Fall 12-17-2021

The Relationship Between Surgical Site Infections and Hand Hygiene Discharge Teaching

Eishlee Renel A. Jasa
University of San Francisco, eajasa@usfca.edu

The Relationship Between Surgical Site Infections and Hand Hygiene Discharge Teaching

Eishlee Renel Jasa, RN, CNL

University of San Francisco

School of Nursing & Health Professions

TABLE OF CONTENTS

Abstract

Problem: In the span of a nine-month period, the incidence of surgical site infections (SSIs) in a singular perioperative unit reached 13. SSIs have been linked with negative consequences for both the patient and healthcare system, decreasing quality of life and increasing costs.

Context: The 20-bed post-anesthesia care unit (PACU) primarily serves adult patients in the East Bay Area, where a variety of surgeries including elective and emergent procedures are performed. This facility specializes in general surgeries, where laparoscopic excisions and hernia repairs were the most commonly observed.

Intervention: The *Standardized 3-Step Hand Hygiene Discharge Teaching* is aimed to improve and standardize the hand hygiene education process in the PACU. It is anticipated to promote increased adherence in handwashing for patients and ultimately decrease SSIs in the long run.

Measures: The proposed outcome measure is the rate of occurrence of SSI per 1,000 patient days. The process measure is the percent of staff compliance in completing the *Standardized 3-Step Hand Hygiene Discharge Teaching* procedure. The balancing measure is ensuring that the intervention does not prolong the discharge process.

Results: The expected results are a significant decrease in SSIs and 70% staff compliance in intervention implementation.

Conclusion: Literature maintains that hand hygiene is a significant intervention in reducing infection. It was observed that on this unit, there were inconsistencies in hand hygiene teaching. Though, further observation on other days and shifts may be indicated to determine the validity of the data. Due to the inability to implement the intervention and inadequate time, future directions may include implementing the *Standardized 3-*

Step Hand Hygiene Discharge Teaching and audits to define a clearer relationship between consistent hand hygiene discharge teaching and the incidence of SSIs.

Keywords: Surgical Site Infections, Hand Hygiene, Handwashing, Patient Education

Section II: Introduction

Introduction

A surgical site infection (SSI) is an infection that occurs at or close to the operative site within 30 days of the procedure or within 90 days if prosthetic implants are used (CDC, 2019). John Hopkins Medicine reviewed that the three different levels of SSIs are classified by their location within the layer of the skin: superficial incisional, deep incisional, and organ or space. Depending on where the infection is, treatment courses often differ. The ability to recognize the presence or development of an SSI early is significant in improving patient safety and optimizing the SSI course of treatment and management plan. In general, the signs and symptoms of SSIs include redness, delayed healing, fever, pain, tenderness, warmth, or swelling. Other signs and symptoms are SSI type-specific, which include pus on the surface or an abscess in the deeper spaces of the tissue. The infection is caused by bacteria, most commonly *Staphylococcus*, *Streptococcus*, and *Pseudomonas*, which can be contacted from various sources. The air, surgical instruments, and hands of the healthcare staff and patient are only a few of the possible sources of bacterial infection.

Additionally, the development of an SSI is dependent on a multitude of factors, including both intrinsic patient-related and extrinsic procedure-related (Atkins, 2021). The following put patients at an increased risk for an SSI: increasing age, obesity, underlying illnesses, type of procedure, location of incision site, length of procedure, and surgical wound type. Although there have been several procedural advancements and multimodal prevention intervention programs, SSIs still remain a challenge (Tartari et al., 2017). Consequently, patients who develop an SSI, experience a decrease in quality of life, affecting both their physical and psychological well-being. They are linked

to longer hospitalization, pain, discomfort, delayed wound healing, prolonged or permanent disability, and even death (Jemebere et al., 2020). In addition to patients being in a less than optimal state, they experience feelings of frustration, helplessness, and unrealistic hope of accurate healing times (McCaughan et al., 2018). SSIs become a financial burden to both the patient and the healthcare system. According to the NHSN (2021), SSIs are the most expensive hospital-acquired infections (HAIs), costing up to billions of dollars a year and significantly increasing the number of inpatient days. In 2010, a study directed to decrease the rate of methicillin-resistant Staphylococcus aureus (MRSA) infections through the improvement of staff hand hygiene compliance, ultimately reduced costs and potentially prevented the prevalence of 51 MRSA infection cases (Gagné et al., 2010). This article establishes the acclaimed importance of handwashing, regardless of type of infection. In addition, the impact of appropriate hand hygiene could be shared with patients to further engage them in their care and promote healthy habits.

Nevertheless, SSIs are highly preventable, making it one of the top priorities in improving patient safety and reducing costs in the perioperative units. According to Brown et al. (2021), nearly 20% of readmissions post-surgery are potentially preventable and account for approximately $300 million in costs. Hospitals, payers, and regulatory agencies are key stakeholders that oversee the data and effects related to SSIs (Pop-Vicas et al., 2021). The pay-for-performance initiative incentivizes facilities for promoting SSI prevention protocols, making it more of a reason to reduce the rates of infections. The increasing complexity of today's healthcare system calls for the reexamination of the effectiveness of new and existing interventions to prevent the development of SSIs. Although technological advances in healthcare have improved

outcomes, the foundation and basics of nursing practices are also important in reassessing. Ultimately, understanding the microsystems and utilizing evidence-based practices will improve patient quality of life and reduce both patient and healthcare system costs.

Problem Description

Late start times and SSIs seemed to be the most pressing issues in this perioperative department in the East Bay Area HMO facility. Though, the incidence of 13 SSIs in a nine-month period signified the reassessment in the processes to promote SSI prevention in this patient population. The organization recognized that this was meaningful data that suggested the necessity for further investigation.

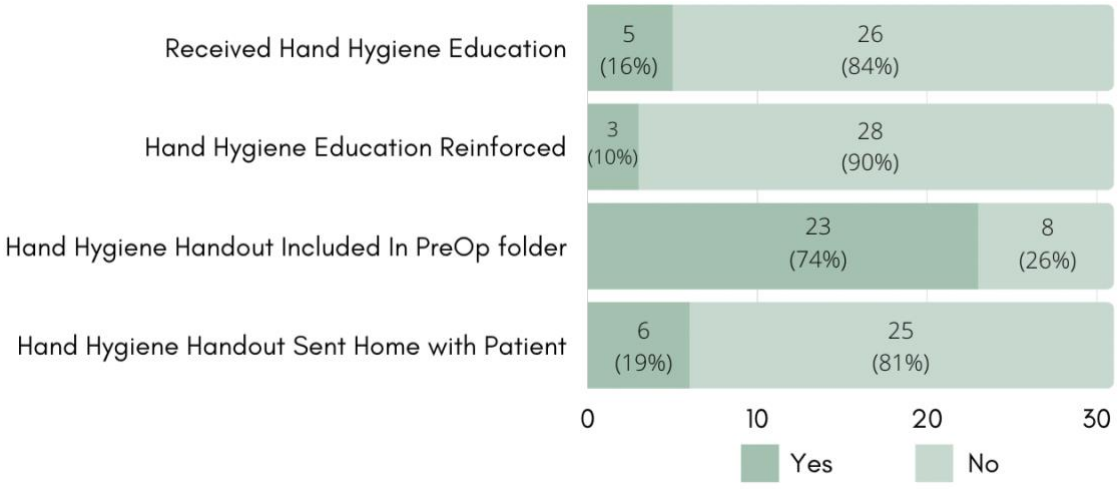
For the first three weeks at the clinical site, one observation day was dedicated to each of the sub-units in the perioperative department to identify potential areas of improvement. These sub-units included the preoperative unit, the operating room (OR), and the PACU. Inconsistencies in hand hygiene discharge teaching between staff in the PACU was identified and a survey that collected each research team member's qualifying observations was created *(See Appendix A)*.

The East Bay Area HMO organization has two separate departments that perform surgeries: the ambulatory surgical unit and the main OR. For the purpose of this project, the PACU in the main OR department was observed. All of the observed data collected in the next six-week period were from adult patients, ages 18 years old and above, with incisional sites. The procedure mix was variable and consisted of, but were not limited to, laparoscopic and open excisional surgeries, repairs, angiograms, and biopsies. These patients were scheduled for discharge the same day; thus, the discharge process was fully observed. Patients who returned to any of the inpatient units were excluded since

discharge teaching regarding handwashing was not indicated. The data collected comprised of observations that specified the type of surgery, a yes or no (Y/N) response to if hand hygiene education was performed, a Y/N response if education was reinforced and what type if indicated yes, if the standardized hand hygiene handout was in the folder, and if that handout was brought home with the patient. In the handout, there are instructions on hand hygiene and additional information on signs and symptoms of healing and infection, incision care, incision closure types, warning about lifting objects, and when to contact their surgeon. Observations were not performed to create blame. Instead, they were critical in quality improvement because they allow clinicians to fully understand possible factors that may have led to an issue (Whiteman et al., 2021). The results from the six-week observation period are presented in Figure 1.

Figure 1. *Hand Hygiene Discharge Teaching Observational Data*

In the span of six weeks, 31 observations during the Wednesday morning shifts were completed in patients with surgical incisions. Of the study group, 16% received hand hygiene education, 10% received education reinforcement, 74% had the existing hand hygiene handout in their preoperative folder, and 19% were sent home with that handout.



Thus, the intervention for this quality improvement (QI) project focuses on the improvement and standardization in the handwashing discharge process. As presented in studies, hand hygiene is still one of the most effective ways to reduce transmission of infectious agents (Gaube et al., 2021). Patient education is a critical nursing role in health promotion. Each nurse followed the facility's protocol in teaching patients in postoperative wound- and self-care at home by utilizing their clinical expertise and the corresponding doctor's pre-written discharge packet. In addition, there was a folder that followed the patient from the preoperative unit to PACU. This folder will be known as the preoperative folder for the purpose of this paper. In this folder, there was a pre-admission sheet that was filled out prior to arrival to the facility, the consent form, and a hand hygiene handout. According to policy, the hand hygiene handout goes home with each patient after discharge. In a majority of the cases, the handout stayed behind, and education explicitly related to hand hygiene was seldomly initiated. Thus, the discharge process was reevaluated.

Nurses have a responsibility to their patients by being their advocates, allowing them to be an active member of the care team and engage in decision-making regarding their care. The general observations performed in the first three weeks of being on the unit indicated that a nursing process had to be reevaluated to promote not only SSI prevention, but also patient engagement and participation. The emphasis on the improvement and standardization of hand hygiene discharge teaching could meet this patient need, while ultimately decreasing the incidence of SSIs.

Available Knowledge

The literature review gathered for this QI project encompasses the elements that constitute this PICOT question: In post-surgical adults (P), how will consistent hand

hygiene discharge teaching in the form of verbal education, education reinforcement, and handouts (I), compared to inconsistent hand hygiene discharge teaching (C) influence the rates of surgical site infections (O) within one year (T)? The databases CINAHL and PubMed were utilized to conduct preliminary research, focusing on relationships between SSIs and hand hygiene. The key words inputted into the search box included: *surgical site infection, surgical wound infection, wound care, handwash*, hand hygiene, discharge teaching, educat*, patient educat*,* and *patient teaching*. The finalized literature consisted of a combination of experimental, expertise-driven, and review articles. Some articles studied surgical site infection control specific to a particular procedure or location of incision, and others focused on the risk factors associated with SSIs and ways to promote prevention. The importance of handwashing in relation to other HAIs was also mentioned. Lastly, others discussed the significance of patient engagement that ultimately increased hand hygiene compliance and decreased SSIs. Ultimately, evidence to support this project's intervention was found. See Appendix B for the evaluation table of the literature review.

Rationale

The initiation of this QI project was driven by the conceptual framework of the nursing process and a combination of Prochaska's Transtheoretical Model (TTM) and Rogers' Diffusion of Innovation Theory. The nursing process is at the core of nursing practice, guiding nurses in decision making supported by their critical thinking abilities. In the first three weeks, where shadowing occurred and general observations were made in all sub-units in the perioperative unit, initial and informal assessments of nursing processes were conducted to aid in narrowing down potential topics of interest. A

process was assessed, a problem was diagnosed, a plan was made, an intervention or few were considered, and the effectiveness and feasibility of the change was evaluated.

Later, the TTM was utilized, which consisted of five stages of change: precontemplation, contemplation, preparation, action, and maintenance. It acknowledges that change is not always quick and decisive. Instead, change moves through the stages, sometimes moving forward and other times, backwards. This is especially true for health-related behaviors in patients and healthcare systems. The perioperative department entered the precontemplation stage when presented with the data showing an increase in SSIs in a nine-month period. The team initiated the beginning of the contemplation stage when the findings of this project were presented to the critical stakeholders, such as the nursing management. Lastly, preparation will be dependent on the nursing management's decision to create buy-ins from regional executives.

Furthermore, Rogers' Diffusion of Innovation Theory introduces the idea of adopter categories represented in a bell curve graph: innovators, early adopters, early majority, late majority, and laggards. It identifies how a group of individuals can influence the likelihood for change to occur. Since the organization that this QI project represents holds characteristics that are present in both transformational and transactional leadership styles, the Diffusion of Innovation Theory is noteworthy to consider because it stresses the importance of networking and attaining buy-ins from key stakeholders to facilitate the change. To further provide a structured approach to enable change, an initial and theoretical Plan-Do-Study-Act (PDSA) cycle was created (*See Appendix B)*. The first PDSA Cycle guided the preliminary observations, and the second PDSA cycle will guide the future implementation of the proposed intervention.

Specific Aim

The specific aim of this QI project focused on SSIs is to improve and standardize the nursing discharge teaching process concerning hand hygiene for post-surgical patients to ultimately prevent SSIs. There was an incidence of 13 SSIs across the span of nine months, suggesting an increase in costs, reduction in reimbursements from the Centers for Medicare & Medicaid Services (CMS), and increase in negative patient outcomes. An initial microsystem assessment for the first three weeks was indicated to identify areas of improvement and probable sources or factors that could increase the risk of SSI development. The following six weeks were focused on observing the discharge process to isolate any patterns in patient education for handwashing. Therefore, the expected outcomes in the case that the intervention was to be implemented included: an improved and standardized handwashing discharge process, an increase in compliance for following this new protocol, a better patient understanding on the significance of handwashing, and a decrease in SSIs. Fundamentally, this QI project can improve the discharge process within the unit, reduce costs, and improve patient outcomes.

Section III: Methodology

Context

High-functioning microsystems play a crucial role in allowing the delivery of quality patient care (Conrad & Douma, 2015). Thus, it is important to consider the microsystem and how it can help initiate change. The SWOT analysis was used to determine the strengths, weaknesses, opportunities, and threats in this microsystem to help in strategic planning and research (*See Appendix C)*. It examines both internal and external components, and when it is well-structured, it can significantly change the strategic direction (Ojala, 2017). Additionally, a root cause analysis (RCA) was performed to investigate the potential causes of the formation of an SSI. This evaluation is represented by a cause and effect diagram, also known as a fishbone diagram *(See Appendix D)*. It allows the examination of complex issues by considering that there may be various causes (Whiteman et al., 2021).

The PACU consists of 20 beds and staffing was dependent on patient volume per day. The unit has surgeons, patient care technicians (PCTs), a unit champion, registered nurses, and nurse managers. Furthermore, it is connected to the preoperative unit and the individual patient spaces were divided by curtains. Patients entered the PACU through the back, where there is a door that leads to the hallways of the OR unit. Other areas in the perioperative department included the OR unit with three separate operating rooms and a red room reserved for emergent procedures, the electroencephalogram (EEG) room, and the lobby/reception room.

The patient begins in the admissions department and are given a set of instructions. They first enter the perioperative department through the reception room, then are led to a sub-area of the pre-operative unit, where they change into a gown and

place their belongings in a secured locker. The pre-assessment sheet, which is located inside the preoperative folder, is completed by the patient and the pre-operative nurse together. The patient is assigned a bed and preparation for the OR begins. Once the operating room and the designated team are ready, the patient walks or is transported by a gurney. The preoperative nurse gives the report to the OR nurse. During the surgery, the OR staff practice infection control precautions, such as maintaining a sterile field and limiting the in-and-outs of the room. The surgical site is closed and the patient, usually still under anesthesia, is transported to the PACU. Again, there is a handoff report between the nursing staff, which in this case is the OR nurse and PACU nurse. The patient is monitored until they are stabilized, demonstrating normal vital signs and not showing any signs of distress. Then the discharge teaching is initiated when the patient is aroused, and the doctor's discharge orders are entered in the electronic health record (EHR). The surgeon will also come to debrief the patient of their surgery, indicating their findings and how it went. As a result of the COVID-19 pandemic, guests are not allowed, and a family member or caregiver is contacted through a telephone call for discharge teaching and pick up information, if indicated. Once discharge teaching is completed, the patient is dressed, and they have collected all of their belongings, they are wheeled down in a wheelchair by a nurse or PCT.

Since approval from regional executives was required to implement and test the change at the time, this QI project's intervention will follow a theoretical PDSA Cycle II. Data relating to compliance and the effectiveness of our intervention were not collected during the project. Furthermore, a Gantt chart was developed to schedule a possible course of the project when the intervention is actually implemented *(See Appendix I)*.

After approval, the Gantt chart and PDSA Cycle II will serve as useful tools to aid in implementing the intervention and determining its impact.

Intervention

During the 12 weeks at the site, it was observed that the typical discharge process was guided by the nurses' clinical expertise and the pre-written discharge packet from the surgeon. In most packets for patients with incisional sites, hand washing was briefly mentioned under wound care instructions in one short sentence. Patients were told to perform hand hygiene, but there were no instructions on how, when, and why. As suggested in several peer-reviewed studies, hand hygiene is important to prevent pathogens from spreading. In post-surgical patients, the surgical site is an ideal entry point for pathogens and their hands are the most probable mode of transmission. By providing appropriate handwashing education, the chain of infection may be broken. The proposed intervention will concisely answer the how, when, and why, ensuring that the patient is fully informed, decreasing the risk of infection, and most importantly, improving patient outcomes.

Standardized 3-Step Hand Hygiene Discharge Teaching

The 3-step hand hygiene discharge teaching is a standardized process aimed to promote consistent patient education for handwashing for all post-operative patients with incisional sites. It is structural yet flexible, informative yet concise, and uncomplicated yet potentially effective. The standardization will promote both staff compliance and consistency, integrating this into their normal routine. Prior to any discharge teaching, the nurse should indicate if a translator or handout of the appropriate language are needed. After the nurse provides the discharge teaching packet from the patient's designated healthcare provider, the nurse will complete the discharge

process with these 3 steps. It will begin with verbal education, which the nurse will review the points that the hand hygiene handout covers with the patient. Next, the nurse will implement education reinforcement through a strategy known as patient teach back, and/or performing hand hygiene while identifying when it should be performed. The method of education reinforcement will be identified by the nurse, determining which one will meet the patient's learning needs. The nurse will then provide feedback and make corrections or suggestions as needed. Finally, the handout will go home with the patient. The 3-step poster can be displayed on the unit to provide staff guidance and reinforcement *(See Appendix E).*

Study of Intervention

Due to the constraints in time and inability to test the intervention, a proposed PDSA Cycle II was created *(See Appendix B).* In the study portion of this PDSA Cycle, it briefly describes the study of the intervention. Auditing strategies will be used to collect the data and later be thoroughly analyzed. The data collection for staff compliance will rely on the nurses' self-audits to determine if they completed the *Standardized 3-Step Hand Hygiene Discharge Teaching* intervention. These self-audits will be an additional sheet in the patient's perioperative folder that will be signed and submitted by the nurse to a designated submission space in the PACU unit (*See Appendix F).* Each nurse assigned to discharge a patient with incisional sites will need to complete this. Another inclusion criterion includes that the patient is discharged the same day and not readmitted to the inpatient units. It will be assumed that the participating nurses are honest with their submissions and that the work culture on the unit fosters an environment that encourages transparency. Conrad & Douma (2015) explain that transparency involved in safety requires a culture that allows the staff to feel safe for

voicing their concerns and mistakes without apprehension of disciplinary action. A signed, initialed, and dated self-audit sheet will represent a success in staff compliance.

At the end of each week, the team will evaluate the self-audits and determine staff compliance during the weekly meetings. The findings will then be discussed, and data interpretation will continue for a total of 12 weeks. On the 13th week, the team will analyze the compiled data of staff compliance. The rate of SSIs will be determined three months after the end of implementing the intervention since an SSI can still be diagnosed 30 days after the procedure or 90 days after the procedure if prosthetic devices are used. This data will be collected through the EHR. Patients within the intervention period timeframe that are readmitted for an SSI will be included in the data. Information such as procedure, procedure date, and general anesthesia will be collected *(See Appendix H)*. The SSI rate will be calculated by diving the total number of SSIs in that period by the number of patient bed days, which is the total occupied beds each day for the month, and then multiplied by 1,000. This data can be used in the future for ongoing evaluation, especially if the intervention or PDSA Cycle must be adjusted and repeated. The purpose of the study step, or evaluation, in the PDSA Cycle, is to determine the next course of actions dictated by the act step. The team will learn how feasible and effective the intervention is, if the expected outcomes are met, and if there are any unexpected problems that arose.

Measures

The measures of this QI project ultimately aim to determine the effectiveness of the intervention in aiding the reduction of SSIs in the unit. The outcome measure is the rate of occurrence of SSI per 1,000 patient days. To affect this outcome aimed to prevent SSIs, this project focuses on the success of appropriate hand hygiene discharge teaching

by nurses. Thus, the process measure is the percent of staff compliance in completing the *Standardized 3-Step Hand Hygiene Discharge Teaching* procedure. The balancing measure is making sure that the intervention does not prolong the discharge process, which can lead to a delay in available beds for incoming patients being admitted into the PACU and in transitioning the patient to the most appropriate level of care, whether they are released home or to another facility.

Ethical Considerations

According to Cutilli (2009), each interaction between a patient and a healthcare staff reflect an informal and implied agreement of receiving and providing care. Symphonology is a theory of how nurses and other providers are directed to make decisions through ethical considerations. They are led by the bioethical standards of autonomy, freedom, objectivity, self-assertion, beneficence, and fidelity. Similarly, the American Nurses Association (ANA) developed the Code of Ethics to guide nurses to practice competently and provide quality care. As healthcare advances in technology, health policy, and research, and nursing practice and roles transform along with it, the Code of Ethics is revised as well (Haddad & Geiger, 2021). The discharge process is no exception to ethics. During the patient education process, the nurse is deciding the best course of actions to teach the patient. Prior to teaching, the nurse assesses the patient's readiness to learn and any relevant information, such as learning deficits. Context awareness allows the nurse to develop an appropriate teaching plan. Ultimately, the goal is to enhance quality of life and outcomes after discharge teaching.

Several standards are applicable to discharge teaching. Although the patient is educated in proper hand hygiene, they still have the right and authority to take action depending on their own personal desires (Cutilli, 2009). Beneficence is practiced

because the nurse provides education to promote wellness in the patient. Likewise, nonmaleficence is practiced because the nurse provides education to prevent infection. Furthermore, Provision 4 of the ANA's Code of Ethics pertains to the nurse being accountable for decision-making when providing care. As previously mentioned, the teaching plan should be well-developed to optimize patient outcomes. Appropriate assessments and the corresponding actions are necessities in safe care. The ability to successfully manage ethical dilemmas is handled through both personal virtues and ethical nursing standards. This project was reviewed by the University of San Francisco as a QI project by faculty using QI review and guidelines; therefore, institutional review board (IRB) approval was not required *(see Appendix G)*.

Section IV: Results

This QI project's inability to implement the intervention resulted in the development of proposed expected results. Ideally, the goal is to have zero SSIs within the 12-week intervention period and 100% nurse compliance. This in comparison to an initial 13 SSIs in nine months and inconsistent, non-standardized hand hygiene discharge teaching. Due to a multitude of factors that could affect the implementation of the *Standardized 3-Step Hand Hygiene Discharge Teaching* process, it is at least expected to have a significant decrease in SSIs and 70% compliance. Although this intervention is meant to reap benefits to the organization, staff, and patients, unintended consequences can arise. Staff may feel that the discharge process is prolonged, delaying the patient from returning home and the delivery of care for others. Over time, it is anticipated that compliance will steadily increase with reinforcement of the intervention. Adjustments and guidance in successfully implementing the intervention will be contingent on the feedback received from those participating. Nevertheless, as a result of decreased SSIs, it is predicted that there will be a reduction in readmissions; thus, there will be a reduction in healthcare costs. Therefore, patients will experience an increase in quality of life.

Section V: Discussion

Summary

In the perioperative department, there was a significant incidence of SSIs in a nine-month period. As a result, observations focused on the processes within the department were made to identify probable causes of the increase in SSIs. Although this project could not implement the change, the various interacting systems, including staff and patients, and their processes, were better understood. The development of SSIs, or HAIs in general, is a complex issue. There are a multitude of factors that can cause and increase the risk of infection. Many of the surgical patients that were admitted had pre-existing underlying conditions, such as diabetes and hypertension. Hand hygiene and comorbidities are just some of the factors that affect the incidence of SSIs. This project aimed to improve and standardize the handwashing discharge teaching. Thus, an enhanced and standardized teaching method targeted for specific populations for other topics of interest could further meet patient learning needs and ultimately improve their quality of life. Additionally, improving the discharge process will allow the patient and nurse to genuinely work as active members of the care team. The patient can practice autonomy and self-determination, while the nurse follows the ANA's Code of Ethics and exercises beneficence, nonmaleficence, and justice. The nurse's responsibility does not end at discharge teaching. Instead, patient education is where it begins. Patients leave the hospital, or any health facility, in hopes of being fully informed to be proactive and optimally provide for their own care. Effective communication and education will promote the patient's well-being outside of the nurse's care. It is the nurse's responsibility to provide the patient with their clinical expertise and community resources to maintain and better their health.

Conclusion

The time spent at this facility was short, but it has given profound insight in the processes, culture, and exceptional patient care in the perioperative unit. This project will allow microsystems and organizations to create a stronger foundation in fundamental practices that may have been overlooked due to the increasing complexity in care and technological advancement in healthcare. Afterall, the macrosystem can only be as good as its microsystems.

After implementation, sustaining this change may be difficult. Many limitations and considerations have been identified. First, there may be resistance from staff due to belief that this intervention is time-consuming, unnecessary, complex, and impractical. The staff's readiness for change should be assessed and an effective plan to create buy-in must be developed. Furthermore, there are limitations within the discharge process itself. Patient's may have conditions that hinder them from optimal learning such as the inability to hear or read, a language barrier, and personal beliefs that affect their desire to learn. As presented in the PDSA Cycle II, a unit champion and staff will be recruited to begin the implementation of the proposed intervention. The unit champion will be responsible for consistently reminding the nurses to complete and submit their self-audits. They will also answer any questions regarding the project and its importance. Other staff will serve as examples in doing the intervention and completing their self-audits, encouraging their coworkers around them. If needed, recurrent in-services or a reminder during huddles will be done. These require a capable unit champion, resilient staff, and a supportive work culture to sustain the project.

In the span of six weeks, a total of 31 observations every Wednesday during the AM shift was collected. For the future, observations and data collection can be done on

other days and shifts to have a better, more generalized data pool. After implementing the proposed intervention, audits on hand hygiene can be performed to track effectiveness. The unit champion can further help enforce the use of this intervention by encouraging and modeling best practices for infection prevention. Designated personnel on the unit can check the folders that are passed around with the patient to determine if the hand hygiene handout is still there or was given to the patient to be taken home. This is also an opportunity for collaboration between the nursing staff and IT to make use of a clinical decision support system that makes a hard stop before the completion of EPIC charting specific to education, ensuring that hand hygiene teaching was performed. This may eliminate the skew of data in the occurrence where nurses complete the intervention, but their self-audit is lost and not processed during the data analyzation period. Lastly, it is suggested that patient surveys are initiated to assess their perceptions on the healthcare staff's effectiveness in infection prevention. Patient engagement and empowerment is important in improving quality of care.

Due to the COVID-19 pandemic and complications in scheduling, this QI project was disseminated in a Zoom conference. The QI project received positive feedback in being able to utilize the nursing process, theories, literature, tools, and QI skills to identify an area of improvement within this microsystem to ultimately improve patient quality of care and outcomes. The project was later approved and will be implemented in the facility's department and possibly other facilities under the same organization.

It is apparent that SSIs can negatively impact the patient and the system. As CDC has noted, SSIs are costly and make up a significant number of readmissions and inpatient days. By improving and standardizing the process of hand hygiene discharge teaching, it is expected that there is an increase in patient and staff engagement,

decrease the incidence of SSIs and readmission rates, reduce costs, and improve health outcomes and patient quality of care.

Section VI: References

Ardizzone, L. L., Smolowitz, J., Kline, N., Thorn, B., & Larson, E. L. (2013). Patient hand hygiene practices in surgical patients. *American Journal of Infection Control*, *41*(6), 487–491. https://doi.org/10.1016/j.ajic.2012.05.029

Atkin, L. (2021). Surgical site infections in vascular patients: The incidence, the impact and the importance of SSI prevention. *Wounds UK*, *17*(3), 86–90.

Brown, C. S., Montgomery, J. R., Neiman, P. U., Wakam, G. K., Tsai, T. C., Dimick, J. B., & Scott, J. W. (2021). Assessment of potentially preventable hospital readmissions after major surgery and association with public vs private health insurance and comorbidities. *JAMA Network Open*, *4*(4), e215503. https://doi.org/10.1001/jamanetworkopen.2021.5503

Centers for Disease Control and Prevention. (2019). Healthcare-associated infections (HAIs). Retrieved from https://www.cdc.gov/hai/ssi/faq_ssi.html

Conrad, R., & Douma, C. (2015). Strategies to engage frontline teams and leaders in sustainable change. *Newborn & Infant Nursing Reviews*, *15*(2), 57–60. https://doi.org/10.1053/j.nainr.2015.04.002

Cutilli, C. C. (2009). Ethical considerations in patient and family Education. *Orthopaedic Nursing, 28* (4), 187-192. doi: 10.1097/NOR.0b013e3181ada78c.

Gagné, D., Bédard, G., & Maziade, P. J. (2010). Systematic patients' hand disinfection: impact on meticillin-resistant Staphylococcus aureus infection rates in a community hospital. The Journal of hospital infection, 75(4), 269–272. https://doi.org/10.1016/j.jhin.2010.02.028

Gaube, S., Schneider-Brachert, W., Holzmann, T., Fischer, P., & Lermer, E. (2021). Utilizing behavioral theories to explain hospital visitors' observed hand hygiene behavior. *American Journal of Infection Control*, *49*(7), 912–918. https://doi.org/10.1016/j.ajic.2021.01.003

Haddad, L. M., & Geiger, R. A. (2021). *Nursing ethical considerations*. StatPearls [Internet]. Retrieved December 7, 2021, from https://www.ncbi.nlm.nih.gov/books/NBK526054/.

Hammoud, S., Amer, F., Lohner, S., & Kocsis, B. (2020). Patient education on infection control: A systematic review. *American Journal of Infection Control*, *48*(12), 1506–1515. https://doi.org/10.1016/j.ajic.2020.05.039

Haverstick, S., Goodrich, C., Freeman, R., James, S., Kullar, R., & Ahrens, M. (2017). Patients' hand washing and reducing hospital-acquired infection. *Critical care nurse*, *37*(3), e1–e8. https://doi.org/10.4037/ccn2017694

Seale, H., Chughtai, A. A., Kaur, R., Crowe, P., Phillipson, L., Novytska, Y., & Travaglia, J. (2015). Ask, speak up, and be proactive: Empowering patient infection control to prevent health care–acquired infections. *American Journal of Infection Control*, *43*(5), 447–453. https://doi.org/10.1016/j.ajic.2015.01.007

Jemebere, W., Deribe, B., Bekele, G., Tenaw, Z., & Fikre, R. (2020). Surgical site infection prevalence and associated factors in Hawassa University comprehensive specialized hospital, Southern Ethiopia. *International Journal of Caring Sciences*, *13*(3), 1573–1581.

Martins, T., Nazareth Amante, L., Vicente, C., Maciel de Sousa, G., Pozzebon Caurio, E., Echevarría Guanilo, M. E., & Balbinot Reis Girondi, J. (2020). Nursing interventions to reduce surgical site infection in potentially contaminated

surgeries: an integrative review. Revista Estima, 18, 1–12. https://doi.org/10.30886/estima.v18.848_IN

McCaughan, D., Sheard, L., Cullum, N., Dumville, J., & Chetter, I. (2018). Patients' perceptions and experiences of living with a surgical wound healing by secondary intention: A qualitative study. *International Journal of Nursing Studies*, *77*, 29–38. https://doi.org/10.1016/j.ijnurstu.2017.09.015

McGuckin, M., Waterman, R., Porten, L., Bello, S., Caruso, M., Juzaitis, B., Krug, E., Mazer, S., & Ostrawski, S. (1999). Patient education model for increasing handwashing compliance. American journal of infection control, 27(4), 309–314. https://doi.org/10.1016/s0196-6553(99)70049-0

National Healthcare Safety Network (NHSN). (2021, January). Surgical site infection infection event (SSI) - CDC. Center for Disease Control. Retrieved November 3, 2021, from https://www.cdc.gov/nhsn/PDFs/pscManual/9pscSSIcurrent.pdf?agree=yes

Ojala, M. (2017). Locating and Creating SWOT Analyses. *Online Searcher*, *41*(1), 59–62.

Pop-Vicas, A., Stern, R., Osman, F., & Safdar, N. (2021). Variability in infection surveillance methods and impact on surgical site infection rates. *American Journal of Infection Control*, *49*(2), 188–193. https://doi.org/10.1016/j.ajic.2020.06.211

Site Infections Reduced for Post-op Cesarean Section Patients. (2018). *Case Management Advisor*, *29*(2), 22–23.

Surgical site infections. Johns Hopkins Medicine. (n.d.). Retrieved December 6, 2021, from https://www.hopkinsmedicine.org/health/conditions-and-diseases/surgical-site-infections.

Tartari, E., Weterings, V., Gastmeier, P., Rodríguez Baño, J., Widmer, A., Kluytmans, J., & Voss, A. (2017). Patient engagement with surgical site infection prevention: an expert panel perspective. Antimicrobial resistance and infection control, 6, 45. https://doi.org/10.1186/s13756-017-0202-3

Whiteman, K., Yaglowski, J., & Stephens, K. (2021). Critical thinking tools for quality improvement projects. *Critical Care Nurse*, *41*(2), e1–e9. https://doi.org/10.4037/ccn2021914

Section VII: Appendices

Appendix A. Hand Hygiene Discharge Teaching Initial Observations Sheet

Hand Hygiene Discharge Teaching Observation Form

Type of Surgery	Was hand hygiene education provided?	Was hand hygiene education reinforced?	Was the unit's handout on hand hygiene in the patient's folder?	Was the unit's handout on hand hygiene sent home with the patient?
	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
	☐ Yes ☐ No	☐ Yes ☑ ~~No~~	☐ Yes ☐ No	☐ Yes ☐ No

Appendix B. PDSA Cycle I & II

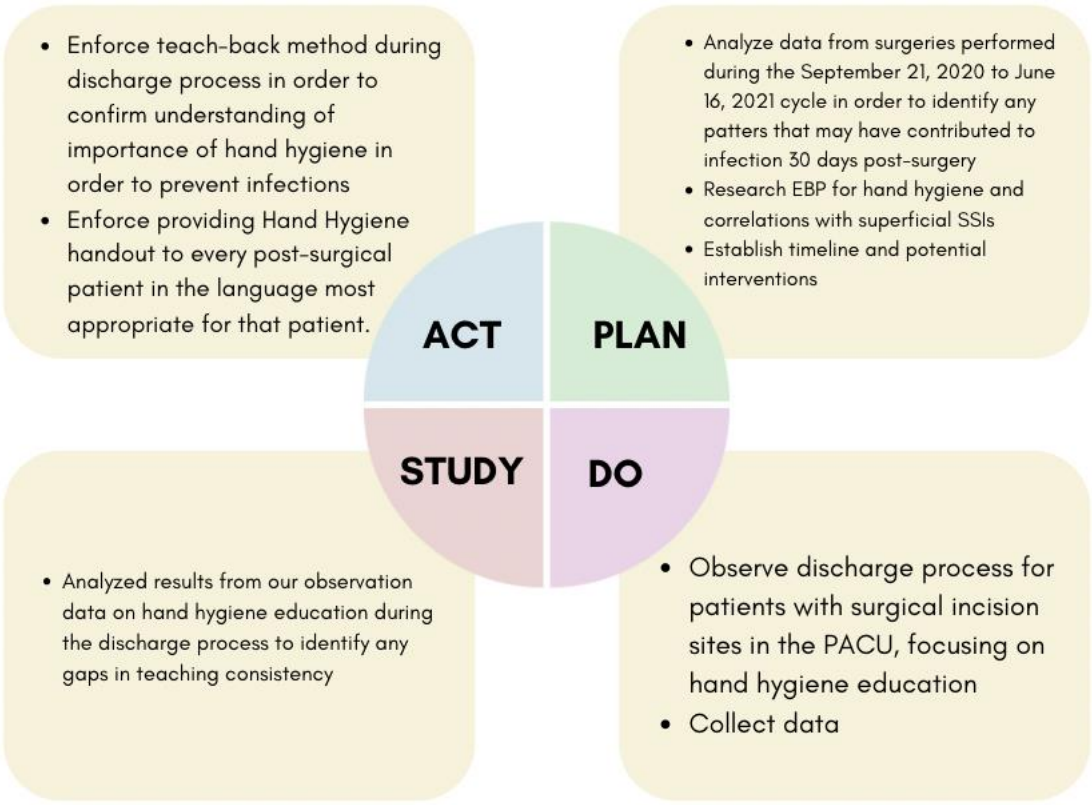


Figure A-1. *PDSA Cycle I* – The initial PDSA cycle was created to guide the assessment of discharge teaching in regard to hand hygiene in the PACU.

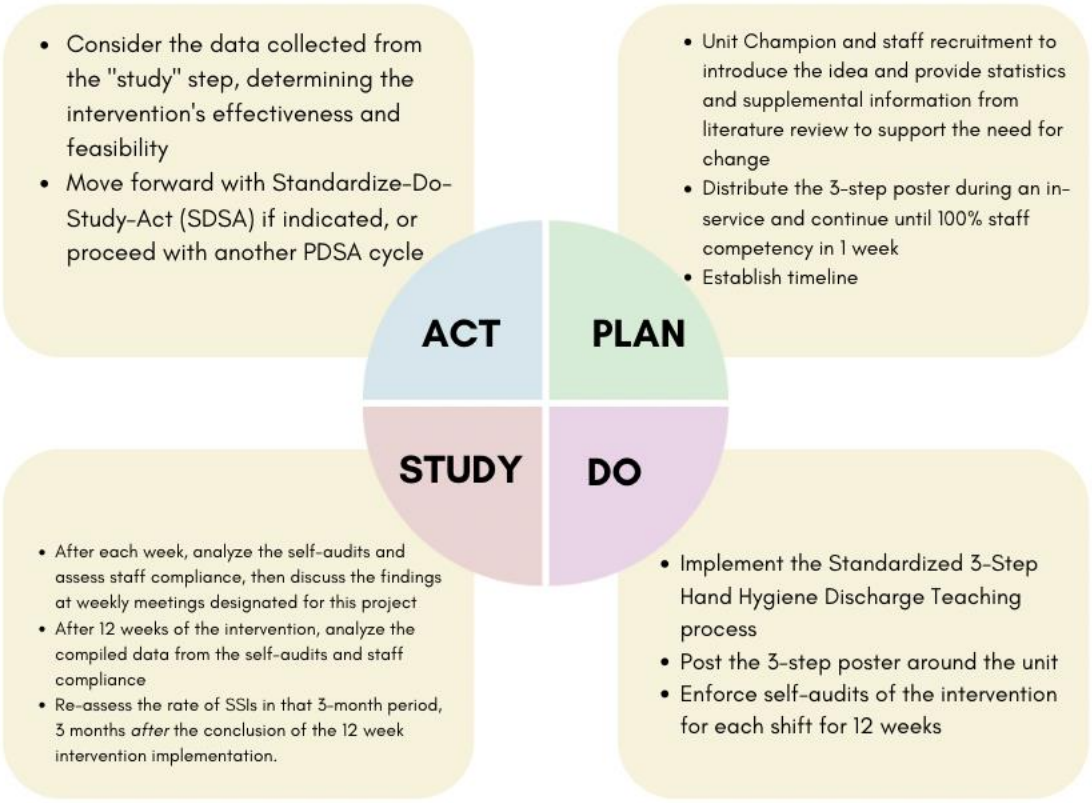


Figure A-2. *PDSA Cycle II* – The second PDSA cycle theoretical in the case that the intervention is tested in the PACU. This cycle may have to be repeated in the future to further assess the project's effectiveness and feasibility.

Appendix C. SWOT Analysis

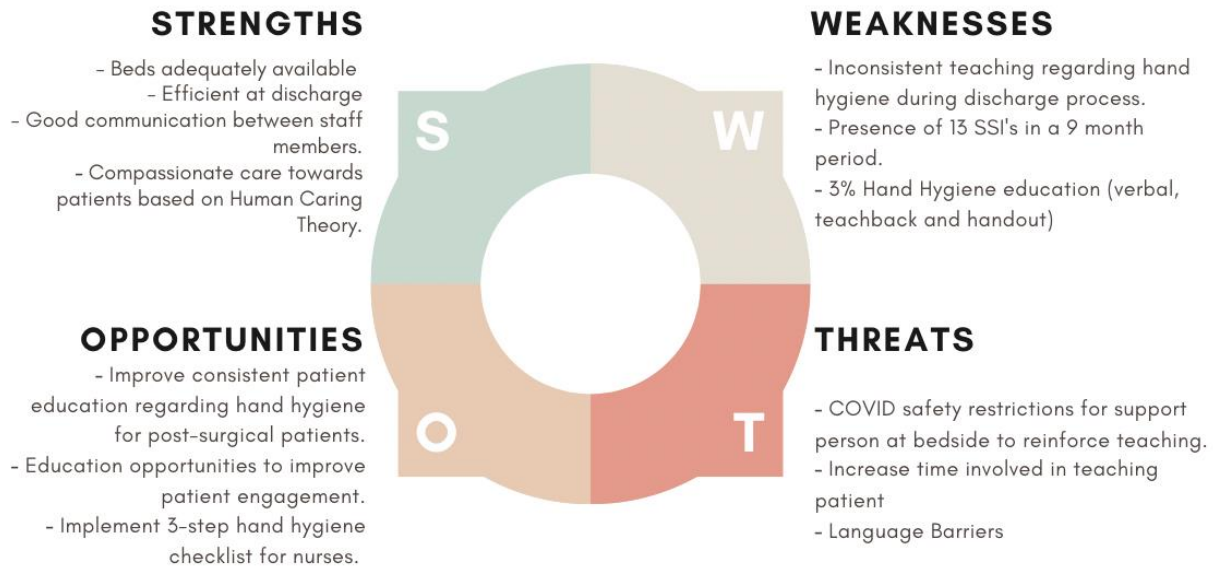


Figure B. The SWOT analysis was utilized to assess the internal and external factors in relation to the PACU and its environment (i.e. organization and global events) that could affect the success of this project.

Appendix D. Fishbone Diagram

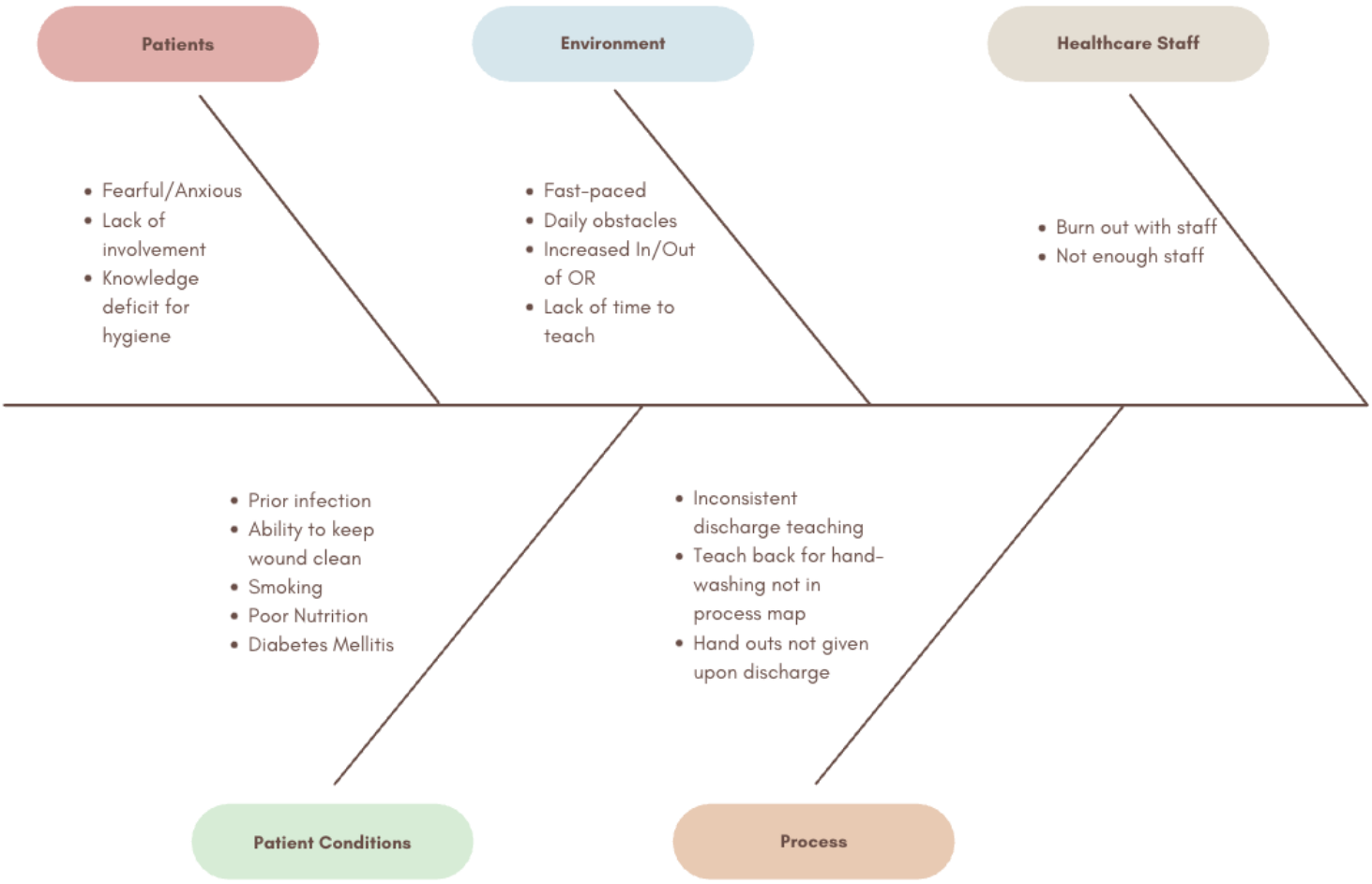


Figure C. The fishbone diagram is a visual representation of the RCA performed, representing the possible causes of SSIs in the facility.

Appendix E. 3-step Poster

UNIVERSITY OF SAN FRANCISCO
SCHOOL OF NURSING AND HEALTH PROFESSIONS

3-STEP HAND HYGIENE DISCHARGE TEACHING *Guide*

1
Verbal Education
Refer to the hand hygiene handout as a guide to verbally educate the patient.

2
Education Reinforcement
Review different modes such as teach back, demonstration, and roleplay.

3
Handout
Ensure the handout is disucussed and taken home with the patient.

WHO SHOULD RECIEVE DISCHARGE TEACHING ON HAND HYGIENE?

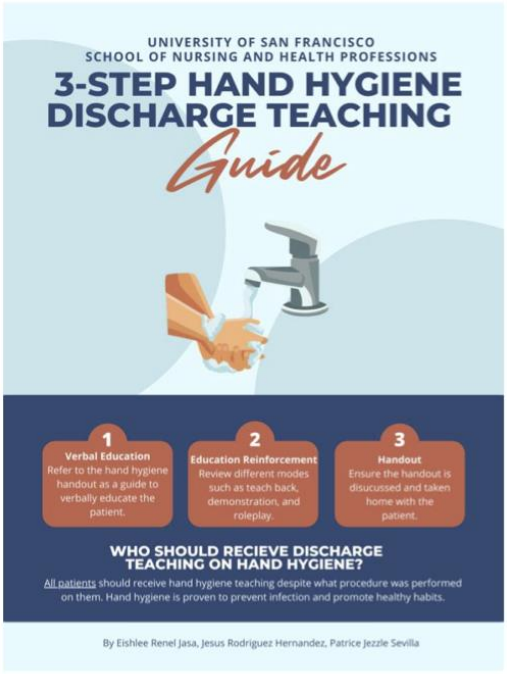
All patients should receive hand hygiene teaching despite what procedure was performed on them. Hand hygiene is proven to prevent infection and promote healthy habits.

By Eishlee Renel Jasa, Jesus Rodriguez Hernandez, Patrice Jezzle Sevilla

Appendix F. Self-Audit

Self-Audit

Standardized 3-Step Hand Hygiene Discharge Teaching



Sign, initial, and date if you completed the 3-step process above.

Name	Initial	Date

Appendix G. IRB Non-research Determination Form

[redacted]

UNIVERSITY OF SAN FRANCISCO School of Nursing and Health Professions

[redacted] This project meets the guidelines for an Evidence-based Change in Practice Project as outlined in the Project Checklist (attached). Student may proceed with implementation.

☐ This project involves research with human subjects and must be submitted for IRB approval before project activity can commence.

Comments:

EVIDENCE-BASED CHANGE OF PRACTICE PROJECT CHECKLIST *

Instructions: Answer YES or NO to each of the following statements:

Project Title:	**YES**	**NO**
The aim of the project is to improve the process or delivery of care with established/ accepted standards, or to implement evidence-based change. There is no intention of using the data for research purposes.	X	
The specific aim is to improve performance on a specific service or program and **is a part of usual care**. ALL participants will receive standard of care.	X	
The project is **NOT** designed to follow a research design, e.g., hypothesis testing or group comparison, randomization, control groups, prospective comparison groups, cross-sectional, case control). The project does **NOT** follow a protocol that overrides clinical decision-making	X	
The project involves implementation of established and tested quality standards and/or systematic monitoring, assessment or evaluation of the organization to ensure that existing quality standards are being met. The project does **NOT** develop paradigms or untested methods or new untested standards.	X	
The project involves implementation of care practices and interventions that are consensus-based or evidence-based. The project does **NOT** seek to test an intervention that is beyond current science and experience.	X	
The project is conducted by staff where the project will take place and involves staff who are working at an agency that has an agreement with USF SONHP.	X	
The project has **NO** funding from federal agencies or research-focused organizations and is not receiving funding for implementation research.	X	
The agency or clinical practice unit agrees that this is a project that will be implemented to improve the process or delivery of care, i.e., **not** a personal research project that is dependent upon the voluntary participation of colleagues, students and/ or patients.	X	
If there is an intent to, or possibility of publishing your work, you and supervising faculty and the agency oversight committee are comfortable with the following statement in your methods section: *"This project was undertaken as an Evidence-based change of practice project at X hospital or agency and as such was not formally supervised by the Institutional Review Board."*	X	

ANSWER KEY: If the answer to **ALL** of these items is yes, the project can be considered an Evidence-based activity that does NOT meet the definition of research.

Appendix H. Post-Intervention SSI Data Collection Excel Sheet

Procedure	Proc date	Anesthesia	ASA	Wound Class	PATOS?	Emergent	Date of Infection	Type of SSI	BMI	Incision start	Antibiotic/ Time	Pre-op Prep	Surgical prep	Hair removal	Temp on arrival to PACU	DM	OR #
THA	*2/20/2019*	*Spinal*	*2*	*1*	*wxa*	*NO*	*3/15/2019*	*PJI*	*22.00*	*10:49pm*	*Ancef 2 Grams IV 1029am*	*preop shower night before and wipe day of OR*	*CHG W/ALCOHOL*	*none*		*no*	*2*
HPRO	*1/16/2019*	*Spinal*	*2*	*1*	*N*	*NO*	*2/11/2019*	*PJI*	*28.00*	*11:20am*	*Ancef 3Grams IV 1114am*	*not done (documented see note by Scott Whitehall- no note found in EMR*	*CHG W/ALCOHOL*	*none*	*Temp not taken in PACU. Temp 5hours post op was 97.9*	*no*	*9*

Surgeon	Scrub Staff	RN	Anesth/ CRNA	MD Review	Smoking	Time from OR to infections	Organism if cultured	ETOH	Irrigation	Clean closing tray?	Wound Protector?	Comments
Sadr	*Surrell, Muvaura*	*Lao, Nguyen*	*Carella/ Sohrabi*	*Dr. Cortese/Dr. Shor & Dr. Jacobson*	*Never*	*23 days*	*Serratia marcescens*	*no*	*Pulsatile lavage*			
Grimsrud, Christophoer	*Johnson*	*Atio*	*Chang/Latronica*	*Dr. Naheed/OR MD Champion*	*yes quit 1/15/1983*	*26 days*	*Serratia marcescens & Morganelli morganni*	*no*	*Betadine irrigation*	*N/A*	*N/A*	*Hematoma due to right hip implant 2/10/2019*

Figure D. The shaded boxes represent the headings of the data to be collected from patients that are readmitted for an SSI. The two following rows are sample data that would be appropriate for their corresponding column.

Appendix I. Gantt Chart

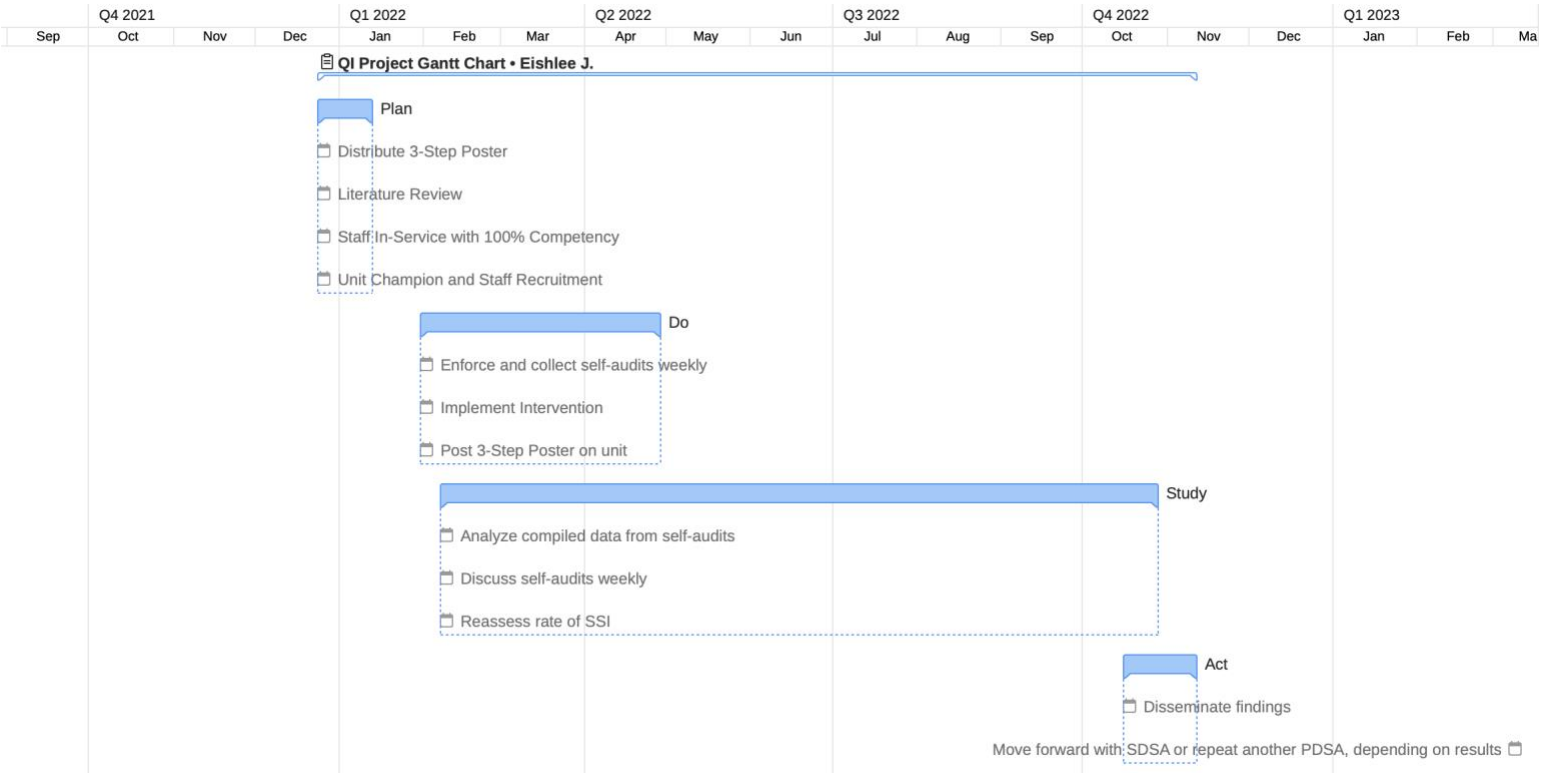


Figure E. The second PDSA cycle is projected to occur in the span of approximately 11 months. The Gantt chart above is divided into the different stages of PDSA II with the sub-tasks under each one.

Appendix J. Evaluation Table

PICOT Question: In post-surgical adults (P), how will consistent hand hygiene discharge teaching in the form of verbal education, education reinforcement, and handouts (I), compared to inconsistent hand hygiene discharge teaching (C) influence the rates of surgical site infections (O) within one year (T)?

Study	Design	Sample	Outcome/Feasibility
Gagné et al. (2010)	Clinical Trial Study	Patients in a community hospital	This study suggests that patient hygiene must not be neglected. MRSA is predominantly transmitted by hand, and all hands are capable of transmitting pathogens that cause infection.
Martins et al. (2020)	Integrative Review	9 primary/original, qualitative and/or quantitative research articles between January 1, 2008 and July 31, 2018, in English, Portuguese or Spanish; written by at least one nurse, focusing on SSIs in potentially contaminated surgeries	This study found that nursing interventions, including hand hygiene in both pre- and post-operative phases, were identified in each perioperative period are essential for nursing care and effective in reducing surgical site infection in potentially contaminated surgeries.
Site Infections Reduced for Post-op Cesarean Section Patients (2018)	Periodical Article	Women who underwent a C-section	The article discusses that a hospital reduced their rate in superficial SSIs in women with C-sections by using a smaller steri-strip and

			emphasizing hand hygiene.
Hammoud et al. (2020)	Systematic Review	25 articles total: 8 studies – education on health care-associated infections was investigated 1 study – education on central line-associated bloodstream infections in 2 studies – education on surgical site infections 12 studies – education on hand hygiene 3 studies – education on isolation rationale, precautions, usage of personal protective equipment 1 study – education on respiratory hygiene	They found that there was a low percentage of patient education on infection control, concluding that there needs to be an emphasis in patient involvement.
Ardizzone et al. (2013)	Quasi-experimental	72 patients and 42 nurses	This study suggests that there should be an increase in hand hygiene efforts towards both patients and healthcare staff.
Seale et al. (2015)	Controlled Experiment	60 surgical patients of various procedures	The study suggests that patients want to be engaged in infection prevention when in the hospital setting.

Tartari et al. (2017)	Expert Panel	N/A	The articles discussed 9 recommendations for SSI prevention for healthcare workers to use to educate and engage their patients.
Haverstick et al. (2017)	Experimental	Patients in a cardiothoracic post-surgical unit	The study found that the decreased infection rates and increased compliance with hand hygiene among the patients may be associated with the implementation of (1) patient education and (2) the increased accessibility and use of hand sanitizer.
McGuckin et al. (1999)	Controlled Experimental	Patients in 4 community hospitals	The study found that when patients monitor healthcare workers compliance in handwashing, it can increase soap usage and handwashing and provide sustainable reinforcement of handwashing principles for healthcare workers.