia cart	4.50 inches	-0.63 inches	3.87 inches
ASC 2 anesthesia cart	4.50 inches	-1.00 inches	3.50 inches
ASC 3 anesthesia cart	4.50 inches	-0.75 inches	3.75 inches
ASC Cystoscopy anesthesia cart	4.50 inches	-0.25 inches	4.25 inches
ASC 3 anesthesia cart	4.50 inches	-0.50 inches	4.00 inches

The post-intervention survey was sent to seven of the eight CRNAs at the clinical implementation site. Of the seven surveys sent out to the anesthesia providers via email, five responded to the survey. The survey consisted of three questions that were set up in a

yes or no format. There was a fourth question that allowed the anesthesia providers to offer any feedback on the project. The survey is located in Appendix C.

All five (100%) of the anesthesia providers responded that the hand sanitizer devices were easily accessible on the anesthesia carts. All anesthesia providers indicated that they used the hand sanitizer devices. Finally, all five anesthesia providers agreed that the placement of hand sanitizer devices allowed for the providers to perform hand hygiene on a more frequent basis during a surgical case. No responses were given regarding how the project could be improved.

Summary

The results for this project indicate the anesthesia providers were willing to use the hand sanitizer devices. The measurements performed indicate a decrease in the content remaining in each of the hand sanitizer devices which indicates the devices were being utilized. Provider feedback from the surveys indicates the anesthesia providers felt the placement of the devices on the anesthesia carts improved the opportunity for hand hygiene.

CHAPTER IV – DISCUSSION

Summary

Anesthesia providers were willing to use hand sanitizer devices if they were in close proximity. All the devices that were used in this project had decreased content remaining in them at the end of the two-week period. Although there were variations in the remaining contents of devices, the collected data reflects an inverse relationship with the utilization of the devices themselves.

Interpretation

This quality improvement project demonstrated that the anesthesia providers who participated in this project utilized the hand sanitizer devices. The findings for this project suggest that the anesthesia providers found the devices to be easily accessible. The feedback from the anesthesia providers on the survey also suggests that the anesthesia providers found they were able to perform hand hygiene more frequently during a surgical case. The information also suggests that the anesthesia providers were utilizing the devices, because each of the devices had less content in them at the end of the two-week period.

Limitations

The main limitation of this project is non-anesthesia providers using the hand sanitizer devices. Surgeons, surgical technicians, registered nurses, and housekeepers are all involved in the daily operations in the operating room. Preventing non-anesthesia providers from using the hand sanitizer devices was a difficult task to accomplish. The devices were placed near the wall on the anesthesia carts to help minimize the use of the devices by non-anesthesia providers.

Another limitation included participation and feedback from the anesthesia providers. The providers were instructed that this project was voluntary and they did not have to participate in the post-intervention survey. For this project, there were five respondents to the survey.

The final limitation of this project was the underutilization of certain hand sanitizer dispensers. Some of the operating rooms were used more often than other rooms. This results in some of the devices not being utilized and having more contents remaining in the devices. The time of the year that this project was implemented had a reduced number of surgical cases when compared to other times. This lack of surgical cases could potentially have an impact on the amount of hand sanitizer that was used throughout the two-week data collection period.

Conclusion

Research has shown over the years that proper and frequent hand hygiene helps to reduce the spread of bacteria. Although there have been vast improvements in the healthcare community with hand hygiene initiatives, hand hygiene continues to be a challenge for anesthesia providers. This project demonstrated that anesthesia providers were likely to perform hand hygiene on a more frequent basis if they have easy access to hand hygiene devices. This improvement in quality care not only increased the anesthesia provider's opportunities to perform hand hygiene, but it also may have helped reduce the spread of bacteria from provider to patient.

This project has a strong chance of sustainability for several reasons. The lead CRNA at this facility was enthusiastic about this project which should translate into being part daily practice. This project has shown that the anesthesia providers will utilize

hand sanitizer devices if they are available. This project may serve as a starting point for having easily accessible hand hygiene devices on anesthesia carts as a standard of practice for anesthesia at this facility.

There are many possibilities for future projects based on this DNP project. A cost-benefit analysis should be performed to determine the financial implications these devices could potentially have on a hospital or surgical centers' budgets. There should be further research into how often and at what times during a surgical case the anesthesia provider is performing hand hygiene. This research might help to determine other factors that may help to improve opportunities for hand hygiene, such as the location and proximity of devices to the provider.

APPENDIX A – Doctor of Nursing Practice Essentials

DNP ESSENTIAL	ESSENTIAL NAME	MET ESSIENTIAL BY:
Essential I	Scientific Underpinnings for Practice.	The intervention used in this project showed that anesthesia providers will use hand sanitizer if it is easily accessible to them in the operating room.
Essential II	Organizational and systems leadership for quality and systems thinking.	This project focused on the anesthesia provider and their willingness to use easily accessible hand hygiene devices if they were placed on the anesthesia work carts.
Essential III	Clinical scholarship and analytical methods for evidence-based practice	Databases were searched for evidence that supports the basis for this project. The evidence for this project included hospital-acquired infections and the negative impact they impose on both the patient and the hospital setting. Evidence also included anesthesia providers and the role they played in the spread of bacteria.
Essential IV	Information systems/technology and patient care for the improvement and transformation of healthcare.	
Essential V	Healthcare policy for advocacy in healthcare.	This doctoral project increased the opportunities for anesthesia providers to perform hand hygiene. This may help to promote a positive outcome for the patient by decreasing bacteria spread by the anesthesia provider from contaminated surfaces in the operating room. The results of this project may lead to a change in policy at the project site that could help decrease HAIs by decreasing the spread of bacteria.
Essential VI	Inter-professional collaboration for improving patient and population health outcomes.	This project utilized collaboration skills along with therapeutic communication among all the CRNAs involved in this project.
Essential VII	Clinical prevention and population health for improving the nation's health.	This project ultimately focused on improving the anesthesia providers hand hygiene practice. This may help to decrease the spread of bacteria from the provider to the patient.
Essential VIII	Advanced nursing practice.	All of the steps for this project used evidence-based practice and nursing science to help improve patient outcomes.

APPENDIX B – Logic Model

RESOURCES	**ACTIVITIES**	**OUTPUTS**	**SHORT AND LONG TERM OUTCOMES**	**IMPACT**
Gather and analyze articles on hand hygiene needs Assessment and evidence review of hand hygiene in anesthesia providers. Synthesize a plan for implementing easily accessible hand hygiene devices.	Provide handouts to anesthesia providers on hand hygiene. Place hand hygiene dispensers on anesthesia carts, which are easily accessible for the providers. Measure the contents of dispensers. Calculate the results of measurements. Post evaluation survey to assess the usefulness of the devices by the anesthesia providers.	Increase in opportunities for hand hygiene. Increase in usage of the hand hygiene dispensers. Acceptance and determine their usefulness of the hand hygiene dispensers by the anesthesia providers.	Anesthesia providers utilize the easily accessible hand hygiene dispensers. Positive feedback from the anesthesia providers on the usefulness of the hand hygiene dispensers. Dissemination of policy change and implementation at the project site. Publish in a journal article to increase awareness of project findings.	Anesthesia providers have an increase in opportunities to perform hand hygiene. AANA adoption as a standard of practice

APPENDIX C– Post Interview Questionaire

Participation in this anonymous questionnaire is voluntary. There are no repercussions for nonparticipation. Thank you for your time.

1. Were hand sanitizer devices placed on anesthesia carts easily accessible?
    a. Yes
    b. No

2. Did you utilize the hand sanitizer devices?
    a. Yes
    b. No

3. Did hand sanitizer devices allow you to perform hand hygiene more frequently while delivering anesthesia during a surgical case?
    a. Yes
    b. No

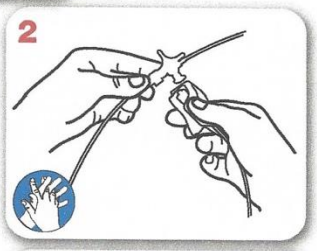
4. How could this project be improved?

APPENDIX D – Provider Handout

Your 5 moments for HAND HYGIENE

BEFORE
PATIENT CONTACT

Clean your hands before touching a patient when approaching him or her

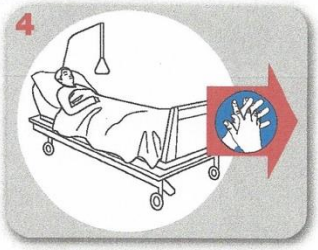


BEFORE
AN ASEPTIC TASK

Clean your hands immediately before any aseptic task

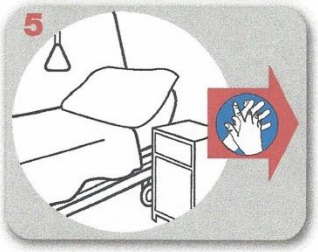
AFTER
BODY FLUID EXPOSURE RISK

Clean your hands immediately after an exposure risk to body fluids (and after glove removal)



AFTER
PATIENT CONTACT

Clean your hands after touching a patient and his or her immediate surroundings when leaving



AFTER
CONTACT WITH PATIENT SURROUNDINGS

Clean your hands after touching any object or furniture in the patient's immediate surroundings, when leaving - even without touching the patient

WHO acknowledges the Hôpitaux Universitaires de Genève (HUG), in particular the members of the Infection Control Programme, for their active participation in developing this material.

World Health Organization

October 2006, version 1.

APPENDIX E – Data Collection Tool

1. Hand sanitizer device number and date:
2. Starting measurement: Inch
3. Week one measurement: Inch
4. Week two final measurement: Inch
5. Initial measurement- week one measurement – final measurement = Inch

APPENDIX F Letter of Support

REGIONAL MEDICAL CENTER
[redacted]

To Whom It May Concern:

I have reviewed Brad Margherio's plan for his DNP project. I understand that he plans to provide information on hand hygiene to our CRNAs and then place hand sanitizer devices on the anesthesia machines. Over a two-week period of time he will be collecting information from the devices that will assess the usage of the dispensers. Once the intervention phase is complete he plans on sending a survey to gain feedback on the intervention. He also stated the survey will keep the CRNAs anonymity. He has explained that he will provide lunch during the information handout period for the anesthesia providers.

Southwest Mississippi Regional Medical Center anesthesia department supports Brad Margherio's project. We look forward to participating in the near future.

Sincerely,

[redacted]
[redacted]MNA, CRNA
Chief CRNA, [redacted]

[redacted]

APPENDIX G – IRB Approval Letter

THE UNIVERSITY OF
SOUTHERN MISSISSIPPI.

INSTITUTIONAL REVIEW BOARD
118 College Drive #5147 | Hattiesburg, MS 39406-0001
Phone: 601.266.5997 | Fax: 601.266.4377 | www.usm.edu/research/institutional.review.board

NOTICE OF COMMITTEE ACTION

The project has been reviewed by The University of Southern Mississippi Institutional Review Board in accordance with Federal Drug Administration regulations (21 CFR 26, 111), Department of Health and Human Services (45 CFR Part 46), and university guidelines to ensure adherence to the following criteria:

- The risks to subjects are minimized.
- The risks to subjects are reasonable in relation to the anticipated benefits.
- The selection of subjects is equitable.
- Informed consent is adequate and appropriately documented.
- Where appropriate, the research plan makes adequate provisions for monitoring the data collected to ensure the safety of the subjects.
- Where appropriate, there are adequate provisions to protect the privacy of subjects and to maintain the confidentiality of all data.
- Appropriate additional safeguards have been included to protect vulnerable subjects.
- Any unanticipated, serious, or continuing problems encountered regarding risks to subjects must be reported immediately, but not later than 10 days following the event. This should be reported to the IRB Office via the "Adverse Effect Report Form".
- If approved, the maximum period of approval is limited to twelve months.
  Projects that exceed this period must submit an application for renewal or continuation.

PROTOCOL NUMBER: 18072402
PROJECT TITLE: A Quality Improvement Project to Increase Hand Hygiene Opportunities for Anesthesia Providers
PROJECT TYPE: Graduate Project
RESEARCHER(S): Brad Margherio
COLLEGE/DIVISION: College of Nursing and Health Professions
DEPARTMENT: School of Leadership and Advanced Practice Nursing
FUNDING AGENCY/SPONSOR: N/A
IRB COMMITTEE ACTION: Exempt Review Approval
PERIOD OF APPROVAL: 08/07/2018 to 08/06/2019
Edward L. Goshorn, Ph.D.
Institutional Review Board

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