

Spring 5-12-2017

# Methodology to Cultivating Hand Hygiene Compliance in Healthcare Facilities

Ugo Okeke

Follow this and additional works at: [https://scholarworks.gsu.edu/iph\\_capstone](https://scholarworks.gsu.edu/iph_capstone)

---

## Recommended Citation

Okeke, Ugo, "Methodology to Cultivating Hand Hygiene Compliance in Healthcare Facilities." , Georgia State University, 2017.  
[https://scholarworks.gsu.edu/iph\\_capstone/57](https://scholarworks.gsu.edu/iph_capstone/57)

This Capstone Project is brought to you for free and open access by the School of Public Health at ScholarWorks @ Georgia State University. It has been accepted for inclusion in Public Health Capstone Projects by an authorized administrator of ScholarWorks @ Georgia State University. For more information, please contact [scholarworks@gsu.edu](mailto:scholarworks@gsu.edu).

## ABSTRACT

Methodology to Cultivating Hand Hygiene Compliance in Healthcare Facilities

By

Ugochukwu Okeke

April 2, 2017

Studies have indicated a concern for the level of hand hygiene compliance throughout hospital facilities. The disturbing levels has caused alarm on whether the lack of hand hygiene practice affects the overall healthcare provided to patients. There is also a growing concern about healthcare workers and patients potentially spreading nosocomial infections through frequent contact with patients. Evidence proves that nosocomial infections are an apparent problem that need immediate attention. Medical officials and healthcare leaders are taking steps to improve the level of hand hygiene compliance and minimizing cases of nosocomial infections by implementing initiatives aimed towards pushing the practice of hand hygiene to the forefront. All healthcare workers that come in contact with patients should view improving hand hygiene and reducing the level of noncompliance as a top priority. Approaches such as ensuring healthcare workers have easy access to hand hygiene materials and resources are a steps toward improving adherence to hand hygiene practice. Nonetheless, there are many other strategies that can contribute to the goal of increasing hand hygiene compliance and decreasing the risk factors related to cross infections. Numerous studies were conducted to measure the effectiveness of different strategies used to reduce the level of noncompliance and promote hand hygiene in

healthcare facilities. Many of the interventions conducted succeeded in its attempts to implement hand hygiene as common practice. Several of the studies took different approaches toward implementing hand hygiene practice as standard protocol when in contact with patients. Although different approaches were taken, the main objective for all of them was the same.

Methodology to Cultivating Hand Hygiene Compliance in Healthcare Facilities

by  
Ugochukwu Okeke

B.S.A, University of Georgia

A Capstone Submitted to the Graduate Faculty  
of Georgia State University in Partial Fulfillment  
of the  
Requirements for the Degree

MASTER OF PUBLIC HEALTH

ATLANTA, GEORGIA  
30303

APPROVAL PAGE

Methodology to Cultivating Hand Hygiene Compliance in Healthcare Facilities

by

Ugochukwu Okeke

Approved:

Rodney Lyn  
Committee Chair

Dennis Reddy  
Committee Member

April 2, 2016  
Date

## Author's Statement Page

In presenting this capstone as a partial fulfillment of the requirements for an advanced degree from Georgia State University, I agree that the Library of the University shall make it available and circulation in accordance with its regulations governing materials of this type. I agree that permission to quote from, to copy from, or to publish this capstone may be granted by the author or, in his/her absence, by the professor under whose direction it was written, or in his/her absence, by the Associate Dean, School of Public Health. Such quoting, copying, or publishing must be solely for scholarly purposes and will not involve potential financial gain. It is understood that any copying from or publication of this capstone which involves potential financial gain will not be allowed without written permission of the author.

Ugochukwu Okeke  
Signature of Author

## TABLE OF CONTENTS

ACKNOWLEDGMENTS .....	2
INTRODUCTION.....	3
APPROACH.....	6
<i>Personal Perspective and Experience</i> .....	6
<i>Databases</i> .....	7
REVIEW OF THE LITERATURE.....	8
<i>Review of Hospital-Acquired Infections</i> .....	9
<i>Evidence of Hospital-Acquired Infections Related to Hand Hygiene Compliance</i> .....	9
<i>Interventions to Increase Hand Hygiene Compliance &amp; Findings</i> .....	16
<i>Intervention to Increase Compliance Through Material Availability and Design</i> .....	16
<i>Intervention to Increase Compliance Through Patient/Provider Relations</i> .....	19
DISCUSSION AND RECOMMENDATIONS.....	20
<i>Interventions to Increase Hand Hygiene Compliance &amp; Findings</i> .....	21
<i>Intervention to Increase Compliance Through Material Availability and Design</i> .....	21
<i>Health Management and Policy Recommendations</i> .....	22
CONCLUSION.....	26
REFERENCES.....	27

## **Acknowledgements**

I first want to acknowledge my Lord and Savior for allowing me to reach this huge milestone in my life. I know that without Him none of this would be possible. I also would like to thank my loving and supporting family for being there with me every step of the way. They have truly given me the motivation to persevere no matter what obstacle in my way. I also would like to acknowledge my committee members for their expertise in academia and overall helpfulness in producing this capstone.



## **Introduction**

A nosocomial infection, also called hospital-acquired infection, is an infection obtained in a hospital setting or healthcare facility. In order for a patient to be diagnosed with a nosocomial infection, he or she would have to have been admitted into the facility for some other disease, with no previous signs or symptoms of a nosocomial infection. “In the United States, it has been estimated that 9.2 out of every 100 patients acquire a nosocomial infection” (Stumblefield, 2014). In a five-year evaluation conducted in more than 110 medical ICUs, 95 hospitals submitted data to a study that described the epidemiology of nosocomial infections in medical intensive units in the United States (Richards, 2002). Of the 181,993 patients included in the analysis, data showed that there were 14,177 nosocomial infections (Richards, 2002). A patient being admitted to a hospital would indicate that the patient is already ill or injured; not only does contracting nosocomial infections regress the patient’s health status, but also it can render more severe outcomes, including mortality. Typically, it is unknown whether a patient received the nosocomial infection from another patient, or from a healthcare worker. In some instances, there are inorganic objects that are touched by an infected person, which will harbor pathogen(s), and eventually compromise an already ill person. Because a hospital already contains a susceptible population, where patients’ immune systems are less capable of fighting off infections, concern and emphasis needs to be placed on minimizing nosocomial infections from spreading.

One contributor to the spread of nosocomial infections is person-to-person transmission (WHO, 2004). The World Health Organization (WHO) notes the significant role of hand contact in the transmission of hospital infections, and that transmission can be minimized with appropriate hand hygiene (WHO, 2004). With many ways of preventing such infections, WHO

also noted that enhancing staff patient care practices, and continuing staff education are preventative methods to mitigate infections. In this, WHO notes that infection control is the responsibility of all healthcare professionals—doctors, nurses, therapist, pharmacists, engineers, and others (WHO, 2004). This speaks to the problem of negligence in proper hand hygiene compliance. Hand hygiene is a widespread issue throughout the clinical setting, and is especially important given the presence of nosocomial infections.

When healthcare workers come into interaction with patients, it is essential that they do not come in with microbes or contagions that might prime to additional sicknesses. WHO has provided insight on how healthcare facilities can better improve compliance of proper hygiene. WHO also offers suggestions, such as to implement better training protocols. By offering innovations and updates to hand hygiene protocol, hospitals will create an environment less conducive to person-to-person pathogen transmission (WHO, 2004). The National Health Service (England) shows that barriers to improved compliance result from limited resources, unconscious negligence/negligence of policy, and most importantly a lack of knowledge (Azim, 2013). This capstone will bring awareness to this important problem, followed by a review of literature and identification of the best available evidence for increasing hand hygiene compliance in healthcare facilities.

Hand hygiene is one of the most effective measures for preventing infections (Azim, 2013), and is defined by several actions designed to reduce hand colonization with transient flora and can be accomplished by both disinfection or washing of the hands (Pittet, 2001). “Hand washing refers to the action of washing hands with a non-medicated detergent and water, or water alone, to remove dirt and loose transient flora in order to prevent cross-transmission” (Pittet, 2001).

The hand hygiene problem affects hospital workers and patients significantly. Agreement with hand hygiene practices differs amid regions and expert masteries, and by operational environments (Azim, 2013). Non-medical staff often notice hand hygiene practices of others, and most believe that doctors' practices are relatively poor (WHO, 2004). However, doctors and medical students notice only their senior colleagues' practices, which strongly influence their own (WHO, 2004). If workers do not wash their hands before and after entering patient rooms, there is a greater risk for patients to become infected. Patients come to receive treatment and improve their health; when hospital workers do not wash their hands, it becomes tougher to provide quality care. Hospital workers need to be aware of their actions, and how it affects patients and other healthcare professionals around them. Identifying evidence-based approaches to promoting hand hygiene in health care settings holds promise for reducing nosocomial infections. The purpose of this APA style capstone is to review the scholarly literature to identify such approaches, and make recommendations to improve hand hygiene among health care workers.

## **Approach**

### *Personal Perspective and Experience*

As part of my employment duties, I am often required to work in the hospital clinic, along with working in a laboratory. The hospital clinic is filled with hundreds of health care personnel, while the laboratory in which I spend most of my time consists of approximately 20-30 researchers. Due to the fact that I am in two departments, I get to witness both sides of protocol and procedures. With regards to compliance of hand hygiene, each department takes a different approach to how compliance is achieved, but they both seem to be successful. The hospital uses awareness of the issue, abundance of materials, and training to achieve compliance, while the laboratory uses a method of fear (by placing ample biohazard labels throughout the lab). I received training on hand hygiene at the start of my employment at the laboratory, and I have yet to be retrained about any new protocols or guidelines. More emphasis is placed on the safety of the experiment rather than the person conducting the experiment. The laboratory works with high-level biohazards, and so individuals try to protect themselves by using gloves and washing their hands.

In contrast, the hospital workers are trained on an annual basis. Each year after the start of the worker's employment, workers are retrained on safety protocols. Not only does this promote awareness, but also it refreshes the individual's memory of how to properly comply with hand hygiene protocol. The hospital also has many restrooms for hand washing, and ensures convenience by placing large number of sanitizing dispensers throughout the facility. This convenience makes it more opportune for workers, patients, and patrons to comply. Another added feature is that many of the doors give you the option of waving over a motion sensor to initiate the door being opened. This allows less contact with the door handles, which typically

harbor many pathogens that can lead to a nosocomial infection. I believe that hospitals are making positive strides in increasing hand hygiene compliance. However, the urgency of the problem of nosocomial infections suggests a need to examine the literature in order to ensure that the best practices for promoting hand hygiene in healthcare environments are identified and shared.

### *Databases*

The scholarly literature on nosocomial infections and hand hygiene was examined to identify and recommend best healthcare practices in facilities for preventing infections. This capstone will highlight effective approaches for promoting hand hygiene in the healthcare setting. These programs will be identified and summarized.

The databases used in this literature review were NCBI, EBSCO and PubMed. This capstone also used supplemental resources, such as program websites, tactical templates, and handbooks that related to hand hygiene and nosocomial infections. Keywords used during the contemporary review were *hand hygiene, approach, protocol, initiatives, healthcare, hand washing, training, hospital acquired infections, hand washing compliance, facility factors, nosocomial infections, improving adherence, person-to-person transmission, infection free surgery, MRSA, sink access, healthcare worker behavior*.

## **Literature Review**

### *Review of Hospital-Acquired Infections*

Hospital-acquired infections persist as a major problem in most neonatal intensive care units (Lam *et al*, 2004). Data from the National Nosocomial Infections Surveillance (NNIS) system analyzed the determination in epidemiology of pathogens in intensive care units for the prevalence and most frequent sorts of hospital-acquired infections, which included, surgical site infections, bloodstream infections, pneumonia, and urinary tract infections (Weinstein, Gaynes, & Edwards, 2005). The data illustrates that in NNIS hospitals, approximately 29,354 bacterial isolates were associated with the 4 common kinds of nosocomial infections listed above (Weinstein, Gaynes, & Edwards, 2005). An additional study by Jean-Louis Vincent (1995) determined the prevalence of hospital-acquired infections in an intensive care unit. A total of 2,064 patients from 17 countries in Western Europe in IC units had an infection acquired from the intensive care unit. The most frequent types of ICU infection reported were pneumonia (46.9%), lower respiratory tract infection (17.8%), urinary tract infection (17.6%), and bloodstream infection (12%) (Vincent, 1995). A national surveillance system for nosocomial infections was instituted in 2002 by the Norwegian Institute of Public Health (Eriksen., 1995). The rate of nosocomial infections in hospitals in Norway identified between 0% to 16%, varying between different hospitals and facilities (Eriksen, 1995). This statistical information raises concern, and reiterates the seriousness of hospital-acquired infections. By cultivating hand hygiene compliance in healthcare facilities, the rates of infection that are hospital acquired will decrease.

In the UK, ~5,000 hospital fatalities yearly are understood to be caused by contaminations communicated from other individuals in the hospital setting (Takahashi, 2010).

One study in Japan used a cross-sectional, correlations design to clarify hand hygiene compliance in the hospital. Assorted intervention programs, such as instructional programs for staff, have been found to escalate hand-washing observance (Takahashi, 2010). A survey for the leaders was gathered from 42 facilities (75.0%), and the replies from 41 facilities (73.2%) were valid (Takahashi, 2010). The questionnaire examined the knowledge and frequency of workers practicing proper protocol; those who were aware of the issue and complied, versus those who unintentionally were not knowledgeable or knowingly did not comply. In Takahashi's analysis, a readiness to exercise typical provisions, the application of hand-washing assessments, the hand-washing setting, and presence at forums were recognized as aspects that encourage hand washing in the care staff in aged-care capacities in Japan (Takahashi, 2010). There were two questionnaires distributed in the intervention program. They were slightly different, as one was geared toward the care staff, while the other was directed more toward facility managers. Compliance was measured using the questionnaires while the design of the experiment remained cross-sectional correlational and descriptive. The questionnaire found that 35% of nurses working in resident populations had not been educated, or taught general provisions to avoid hospital-acquired infections (Takahashi, 2010). The conclusion attributed the low level of compliance to negligence and unawareness. After interventions were implemented to strengthen awareness and train fellow workers, compliance climbed at rates higher than when no intervention was taken (Takahashi, 2010).

### *Evidence of Hospital-Acquired Infections Related to Hand Hygiene Compliance*

Hand hygiene has been singled out as the most important measure in preventing hospital-acquired infection (Lam *et al*, 2004). The importance of good hand hygiene practices in a NICU

cannot be overstated; nevertheless, many studies report that health care workers (HCWs) fail to wash their hands more than half of the recommended number of times, and in many cases, the hand-washing procedure is inadequate (Lam *et al*, 2004). Hand hygiene compliance among HCWs needs to improve (Lam *et al*, 2004). Lam *et al*, (2004) implemented an intervention in two parts: how frequently patient interaction was completed, and how applying appropriate hand hygiene might move the illness rate, with attention being placed on patient awareness. A sequence of instructional programs directed at doctors was established based on the interpretations, boundaries recognized from the initial stage of the observation study, and staff questionnaire study (Lam *et al*, 2004). The intervention lasted for a 1-year interval, in which hand washing methods, hand hygiene, and patient interaction occurrence were all observed among 667 patients (Lam *et al*, 2004). The study design was in most parts observational in order to measure compliance, with researchers directly watching surveillance cameras. The researchers found that compliance for hand hygiene improved from 40-53% before patient contact to 39-59% (Lam *et al*, 2004). Health care associated infections reduced from 11.3 to 6.2% (Lam *et al*, 2004).

One objective of the multimodal intervention by Lam *et al* (2004) was to see how often healthcare workers washed their hands, when in contact with patients (neonates). Likewise, the purpose of this study was to also monitor the compliance of healthcare workers and which prompted to regular hand hygiene audits. The general setting for this study was the NICU of Queen Mary hospital, which is a twelve bed NICU, and holds six patients per cubicle. The observation was held for about four weeks on daytime shift, and observers were given one week to familiarize themselves with the setting. A target NICU patient was chosen indiscriminately beforehand at each observation period, which lasted for 8 hours. Each personnel who came into



contact with the target patient, which included doctors, nurses, allied health (e.g., physiotherapists, occupational therapists, radiographers), and others (e.g., guests) were seen (Lam *et al*, 2004). The observers were to watch as each personnel was giving two opportunities (before and after) to comply with the hand hygiene audit. The observation was also separated into two categories: high-risk contact and low-risk contact. In the case of a selected patient, high risk contact involved touching patient files, bed alarm, and touching one's self. High risk contact calls for healthcare workers to be prompted to wash hands with soap and warm water. Low risk contact is when a healthcare worker moved from one task to the other on selected patient. A prime example would be from chest tube to urinary catheter on selected patients, and would urge low risk contact hand hygiene protocol, which included hand rubbing with antibacterial alcohol.

Although the observation went on for about a month, the intervention and training nurses and healthcare workers went on for about a year. What was learned from this study, showed that hand hygiene was inadequate, even when it was divided into high and low risk to show more distinction. Physicians in particular wash their hands significantly less frequently (50% less) than nurses (Lam *et al*, 2004). It also implies that most did not know they were being watched.

The protocols were implemented by face-to-face training and retraining demonstrations, conducted at regular intervals (Lam *et al*, 2004). The motive behind this action was not only to improve hand hygiene compliance amongst those already employed, but also for new employees. A hand hygiene procedure was assimilated as part of the orientation agenda for all novel staff, highlighting the significance and the acceptable stages of hand-washing (Lam *et al*, 2004). Following the training protocol there was a post assessment, comparing the pre assessment that was given prior to training. Staff showed a 35% increase in protocol application following the training (Lam *et al*, 2004). A computerized program SPSS was used to develop and create the

statistics. The statistics implied that there was significant improvement in the observed hand hygiene obedience after patient interaction (before: 39%; after 59%;  $P < .001$ ) (Lam *et al*, 2004). As well, MRSA diffusion rates decreased (2.16 to 0.93 episodes per 10 000 patient-days;  $p < 0.001$ ), and the utilization of alcohol-based hand rub solution improved from 3.5 to 15.4 L per 1000 patient-days (Lam *et al*, 2004). Improving hand hygiene education at consistent intervals, with new and previous employees, helped develop better habits and reduce risk for hospital-acquired infections.

Insignificant hand hygiene is the chief cause of MRSA transmission within hospitals (Davis, 2010). “However, after applying alcohol gel, 99% of transient organisms, including MRSA, are eradicated” (Davis, 2010). In an effort to decrease the incidence of patients with MRSA, hand-hygiene mindfulness has become increasingly perceptible worldwide (Davis, 2010). In a study done in the United Kingdom, compliance was evaluated via a discretely situated close-surveillance camera at the entrance of a ward hospital participating in study; recording was examined to screen compliance of all individuals incoming the ward throughout a 12-month period (Davis, 2010). Hospital personnel were made aware of how to practice hand hygiene through training sessions. Emphasis placed on alcohol gel application and staff was encouraged to use the gel as often as possible. Table 2 depicts the results of an increase in awareness and indicates that compliance increased as a result of the intervention. It should be noted that despite the increase in hand hygiene after the intervention, compliance remained a problem, with nurses the only groups scoring above 70% compliance. The statistical difference between pre versus post intervention shows that there was a 53.8%, 51.2%, 45.3%, 33.5%, and 21.3% increase in compliance and adherence of doctors, nurses, porters, visitors, and patients, respectively. The statistics indicate that once individually separated, the simple intervention

suggestively improved hand hygiene fulfillment, the mean compliance over 6 months significantly improved ( $P < 0.001$ ,  $P < 0.05$ ). The study suggests that not only is important to progress hand hygiene compliance, but also to support advances to preserve high-quality healthcare practice (Davis, 2010). However, sustained behavioral modification can necessitate a cultural alteration via a ‘bottom-up’ approach (Davis, 2010).

**TABLE 2.** Compliance with applying alcohol hand gel on entering a surgical ward before and after intervention (Davis, 2010)

	<b>Before</b>		<b>After</b>		<b>P-value</b>
	<b>n</b>	<b>Compliance (%)</b>	<b>n</b>	<b>Compliance (%)</b>	
Doctor	21	0	13	53.8	0.009
Nurse	21	23.8	8	75.0	0.028
Porter	28	21.4	6	66.7	0.048
Visitor	58	34.5	25	68.0	0.008
Patient	13	23.1	9	44.4	0.376

---

All persons	154	24.0	61	62.3	< 0.0001
-------------	-----	------	----	------	----------

---

Erkan and colleagues (2011) reported that, “Microorganisms remain on the hands of nurses for different durations of time. For instance, vancomycin-resistant enterococci can remain for at least 60 min on the fingertips, either with or without gloves, whereas *P. aeruginosa* can remain for up to 180 min after the hands have been contaminated” (Erkan, Finkik, & Tokuc, 2011). The prospective study lasted from January to March 2009, with 211 of 350 nurses choosing to participate. Amid the tactics projected to proliferate the degree of hand washing, the greatest vital step was to educate nurses at what time and in what way to wash their hands (Erkan, Finkik, & Tokuc, 2011). An individual information form, pretest assessment form, and pretest assessment form were used for data collection. The Mc Nemar chi-square test was used to analyze the differences between the variable levels before and after training. It was found that, subsequent a training assembly and feedback, hand-washing obedience amplified from 7.8% to 54.5% among nurses, assistants, and doctors in an intensive care unit (Erkan, Finkik, & Tokuc, 2011). Vancomycin-resistant enterococci remnant on nurses’ gloves declined from 36% to 12% (Erkan, Finkik, & Tokuc, 2011). The statistics proved to be statistically significant ( $P = 0.024$ ,  $P < 0.05$ , as there were three times less microorganisms on the nurses’ hands and gloves than when first assessing.

To modify the behavior of HCWs to produce improved and sustained compliance with hand washing standards, and to improve the quality of patient care, proper training protocols must be administered (Harbarth, 2000). One study that attempted to improve healthcare workers

hand hygiene compliance was conducted by Harbarth (2000). The study hypothesized that Harbarth's agenda would not only cause growth in adherence with hand hygiene, but also lessen MRSA spread and nosocomial infection frequencies. It stated that increased training, and encouraging the use of alcohol-based hand washing at bed side, would help reduce the risk of hospital-acquired infection. The study monitored the general fulfillment with hand hygiene during repetitive patient care coaching in Geneva, Switzerland, before and during application of the hand-hygiene operation. The program also promoted carrying hand sanitizers and having them mounted bedside. Single bottles of hand rub solution (alcohol-based) were dispersed in sizeable quantities to all wards, and customized containers were attached on all beds to facilitate access to hand disinfection (Harbarth, 2000). Secondary outcomes were nosocomial rates and disinfectant hand rub consumption. HCWs were recommended to hold a bottle in their pocket and, in 1996, a newly-considered flat (instead of round) bottle was readily accessible to further expedite portable transport (Harbarth, 2000).

As a result, hand hygiene improved based on consistent training and intervention. Overall, there were 20,000 opportunities for hand hygiene observed, with compliance increasing from 48% to 66%. This is statistically significant in that the increase in compliance made for over 50% of hand hygiene opportunities complied, and decrease in MRSA transmission rate. There was a significant increase in the frequency of hand washing by the nurses ( $t = -2.202$ ,  $P = 0.029$ ) and the time spent on hand washing ( $P = 0.04$ ,  $P < 0.05$ ) after the training program (Harbarth, 2000). No statistical analysis was attempted with regard to the products preferred for hand washing, or the methods of drying the hand (Harbarth, 2000). It was shown that the compliance of nurses and nursing assistants had improved remarkably, from 54% to 84%; however, the compliance of doctors did not show significant improvement. Although doctors'

overall compliance with hand cleansing did not improve, they switched from hand washing to hand disinfection during the study period (Harbarth, 2000).

### *Interventions to Increase Hand Hygiene Compliance & Findings*

As mentioned by the WHO, improving compliance of hand hygiene involves bringing awareness to the issue, followed by actual implementation of following proper hand hygiene protocol and practices (WHO, 2004). According to Lee (2004), studies show that more vigorous training will reduce the risk of insufficient and improper use of hand hygiene amongst healthcare workers. More regard should be given to the matter of hand hygiene compliance, and this must change first in order to implement the next methods for increased compliance. An additional method by which to increase compliance includes making materials needed for compliance more readily available, not only to the health care workers, but also to any patron in healthcare facilities. In many facilities there are limited sinks, hand sanitation dispensers and other necessary materials for compliance to truly be optimized. Along with the limited resources available, hospitals should take into account how or where these resources should be dispersed. Not only should the supplies be available, but also hospital design can and will influence cooperation. Finally, exploration of hand hygiene cooperation through provider and patient interactions can further the compliance of all healthcare workers.

### *Intervention to Increase Compliance through Material Availability and Design*

In regards to hand hygiene, hand-washing material availability and design play big roles in hand-hygiene compliance. Hand-washing material availability and design refers to the accessibility a healthcare facility has to any amount of hand washing supplies, and the

convenience to updated hand-washing supplies. According to Azim (2013), the National Health Service (NHS) has shown a direct correlation between hand-hygiene compliance and the amount of available supplies. Audits were completed by the NHS to prove that with more accessibility to hand-washing materials that hand-hygiene compliance would rise (Azim, 2013). These audits also were set in place for hospital employees, visitors, or patients to become more aware of hand-hygiene. The NHS completed and audited where and how many hand-washing materials and alcohol rubbing stations were available in each ward and ward entrance of the healthcare facility (Azim, 2013). The audit's results identified areas lacking in hand-washing materials and alcohol rubbing stations; hospital workers then identified the gap in hand-washing materials and alcohol rubbing stations, and developed a plan to obtain hand-washing materials. After awareness spread throughout the hospital, there was a 15% rise in hand-hygiene compliance (Azim, 2013). No statistical analysis was attempted with regard to the audits conducted in the facility. However, the increase suggests that the NHS's conjecture was true.

Hand-washing supplies and alcohol rubbing stations are not the only problem area in regards to hand-hygiene compliance. Larson *et al.* (2012) completed research to show how even the design of hand-washing materials can affect hand-hygiene compliance, thus lessening the spread of hospital-acquired infections. The study was a crossover study design in which the manual and touch-free dispensers were used in 2 hospital facilities. The materials at the center of Larson *et al.*'s research were alcohol sanitizer dispensers. Touch-free and manual alcohol sanitizer dispensers were positioned in the emergency sector and an intensive care unit of a sizeable pediatric clinic for a two 2-month period. Counting devices instated in every dispenser, as well as direct observation, were used to conclude definite regularity of, and indications for, hand hygiene (Larson *et al.*, 2005). The daily usage of the touch-free alcohol sanitizer dispensers

was always higher per patient, per day; the results also show that although overall hand-hygiene compliance was low, the hand-hygiene compliance was higher in the units that provided touch-free alcohol sanitizer dispensers (Larson *et al.*, 2005). The table depicts the actual results of each daily usage mean:

Count	Type of Dispenser: Manual	Type of Dispenser: Touch-Free	P
No. of uses per dispenser per day, mean (SD)*	25.6 (19.6)	41.2 (26.9)	.02
No. of episodes of hand hygiene per patient per hour, mean (SD)†	3.33 (2.7)	4.42 (2.8)	.04
No. of episodes of hand hygiene before contact with a patient per hour, mean (SD)†	1.26 (1.74)	1.58 (1.59)	.003
*Measured by using installed counters.			
†Measured by using direct observation.			

Table 2: Daily uses of alcohol dispenser by type of dispenser (Larson *et al.*, 2005).



Lankford *et al.* (2003) also completed research to demonstrate the connection between healthcare facility design and access to hand washing supplies and hand-hygiene compliance; the research centered on the supply and placement of a hand-washing sink in healthcare facilities, and was comprised of observations made from “healthcare worker hand hygiene in four nursing units that provided similar patient care in both the old and new hospitals: medical and surgical intensive care, hematology/oncology, and solid organ transplant units” (Lankford *et al.*, 2003). The observations showed that sinks were more accessible, and that hand-hygiene compliance was higher in the new hospitals in comparison to old hospitals (Lankford *et al.*, 2003). The mean quantity of indications for hand hygiene per patient was significantly larger in the PICU (new) than the emergency department (old) (6.12 vs 5.16 indications, respectively;  $P=.02$ ) (Lankford *et al.*, 2003).

#### *Intervention to Increase Compliance through Patient/Provider Relations*

Duncan (2007) examined patients’ sensitivity to MRSA status and hand washing, by closely looking at how patients perceive hand hygiene in the healthcare workplace, and discusses patients’ understanding of the issue. The recommendation was to strengthen the relationship between patient and provider, and increase understanding (Duncan, 2007). In order to quantify the data and attain the desirable information, a questionnaire was developed. There was a strong suggestion from the figures that access and accessibility of patient information at the exploration site was deficient (Duncan, 2007). Numerous respondents (74.7%,  $n=74$ ) had not received any information about MRSA and hand hygiene upon admittance to hospital, and that merely 3.6% of patients had discovered this information from patient information brochures in hospital (Duncan, 2007). Patients’ awareness was lacking and the relationship with provider correlated.

## **Discussion and Recommendations**

Hand hygiene compliance is an issue on the rise in hospitals and other healthcare facilities. Epidemiologic research shows hand hygiene practices, and stricter hand hygiene compliance standards in healthcare facilities, correlate to a decrease in hospital-acquired infections, or HAI's (Pittet, 2001). Nosocomial infections are contracted through direct contact, and unfortunately that contact usually occurs when a staff member tends to one patient, and then immediately tends to another without adhering to hand hygiene/safety protocol. The severity of the nosocomial infections is more apparent when patients succumb to pneumonia, urinary infections, or other related infections that can lead to death.

Although not mentioned, there could possibly be issues in measurement of hand hygiene compliance. Many of the studies either used video surveillance or counting devices in dispensers to measure compliance. Baseline measurements are calculated when no intervention is used versus post intervention. One other method of compliance included surveys given to personnel also referred to as self-report. This approach can implicate bias in answers, with individuals claiming to practice proper hand hygiene when in fact they do not. While self-reports may deliver evidence regarding health care workers' familiarity of procedures suggestions, they are subject to bias and ought not be used as the only measure of guideline observance (Adams *et al.*, 1999). Objective data is most preferred with methods such as direct observation and video monitoring.

Compliance with hand-hygiene recommendations is usually below 50% across various healthcare facilities (Pittet, 2001). From the readings noted in literature review, there are several barriers to adhering to appropriate hand hygiene. Some of these reasons include healthcare workers' inadequate knowledge of protocol and guidelines, sinks inconveniently placed or unavailable, patients taking priority over hand hygiene, as well as a lack of recognition, or simple

forgetfulness (Pittet, 2001). Ideally compliance should be observed at 100% rate, each intervention is meant to increase observance irrespective to the level of compliance.

Handwashing behavior falls into two categories: inherent handwashing practice and elective handwashing behavior (Whitby, 2006). For nurses, inherent handwashing practice occurs when nurses feel the need to wash their hands once they have been in contact with areas described as “emotionally dirty places,” like genitals, or an unhygienic demeanor. Elective handwashing behavior includes noninvasive physical interaction with a patient (Whitby, 2006). If it is not a threat, it does not cause a fundamental response to wash hands. Then again, after excessive contact in a healthcare environment, handwashing is necessary to prevent potential cross-infection.

Nurses believe they do not have time to wash their hands on all occasions. The duties are organized through a hierarchy of risk to infection, not necessarily ranking handwashing opportunities (Whitby, 2006). These behavior aspects can best be combatted with reeducation and enforcement of proper hand hygiene. Repetition of hand hygiene and promoting awareness helps to eradicate and reverse behavioral habits (Whitby, 2006).

The purpose of this capstone is to shed light on an issue that is easily overlooked, due to the fact that it is often not monitored or enforced . Increasing education of staff members, as well as adequately equipping them with the tools and resources to abide to hand hygiene compliance, is necessary in order to control the spread of infections in hospitals and other healthcare facilities.

When individuals enter, or are admitted into, a hospital, it is likely that they are already battling or suffering from an infection, injury, or disease; thus, the likelihood of contracting bacterium from a hospital is higher due to their weakened state. Working in a hospital as staff

members, and as a part of a team committed to protecting patients, it is important to strengthen the significance of hand hygiene compliance. Carelessness, miseducation, or a lack of adequate resources could all lead to a lack of compliance. The goal is to address each of these barriers, increase awareness, and provide recommendations on how the barriers can be overcome, which would lead to safer conditions for both staff and patients.

### *The Joint Commission*

The Joint Commission is an independent, not-for-profit organization that endorses and verifies over 20,000 health care programs and organizations. This organization's duty is to improve health care for the community by assessing organizations, and encouraging them to deliver safe and operational care of the highest quality. The Joint Commission develops a Standards development process that institutionalizes many aspects of health care quality optimization: suggestions for emerging quality and safety issues, survey processing, evaluation, and performance improvements. The mission of the Joint Commission is: "To continuously improve healthcare for the public, in collaboration with other stakeholders, by evaluating health care organizations and inspiring them to excel in providing safe and effective care of the highest quality and value" (The Joint Commission, 2017). The group revises its accreditation criteria and develops patient's safety objectives on an annual basis, making information transparent for all persons interested to review online.

The Joint Commission offers a quality checklist to designate the completion of quality care implementations and services; it also looks into each sector of an institution and determines whether the facility exhibits the best care. The Joint Commission can devise, in their checklist, an evaluation of hand hygiene protocol so that accredited facilities must abide by a certain high-

level standard to maintain accreditation. When a facility earns a Gold Seal, it signifies that the building and staff place an emphasis on quality of care. This could serve as an incentive to the healthcare facility to better its compliance and practices. It would be beneficial for the Joint Commission to set expectation for hand hygiene compliance in healthcare facilities. This highly reputable organization can better evaluate the policy in the health organizations they endorse, while also encouraging policy dissemination and implement change.

### *Health Management and Policy Recommendations*

This literature review has identified the following three recommendations to promote hand hygiene among healthcare workers. First, the availability of accessible and updated hand washing supplies plays a major part in hand hygiene compliance. A healthcare worker or patient may not see a sink to wash their hands, for example, and may neglect to wash their hands as a result. Also, healthcare workers and patients are more susceptible to infection if materials are not updated; touch free alcohol dispensers are less prone to infections compared to regular alcohol dispensers, due to their ability to avoid physical contact. Alcohol-based hand rub reduced the time to cleanse hands. The time and inconvenience of handwashing is eliminated by the alcohol-based hand rub, and compliance increased (Whitby, 2006). This led to the marketing and introduction of alcohol-based hand rub in hospital facilities (Whitby, 2006). New standards that would require more investment into touch free dispensers, sinks, and other necessary materials to make hand washing supplies available would help to increase compliance. Standards can also ensure that a quota is met for health care facilities to have enough hand washing supplies available for use.

Second, hand hygiene-based training also plays a major role in hand hygiene compliance. Because of the complexity of the process of change, solo interventions often fail, and

multimodal, multidisciplinary strategies are necessary (Harbarth, 2000). When the hand-washing compartment and familiarity of nurses were assessed beforehand and following training, which consisted of an online module explaining methods of washing hands, it was concluded that training improved the regularity of hand washing by nurses, the interval they exhausted on hand washing, their comprehension, and the value of hand-washing (Harbarth, 2000). Many healthcare workers and patients are not well informed about the proper procedure for hand washing. If more healthcare workers and patients were better informed, there would be fewer occurrences of nosocomial infections, and more accountability from both healthcare workers and patients. Standards will be constituted to ensure that each and every healthcare professional goes through annual training and educational sessions that incorporate thorough hand washing and hand hygiene compliance. Managers, administrators and supervisors will be responsible for setting policy and ensuring implementation. The standard will require sessions to be conducted once a year by each health care worker.

Third, hand hygiene awareness plays a major role in hand hygiene compliance. For example, some patients are not aware that healthcare workers are exposing them to nosocomial infections. Patients should receive detailed pamphlets that describe hand hygiene. In such literature, implications regarding a neglect of hand hygiene could be addressed, as well as instructions for washing hands. Another method to increase awareness is to place more signs around healthcare facilities to direct patrons either to wash hands thoroughly, or use hand sanitizer dispensers. With the evidence provided, and further emphasis on practicing proper hand hygiene in the healthcare facility, we will see more trends of increased compliance, with a decline of nosocomial infections. Standards to help increase awareness includes making quotas for how many signs are placed inside a health facility, just like signs must be made visible and

clear for other hazards in the building. Also any visit to healthcare facilities will include handing out packets of hand hygiene practice literature to all patrons entering the hospital.

The commitment of healthcare policy is to offer regulation for the day-to-day functional undertakings in a healthcare setting. Policy in healthcare is extremely significant, as it sets an overall design of achievement used to guide anticipated results, and is an essential standard to help make resolutions. Hand hygiene compliance should be made more prominent in day-to-day activity. Policy related to hand hygiene is of significant importance to daily routines and practices in the healthcare setting.

From a health management and policy standpoint, the greatest and most powerful instrument to use in order to increase cooperation is to implement policy that supports this capstone. Stricter policy on hand hygiene compliance may very well include mandatory training that is annual and up-to-date. As well, there must be sufficient and updated materials for proper hand hygiene. Policymakers from these healthcare facilities must be held to account to ensure these changes, and an increase in hand hygiene material availability. Those in higher managerial position must ensure that compliance is upheld; they too must be made accountable for their work and lack of compliance, by bringing awareness to the problem, to workers and patients, alike. By doing so, other workers, such as nurses, doctors, facility works, and even patients will decrease negligence and increase compliance.

## **Conclusion**

Hand hygiene plays a major role in the well-being of patients and healthcare workers. If hand washing compliance is not maintained throughout healthcare facilities, it can cause health hazards, one being nosocomial infections. The health hazards that can arise with non-compliance in regards to hand hygiene can be fatal. In order to promote and maintain the highest level of hygiene compliance, healthcare facilities must make sure that they have accessible and updated hand washing supplies, hand hygiene-based training, and resources to advocate hand hygiene awareness to healthcare workers and patients. This paper has touched upon a number of methods with which to improve compliance, such as frequent training, as well as educational resources throughout the healthcare facility, like pamphlets, signs, and step-by-step posters that detail the process of effective hand washing (Aziz, 2013). In most businesses and organizations, training and re-training occurs to keep staff updated regarding pivotal aspects of their job roles and duties. Training can be a costly investment, but proves to be effective, and ultimately saves money down the line when staff is equipped to handle emergency situations and everyday job functions (Larson, 2005). The purpose of hand hygiene training would be to teach effective behavior, and change attitudes around this behavior. If staff members know that they are not just washing their hands, but also are protecting patients, this could change perspectives on this process' degree of importance (Erkan, Finkik, & Tokuc, 2011). In conclusion, it will take compliance on all levels to upsurge hand hygiene compliance, and to eradicate hospital-acquired infections.



## References

- Adams, A., Soumerai, S., Lomas, J., & Ross-Degnan, D. (1999). Evidence of self-report bias in assessing adherence to guidelines. *International Journal for Quality in Health Care*, 11(3), 187-192. doi:10.1093/intqhc/11.3.187
- Aziz, A.M. (2013). How better availability of materials improved hand hygiene compliance. *British Journal of Nursing*, 22(8), 458-463
- Davis, J. (2010, April 1). Infection-free surgery: how to improve hand-hygiene compliance and eradicate methicillin-resistant *Staphylococcus aureus* from surgical wards. *National Institute of Health*. Retrieved September 21, 2016 from <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3025203/>
- Duncan, C.P., & Dealey, C. (2007). Hand hygiene. Patients' feelings about hand washing, MRSA status and patient information. *British Journal of Nursing*. 16(1), 34-38
- Eriksen, H. (2004, September 23). Prevalence of nosocomial infections in hospitals in Norway, 2002 and 2003. Retrieved November 22, 2016, from <http://www.sciencedirect.com/science/article/pii/S0195670104004712>
- Erkan, T., Finkik, U. Y., & Tokuc, B. (2011). Hand washing behavior and nurses' knowledge after a training programme. *International Journal of Nursing Practice*. 17(5), 464-469

Goodliffe, L., Regan, K., & Larocque, M. (2014). Rate of healthcare worker—patient interaction and hand hygiene opportunities in an acute care setting. *Infection Control & Hospital Epidemiology*. 35(3), 225-230

Harbarth, S. (2000, January 1). Effectiveness of a hospital-wide programme to improve compliance with hand hygiene. *The Lancet*. Volume 356 Issue 9238. Retrieved September 21, 2016 from, [http://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(00\)02814-2/fulltext](http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(00)02814-2/fulltext)

Lam, B., Lee, J. Lau, Y. (2004, June 1). Hand Hygiene Practices in a Neonatal Intensive Care Unit: A Multimodal Intervention and Impact on Nosocomial Infection. Hand Hygiene Practices in a Neonatal Intensive Care Unit: A Multimodal Intervention and Impact on Nosocomial Infection. *Pediatrics*. Retrieved September 21, 2016 from, <http://pediatrics.aappublications.org/content/114/5/e565.short>

Lankford, M. (2003, February 1). Influence of Role Models and Hospital Design on the Hand Hygiene of Health-Care Workers. *National Institute of Health*. Retrieved September 21, 2016 from, <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2901948/>

Larson, E. (2005, January 1). Hand Hygiene Behavior in a Pediatric Emergency Department and a Pediatric Intensive Care Unit: Comparison of Use of 2 Dispenser Systems. Hand Hygiene Behavior in a Pediatric Emergency Department and a Pediatric Intensive Care Unit: Comparison of Use of 2 Dispenser Systems. *American Journal of Critical Care*. Volume 14, Number 4.

Retrieved September 21, 2016 from, from

<http://ajcc.aacnjournals.org/content/14/4/304.short>

Pirie, S. (2010). Hand washing and surgical hand antisepsis. *Journal of Perioperative Practice*.  
*20(5)*, 169-172

Pittet, D. (2010, December 20). Improving Compliance With Hand Hygiene in  
Hospitals.JSTOR. *Chicago Journals*.Volume 21 No. 6 Retrieved September 21, 2016  
from, <http://www.jstor.org/stable/10.1086/501777>

Pittet, D. (2001, March 1). Improving adherence to hand hygiene practice: a  
Multidisciplinary approach. *National Institute of Health*. Retrieved September 16, 2016  
from, <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2631736/>

Richards, M., Edwards, J., Culver, D., & Gaynes, R. (n.d.). Hospital Infections Program,  
National Center for Infectious Diseases, Centers for Disease Control and Prevention,  
Atlanta, GA 30333, USA. Retrieved October 13, 2016, from  
<http://europepmc.org/abstract/med/10362409>

Smith, S. (2009). A review of hand washing techniques in primary care and community setting.  
*Journal of Clinical Nursing*, 18(6), 786-790

Stumblefield, H. (2014). Hospital-Acquired (Nosocomial) Infections. Retrieved October 13,  
2016, from [http://www.healthline.com/health/hospital-acquired-nosocomial-infections -  
Overview1](http://www.healthline.com/health/hospital-acquired-nosocomial-infections-Overview1)

Takahashi, S., & Turale, S. (2010). Evaluation of individual and facility factors that promote hand washing in aged-cared facilities in Japan. *Nursing & Health*

*Sciences.* (12)1, 127-134

The Joint Commission. *Accreditation, Health Care, Certification | Joint Commission.* The Joint Commission, May 1995. Web. 02 Jan. 2017. <https://www.jointcommission.org>

WHO. (n.d.). Prevention of hospital-acquired infections. Retrieved October 13, 2013, from <http://apps.who.int/medicinedocs/documents/s16355e/s16355e.pdf>

Whitby, M. (2006, May 11). Why Healthcare Workers Don't Wash Their Hands: A Behavioral Explanation. Retrieved December 28, 2016, from [https://espace.library.uq.edu.au/data/UQ\\_81823/UQ81823\\_OA.pdf?Expires=1485534951&Signature=fn~u~578Ox-jKC8Ijm3JiKC8JE~wQE2OkCNdRgKegxWaQhftQbUayIxH7rRRtHjIFtbmTjDx4uwz3mQQBrRrdJXJOpifEOIueWlhn](https://espace.library.uq.edu.au/data/UQ_81823/UQ81823_OA.pdf?Expires=1485534951&Signature=fn~u~578Ox-jKC8Ijm3JiKC8JE~wQE2OkCNdRgKegxWaQhftQbUayIxH7rRRtHjIFtbmTjDx4uwz3mQQBrRrdJXJOpifEOIueWlhn)

Weinstein, R., Gaynes, R., & Edwards, J. (2005, March 25). Overview of Nosocomial Infections Caused by Gram-Negative Bacilli. Retrieved November 22, 2016, from <http://cid.oxfordjournals.org/content/41/6/848.short>

Vincent, J. (1995, August 23). The Prevalence of Nosocomial Infection in Intensive Care Units in Europe. Retrieved November 22, 2016, from <http://jamanetwork.com/journals/jama/fullarticle/389495>