Speak Up for Hand Hygiene and Decrease Healthcare Associated Infections

Bernadette Priya Pandya-Orozco

California State University, Northern California Consortium Doctor of Nursing Practice

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Speak Up for Hand Hygiene and Decrease Healthcare Associated Infections

Bernadette Priya Pandya-Orozco

A doctoral project completed in partial fulfillment of the requirements for the degree of Doctor of Nursing Practice in the Valley Foundation School of Nursing, San José State University

April 2023
# Doctoral Project Team Members

<table>
<thead>
<tr>
<th>Name</th>
<th>Title and Affiliation</th>
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<tbody>
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<table>
<thead>
<tr>
<th>Name</th>
<th>Title and Affiliation</th>
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<tbody>
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Dedication

To share my inspiration for this project would be to quote Dr. Donald Berwick’s plenary address at the December 2004 Institute for Healthcare Improvements (IHI’s) 16th Annual National Forum on Quality Improvement in Health Care.

"The names of the patients whose lives we save can never be known. Our contribution will be what did not happen to them. And, though they are unknown, we will know that mothers and fathers are at graduations and weddings they would have missed, and that grandchildren will know grandparents they might never have known, and holidays will be taken, and work completed, and books read, and symphonies heard, and gardens tended that, without our work, would never have been. “Donald M. Berwick, MD, MPP, President Emeritus, Institute for Healthcare Improvement

This quote embodies why I am passionate to do this work and strive every day for the belief that hand hygiene compliance can be 100% and that zero harm is achievable.

Acknowledgements

I would like to thank my family and friends for their tremendous support in this journey to achieve my lifelong dream as I could not have achieved it without them.

I also would like to acknowledge my DNP Chair Dr. Lisa Walker-Vischer, my mentor Dr. Minal Kapoor, The O’Connor Executive Leadership and the PCU Unit Leadership for without their contributions this project would not be possible.
Speak Up for Hand Hygiene and Decrease Healthcare Associated Infections

Bernadette Priya Pandya-Orozco, DNP(c), RN, PHN, CIC

Doctor of Nursing Practice Program
The Valley Foundation School of Nursing

San José State University

April 30, 2023
Abstract

Background: Hand hygiene (HH) is one of the most cost-effective and simplest ways to reduce healthcare associated infections (HAIs). Incorporating Speak Up for hand hygiene enables healthcare workers (HCW) to communicate without fear when they observe noncompliance with HH requirements.

Objective: To increase HH compliance by utilizing Agency for Healthcare Research and Quality (AHRQ) TeamSTEPPS education to encourage Speak Up for HH and lead to reduction in HAIs.

Methods: The researcher provided educational training on “Speak Up for Hand Hygiene” and performed regular audits to examine its effects on one hospital unit in a California Bay Area healthcare system. A pretest/posttest was provided to measure the participants’ understanding of “Speak Up culture.” Trained auditors observed hand hygiene occurrences: entering and exiting patient care areas.

Results: The results were analyzed using a two-tailed paired sample t-test which was significant based on an alpha value of .05, \( t(17) = -5.43, p < .001 \), indicating the null hypothesis can be rejected. The results for HH compliance were statistically significant, increasing from 89.79% pre-Speak Up training to 94.71% post-intervention. A Chi-square Test of Independence was conducted, and the results showed they were independent of each other and were significant based on an alpha value of .05, \( \chi^2(1) = 4.97, p = .026 \).

Conclusion: The number of HAIs can be reduced by implementing Speak Up training for Hand Hygiene. Additionally, performance improvement can be sustained when leadership and the culture of the organization welcome transparency and empower Speak Up for Hand Hygiene.

Keywords: hand hygiene, HAIs, teaching Speak Up through AHRQ TeamSTEPPS, Auditing
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Healthcare Associated Infections

The House of Representatives cited HAIs as the sixth leading cause of preventable death and discussed mitigating strategies to prevent HAIs, such as adherence to hand washing, which are not costly (Healthcare-Associated Infections, 2009). Numerous quality initiatives exist that are targeted to reduce HAIs, for example, the requirements set forth by the Health and Human Services (HHS) program (Department of Health and Human Services, 2022). These initiatives drive efforts for quality improvement by setting goals for hospitals focused on harm reduction, such as hand hygiene and adherence to evidence-based practices. These targets are specific and aim at reductions in several HAI classifications, such as hospital onset Clostridioides difficile infections (HO-CDI), central line associated bloodstream infections (CLABSIs), catheter associated urinary tract infections (CAUTIs), and surgical site infections (SSIs) (Health and Human Services, 2022).

A study involving multiple diverse hospitals within the United States found that one in every twenty-five patients will acquire at least one healthcare associated infection (HAI) during their admission (Magill, et al., 2014). These infections can lead to significant harm for patients and even to loss of life. HAIs are conditions patients contract related to care or lack thereof while in healthcare settings. These infections can be widespread, frequently occurring either during surgical procedures or involving in-dwelling devices, such as central lines and urinary catheters as well as surgical procedures (Jeeva & Wright, 2014). HAIs can occur in any setting, including ambulatory care, acute care hospitals, and long-term care facilities. However, HAIs are preventable if evidence-based strategies are implemented to increase hand hygiene compliance.
Hand Hygiene (HH) as a Strategy to Eliminate HAIs

One strategy which can help prevent the spread of HAIs is to educate and promote hand hygiene (HH) compliance (Healthcare-Associated Infections, 2009). Hand hygiene is a fundamental infection prevention practice and linked to reducing HAIs as well as the spread of multidrug-resistant organisms (Sax et al., 2007). Although these organisms live everywhere, even on inanimate surfaces, most of them can be easily killed with the use of alcohol-based hand sanitizers (Boyce & Pittet, 2002). Centers for Diseases Control and Prevention (CDC) (2022) research has demonstrated that washing hands can decrease deaths from diarrheal disease by up to 50%, one of many diseases hand hygiene can prevent. The CDC also states that if everyone regularly washed their hands, over one million deaths could be prevented (CDC, 2022).

The efficacy of handwashing has been known to the scientific community for almost two hundred years. In the early 1800s, Ignaz Semmelweis studied the correlation between lack of hand hygiene and increased patient infections resulting in death, hypothesizing that contaminated hands, especially after autopsies, increased mortality rates (Pittet & Boyce, 2001; Boyce & Pittet, 2002). His work promoting HH compliance with chlorinated lime juice after performing autopsy exams and every patient encounter significantly reduced the mortality rate and is considered the first study to associate increased HH compliance with reduction in patient mortality (Pittet & Boyce, 2001). Over the past two centuries, scientists have discovered more and improved ways of ensuring hand hygiene, which have saved countless lives.

Hand Hygiene Compliance Barriers

Despite the groundbreaking work completed by Semmelweis that occurred more than two hundred years ago, we are still struggling to perform this basic infection prevention practice as hand hygiene (HH) compliance remains low among healthcare workers (HCWs) (CDC, 2022).
Many variables have been identified for the lack of compliance, including accessibility, feasibility, and organizational culture. Obstacles related to accessibility and feasibility include irritation caused by hand washing agents, inconveniently located hand washing stations, staff having too many tasks and not enough time, staffing constraints, or interference with patient/HCW relationships (CDC, 2022). Moreover, the number of opportunities to perform hand hygiene during one shift can require the HCW to perform HH up to 100 times as they enter and exit patient care areas multiple times an hour, which can be a barrier (CDC, 2022).

A problematic aspect of organizational culture can be the perception that HAI acquisition is not seen as a high priority, and fellow coworkers are concerned about how they will be perceived if they enforce accountability (Pittet & Boyce, 2001). When change is necessary, systems are not always prepared to accommodate the adjustments related to performance improvement work (Pittet, 2001). The hectic nature of healthcare settings cannot always be helped, but the organizational culture can encourage rather than deter friendly accountability.

**Organizational Culture Change**

Without organizational system support, one cannot expect improvement in hand hygiene compliance (Pittet, 2001). Several variables need to be considered when looking to improve hand hygiene accessibility and feasibility, but one of the most important variables is assessing whether the organization’s culture fosters strategies that encourage speaking up when opportunities for hand hygiene are identified (Goedken, 2019; Pittet, 2001). Creating an organizational culture that welcomes and states the need for transparency when barriers are identified will empower staff and providers to speak up in order to decrease HAIs (Robbins & McAlearney, 2016). It is important for hospitals to shift their culture, open the channels of communication, and welcome feedback from staff in order to increase patient safety (Boysen, 2013). Scholars Dwyer, Shon and
Larin (2013) discussed that support for organizational culture change requires a strong leadership team that embodies transformational leadership characteristics. However, for leadership to be effective, a clear and achievable strategy is necessary.

## Speak Up for Hand Hygiene

There are numerous studies to support the importance of staff holding each other accountable for hand hygiene (HH) and speaking up when HH opportunities arise (Fuller et al., 2012; Linam et al., 2017; Stewardson et al., 2016). There are multiple encounters which require HCWs to perform hand hygiene, such as entering and exiting patient rooms. When noncompliance with hand hygiene is observed, it is important for staff to Speak Up and remind one another to perform hand hygiene. Speaking up for HH reduces healthcare associated infections (HAI) and increases patient safety (H.R. Rep. No. 110-122, 2008; Linam et al., 2017). Implementing a Speak Up initiative as an approach to improve hand hygiene requires an organization culture shift that supports empowerment of staff and providers without fear of retaliation or hostility (Erasmus et al., 2009; Westover, 2020).

## Speak Up Strategy

According to Westover (2020), “speak up culture” is defined as an environment where employee feedback is valued and where leaders create a safe environment that not only promotes Speak Up but fosters its growth and development. One of the differentiating aspects of a Speak Up intervention is the willingness of leadership to participate in the feedback and encourage the Speak Up culture. In a study by Linam et al. (2017), they implemented a multimodal intervention strategy that incorporated Speak Up for HH as well as leadership support, HCW knowledge, supply availability, and culture change. This study demonstrated results of increased and sustained hand hygiene scores >95% after a 4 year period. It is likely that the required leadership
support of the cultural change influenced the success of the Speak Up initiative. This along with a study by Henriksen and Dayton (2006) illustrate that an important aspect of the Speak Up strategy is the leadership support to discourage silence and encourage all staff to speak up for patient safety.

Additionally, Fuller et al. (2012) performed a study from 2006 to 2009 to see whether feedback intervention (FIT) was more effective than routine practice. This three-year randomized control trial across sixteen hospitals in England and Wales included the utilization of the World Health Organization (WHO) safety challenge, verbal feedback during observation, and personalized action plans. This study showed that if the ward leadership had already instituted the national HH guidelines, there was a marked improvement in HH compliance of an increase of 13-18% in intensive therapy units with 10-13% in the general care units (Fuller et al., 2012). This FIT strategy also shows that a consistent improvement in HH compliance is possible with verbal feedback intervention and leadership support; however, Fuller et al. (2012) proposed a sustained trial that incorporated behavioral theory may provide improved results.

Similar to the FIT strategy in the study conducted by Fuller et al. (2012) and the Speak Up initiative during Linam et al.’s study in 2017, a study conducted by Stewardson et al. (2016) from 2010 to 2012 implemented what they labeled enhanced performance feedback. Selecting from sixty-seven wards in Switzerland, researchers chose twenty-one wards to implement enhanced performance feedback, twenty-four wards to implement that intervention plus patient participation, and twelve wards were removed from the study (Stewardson et al., 2016). The enhanced performance feedback strategy included training, awareness raising, information of WHO’s HH guidelines, and immediate feedback during observations when feasible. This latter tactic resembled the Speak Up strategy outlined in this proposal. After Stewardson et al. (2016)
established a baseline HH compliance pre-intervention for one year, researchers found that there was an increase in HH compliance from 66% to 75% in the enhanced feedback performance group along with the increase in compliance still in effect after two years. This study shows that along with general HH education, interventions with regular feedback similar to Speak Up have potential to not only increase HH compliance during the intervention but afterwards as well.

While bringing attention to WHO’s and/or the CDC’s HH guidelines helps HH compliance, adding Speak Up education could enhance results. Utilizing a standardized approach to Speak Up education ensures consistent and clear communication regarding expectations and goals. In 2013, the Agency for Healthcare Research and Quality (AHRQ) developed evidence-based training modules to improve communication and teamwork among healthcare team members (Agency for Healthcare Research and Quality, 2013). These modules have been utilized successfully nationwide to educate healthcare workers on the importance of open communication with a standardized approach (Agency for Healthcare Research and Quality, 2013).

Despite studies that demonstrate the effectiveness of Speak Up or similar strategies to increase HH compliance, the potential efficacy of those interventions could have been negatively impacted by other contributing factors and barriers on a personal, interpersonal, and/or organizational level (Fuller et al., 2016; Linam et al. 2017; Stewardson et al., 2012).

**Healthcare Worker (HCW) Barriers Related to Hand Hygiene Compliance**

Multiple physical barriers exist for hand hygiene (HH) compliance related to the accessibility and feasibility, such as the locations of hand sanitizers or hand-washing sinks and the inability for staff to place items down and perform HH before entering a patient room. Additional perceived barriers include time constraints related to the act of performing hand
hygiene and the idea that one missed opportunity for HH will not result in patient harm (Boyce & Pittet, 2002). To address these concerns, organization-wide systematic reviews of facilities and practices would be necessary. However, possible solutions and adjustments could be outside the organization’s budget. Nevertheless, there are still ways to increase HH compliance through interpersonal interactions and organizational culture that will fit within the current physical or location-based constraints.

**Healthcare Worker (HCW) Barriers Related to the Speak Up Strategy**

Overall, healthcare workers recognize Speak Up as important when it comes to patient safety; however, when situations involve unprofessional behaviors by others, interpersonal complications can diminish the urgency to intervene (Kennedy et al., 2020). According to Palatnik (2006), poor communication has been identified as one of the root causes of reported harmful events and has contributed to significant patient harm and mortality rates. One survey reported that 49% of HCWs felt uncomfortable questioning actions of those with perceived authority, and 65% feared retaliation for asking questions when they perceived something to be wrong (Palatnik, 2006). Another study conducted with HCWs reported that they observed colleagues making mistakes or taking dangerous shortcuts, but only 1 out of 10 HCWs reported they would speak up about their concerns (Palatnik, 2006). During a 2012 survey of 209 medical students, Samuel et al. learned that 83% were willing to Speak Up to fellow interns, but were reluctant to question the senior staff regarding inappropriate HH. However, the senior staff claimed that they would have been receptive to the feedback, implying that a Speak Up culture would have improved levels of HH compliance. Communication is crucial to patient safety; thus, finding ways to make HCWs more open to Speak Up strategies can help reduce harm.
Addressing the intimidation factor involved in staff hierarchy is important for implementing a Speak Up culture. Martinez et al. (1999) conducted a survey to collect data on attitudes towards Speak Up culture, and most respondents cited fear of conflict as a reason why they were unwilling to speak up to members higher in the staff hierarchy even when traditional patient safety measures were not being followed. Even though implementation of Speak Up culture can decrease patient harm, adjusting the environment to provide an equal voice for all members of the healthcare team is important as well.

Health care workers (HCWs) are from diverse backgrounds and cultures, which creates another barrier to implementation of Speak Up. In a systematic review and meta-analysis by Lee et al. (2021), nine studies were analyzed and showed that perceived hierarchy in the workplace was a major barrier in East Asian cultures as well as the use of direct verbal communication. In their cultures, indirect communication styles are more acceptable, leading to hesitancy to Speak Up when they observe a lack of HH compliance. This difference in communication expectations can create not only miscommunications and tension in the workplace but even confrontation from leaders. According to Henriksen and Dayton (2006), the term “organization silence” is used to define when organizations take no actions on these significant issues. In an article by Merrill (2017), not speaking up equates to acceptance of the behavior of the oppressor, such as those confrontational members of authority, and in the case of hand hygiene their non-compliant behaviors. Therefore, the Speak Up strategy requires encouragement of open and transparent communication to decrease patient harm while taking into account cultural differences (McGuckin et al., 1999). This is more achievable when Speak Up education is provided in a standardized method on a widespread scale.
In summary, available evidence supports Speak Up as a possible solution to address hand hygiene compliance. While there are physical barriers that affect HCWs ability and willingness to follow HH procedure, change on an organizational level can have positive effects. Hospital leadership can prioritize a culture which empowers staff and providers to Speak Up when opportunities related to basic infection prevention practices, such as hand hygiene compliance, are possible but not followed. Additionally, taking a standardized approach to Speak Up education can attempt to address concerns that involve different communication expectations that HCWs might have. Open and transparent communication decreases patient harm, and Speak Up interventions, such as TeamSTEPPS, can address issues like poor communication and organization silence when those are contributing factors to lack of HH compliance.

Practice Gap and Purpose

Despite the evidence supporting Speak Up and similar interventions, they are not routinely implemented in the hospital setting. The proposed project will address this gap by educating staff on the importance of engaging in Speak Up culture when hand hygiene (HH) opportunities are identified as there is significant evidence supporting the correlation of increased HH compliance reducing HAIs (Centers for Disease Control and Prevention, 2022).

Diffusion of Innovation Theory Framework

Diffusion of innovation (DOI) theory is one of the oldest social science theories and was developed by Everett M. Rogers in 1962 (Halton, 2021). The study of innovation was initiated and developed in the early 1920’s related to advancing technology in agriculture, rural sociology, education, and public health (Ryan & Gross, 1943). Rogers’ DOI theory defines diffusion as a social process through which an idea can spread from individuals who are perceived as respected and are considered credible when making decisions (Rogers, 2003).
Adoption of an innovation is not an automatic process, nor does it occur systematically in a social system (Rogers, 2003); it is a process by which some individuals are more accepting of an innovation than others (Rogers, 2002). In Figure 1, the five adopter categories are listed and defined: innovators, early adopters, early majority, late majority, and laggards. The first two categories of innovators and early adopters are seen as influencers or “change agents”: individuals who are trusted, well-respected, and well-connected peers within the social system. These first two categories have power to sway the early majority category who are rarely leaders within the social system but are earlier to adopt than the average individual, yet they are a significant percentage of the population (Kaminski, 2011).

In Figure 2, the percentages of the population attributed to each of the adopter categories are delineated (Kaminski, 2011; Rogers, 2003). The next category is the late majority; this group
is slow to adopt the innovation and will usually take their time to see how others experience the innovation, but they can be swayed by peer pressure (Kaminski, 2011). The last category is the laggards; this group does not like change and will usually only adopt the innovation if the alternatives appear worse (Kaminski, 2011).

In this context, adoption requires an individual to do something differently, (Rogers, 2003), for example, a healthcare worker performing a new behavior, such as adding the step of washing hands before initiating a sterile procedure. Innovation decision-making involves a five-step process as depicted in Figure 3: knowledge, defined as when an individual becomes aware of an innovation; persuasion, when the individual forms a positive or negative attitude toward the innovation and seeks additional information; decision, when an individual engages to either accept or reject the innovation; implementation, when individuals incorporate the innovation into use and determines its utility; and confirmation, the final stage which is both interpersonal as
well as intrapersonal since they rely on the relationships between either the innovators, early adopters, or early majority (Kaminski, 2011; Rogers, 2002).

A distinguishing feature of DOI theory is that for many members of a social system, the decision to adopt the innovation depends heavily on the decisions of the other members of the system, namely the innovators, early adopters, and early majority (Dingfelder & Mandell, 2010). The tipping point shown in Figure 2 occurs when a small percentage of the social system, usually the innovators and early adopters, are able to persuade the early majority to implement change, thus pushing the innovation to spread. This leads to acceptance of the innovation occurring at a critical mass level (Gobble, 2019). When the change agents, who only make up approximately 10-20% of social system members, adopt an innovation, the innovation spreads, and after a certain amount of time is considered and accepted as a social norm (Rogers, 2003).

Rogers’ DOI theory continues to be tested and researched in multiple disciplines, such as anthropology, communication, and education (Rogers, 2003). Diffusion of innovation has been
successfully utilized in healthcare to disseminate novel strategies for prevention and treatment of diabetes (Lien & Jiang, 2017). Public health studies have utilized DOI to disseminate interventions related to education on heart disease and prevention of Human Immunodeficiency Virus (HIV) (Green et al., 2009; Svenkerud & Singhal, 1998). Additionally, Rogers (2002) performed a study where drug prevention innovations utilized DOI to help spread and implement new ideas in preventing addiction. DOI theory has been successful in dissemination of new ideas and allows for the flexibility to achieve different outcomes.

**DOI Applicability and Relevance to Speak Up for Hand Hygiene DNP Project**

Rogers’s theory of DOI is applicable to the Speak Up for Hand Hygiene (HH) and will decrease the HAIs quality improvement project because speaking up for HH requires acceptance at a critical mass level (McGuckin et al., 1999; CDC, 2020). Utilization of DOI to diffuse the importance of speaking up for HH will spread and increase compliance in HH by influencing the innovators and the early majority groups. Speak Up education will be disseminated utilizing the Agency for Healthcare Research and Quality (AHRQ) TeamSTEPPS training structure to ensure standardized communication is given to all staff in the selected nursing unit (Agency for Healthcare Research and Quality, 2013). The DOI adopter categories will help structure the identification of the innovators and early adopters that are a part of the selected unit. According to Rogers (2003), utilization of the innovators and early adopters who are trusted peers will help to persuade the early majority and lead to the tipping point and critical mass acceptance of the innovation. Additionally, peer pressure will aid in the late majority of adopters accepting the innovation of Speak Up for Hand Hygiene. The laggards will join once the hand hygiene compliance and HAI reduction data demonstrates the importance of supporting the project’s purpose to decrease HAIs through this DNP project.
The relevance of DOI theory for this DNP project is seen in its five innovation decision-making processes related to dissemination of an innovation. For a visual representation of this project, see Figure 3, which provides an overlay of the DNP project using the five assumptions and the five innovative decision-making processes, demonstrating how the theory will be applied to the project. Engaging the innovators and early adopters in the communication is pivotal to ensure the communication is spread to the early majority and can lead to the “tipping point” (Rogers, 2003). Additionally, the theory provides relevance as it has been utilized in studies to disseminate education in healthcare facilities for prevention strategies.

**Methods**

**Design**

A one-group pretest and posttest design was used to examine the impact of Speak Up education on hand hygiene compliance rates.

**Setting**

The DNP project was implemented at O’Connor Hospital, which is part of the County Santa Clara Health System. O’Connor Hospital is a 358-bed acute care teaching hospital that provides emergency care, critical care, a birthing center, oncology, medical-surgical, medical-telemetry, and perioperative services. The selected unit was the Progressive Care Unit (PCU). This hospital unit is primarily a medical-telemetry floor with 52 beds. The unit is the largest inpatient unit with the highest volume of patient admissions. The hospital’s policy on hand hygiene was utilized as the foundation to perform observational audits for hand hygiene compliance.
Sample

Participants in the study were recruited from all disciplines that provided services in the PCU, such as nursing, nursing assistants, environmental services, medical providers, unit clerks, occupational therapists, physical therapists, respiratory therapists, case managers, and social workers. All shifts were invited to participate via emails to all staff and providers as well as fliers were posted in break rooms, unit huddle boards, and physician lounges. There was no maximum number of participants with no mandatory participation. Pretest and Posttest surveys required the last five numbers of individuals’ mobile phone numbers to keep them anonymous, which were used to identify participants and compare answers.

Description of Measurement and Data Collection

In order to evaluate the effectiveness of education provided on creating a culture of safety, two forms of data collection were conducted. The first data collection tool was created by the researcher and was a pretest and posttest survey with seven questions using a Likert scale (Appendix A). The only demographic information collected was staff type (i.e. nurse, physician, or environmental services). The survey questions posited were to assess the participant’s perceived level of knowledge in Speak Up and its importance in patient safety as well as assess whether participants perceive the organization is supportive of speaking up for patient safety. The Likert scale answers utilized a 5-point scale (1 = strongly agree to 5 = strongly disagree). Administration of the pretest was emailed to all PCU staff and physicians and also offered immediately prior to the education session on Speak Up. The posttest was conducted immediately after education was provided. Each pretest and posttest question was compared separately to determine level of knowledge for each question. Discussion of the pretest and posttest as well as the HH compliance variables are delineated in Table 1.
Table 1

*Pretest and Posttest Questions Scale Variables*

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Operational Definition</th>
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<tbody>
<tr>
<td>Speak Up Education Pretest Scores</td>
<td>Likert scale test 5 point</td>
</tr>
<tr>
<td></td>
<td>(1) Strongly Agree</td>
</tr>
<tr>
<td></td>
<td>(2) Agree</td>
</tr>
<tr>
<td></td>
<td>(3) Undecided</td>
</tr>
<tr>
<td></td>
<td>(4) Disagree</td>
</tr>
<tr>
<td></td>
<td>(5) Strongly Disagree</td>
</tr>
<tr>
<td>Speak Up Education Post-test Scores</td>
<td>Likert scale test 5 point</td>
</tr>
<tr>
<td></td>
<td>(1) Strongly Agree</td>
</tr>
<tr>
<td></td>
<td>(2) Agree</td>
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<tr>
<td></td>
<td>(3) Undecided</td>
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<tr>
<td></td>
<td>(4) Disagree</td>
</tr>
<tr>
<td></td>
<td>(5) Strongly Disagree</td>
</tr>
<tr>
<td>Hand Hygiene (HH) Compliance Entering Patient Care Areas</td>
<td>Aggregated data from secret shopper audits on HH compliance will be entered immediately after rounding on units. Data entered will be in/out compliance of HH data for HCWs entering patient care areas.</td>
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Hand Hygiene Compliance
Exiting Patient Care Areas

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<th>Hand Hygiene Compliance</th>
<th>Exiting Patient Care Areas</th>
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<tbody>
<tr>
<td>Aggregated data from secret shopper audits on HH compliance will be entered immediately after rounding on units. Data entered will be in/out compliance of HH data for HCWs exiting patient care areas.</td>
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The second data collection measured hand hygiene (HH) compliance. Hand hygiene audits were performed by registered nurses who had been trained by infection prevention nurses. All observational audits were performed by nurses who conducted multiple audits, such as central lines and Foley catheters, so as not to attract attention of the staff observed. Hand hygiene compliance monitored two distinct measures: entering and exiting patient care areas, which is similar to the study conducted by Linam et al. (2017). Nurses conducting audits utilized a paper audit tool while performing observations Monday through Friday during the day for a period of three months. Any staff member or physician observed as noncompliant was reminded by stating a phrase “Clean20,” which was developed by the Hospital Acquired Infection taskforce to remind others to perform HH. All healthcare workers (HCWs) were aware of its meaning and usage since this phrase has been shared in unit huddles throughout the year. Even prior to the project, the phrase “Clean20” was known to some members of the staff. Immediately after audits were completed, nurses entered the data into the Infection Control audit spreadsheet which calculated the percentage rate during entering and exiting, and this was reported to the unit leader weekly for a period of three months. The range of compliance was calculated by the number of instances when HH was required and observed, resulting in a percentage range from 0% to 100%. High HH compliance was defined as 90% or greater, and low compliance was defined as
any percentage less than 90%. This data was taken after Speak Up education was provided to the PCU.

**Procedures**

Empowering staff and providers to speak up when opportunities for improvement was correlated to increasing patient safety (Martinez et al., 2017). Implementation of Speak Up culture requires leadership to inspire a shift which allows for communication without fear of retaliation when opportunities for improvement are identified (Kennedy et al., 2020).

First, prior to the Speak Up education sessions, all staff and providers were emailed a pretest questionnaire which did not have any participant identifiers except for the last 5 numbers of their cellphone so the participant answers could remain anonymous. This pretest was given to measure their understanding of Speak Up prior to being provided the educational material. All participants were required to turn in the pretest questionnaire in order to participate either via email or in person when they arrived for the education sessions. Additional pretest questionnaires were available for any participants who did not receive an emailed pretest questionnaire. The completed pretest was required prior to attending the educational sessions.

Second, the researcher provided education to the Progressive Care Unit (PCU) nursing and physician leadership, nursing staff, and ancillary departments on Speak Up for Hand Hygiene (HH) utilizing the methods of TeamSTEPPS to standardize communication (Appendix C). This training was supplemented with a story of harm from the Health and Human Services Agency titled “Partnering to Heal: Teaming-Up Against Health Care-Associated Infections” (Department of Health and Human Services, 2022). This provided an emotional and realistic depiction of the need for Speak Up for hand hygiene. Additionally, a short video on leadership was shared, titled “leadership lessons from Dancing Guy” by Derek Sivers, an author of
philosophy who has provided TED talks on how to start a movement (Sivers, 2010). Training of PCU staff on Speak Up education was supported by the organizational work led by the hospital executive leadership to implement open channels of communication.

Third, immediately after education sessions were provided, all participants were given the posttest questionnaire. Completion of the posttest was required prior to leaving the Speak Up education sessions. All questionnaires were collected and stored in a secure location in the hospital department of Infection Control’s password protected access-only files.

Subsequently, the fourth step analyzed the pretest and posttest data collected and assessed whether the education sessions increased Speak Up comprehension for the participants.

The fifth step involved the audit of healthcare workers performing HH and consisted of measuring hand hygiene compliance entering and exiting patient rooms. Auditors were registered nurses and occasionally student interns, and audit compliance was performed on all shifts Monday through Friday with a goal of ten audits per day for three months.

Concurrently, the data was input into a spreadsheet immediately after audits were completed by the auditor. The researcher assessed the data weekly to measure improvement in hand hygiene compliance over a period of three months. This data included compliance for entering and exiting patient rooms and also delineated observation by discipline. The project timeline is referred to in Appendix B.

Finally, evaluation of the intervention was performed over a three-month period. Hand hygiene compliance rates three months before the project started were compared to compliance rates after the project intervention. The effects of the Speak Up education intervention were determined by comparing the hand hygiene (HH) compliance audits across the project’s duration to determine if there was an increase in compliance in HH. The project evaluation consisted of a
pretest and posttest design. Intellectus software was used to store and analyze the data. Run charts were used to observe week-to-week HH compliance before and after the Speak Up education intervention’s implementation. The analysis of the data was performed using paired t-tests to compare the pretest and posttest knowledge of Speak Up to determine if the mean difference was statistically significant after the education intervention.

IRB

This project received program approval using the San Jose State University IRB exclusion worksheet and was determined to not meet the requirements for human subject’s review.

Risks

There were minimal risks associated with this educational intervention in regard to emotional reaction when healthcare workers were reminded to practice HH. The potential uncomfortable feelings could involve embarrassment or frustration when reminders are given. If subjects were distressed, unit leaders were informed and per standardized processes and protocols, the subjects were referred to the employee assistance program (EAP). The audits performed on HH were deidentified, so any noncompliance was not traced back to any specific participant.

Benefits

There was no direct benefit to participants.

Costs

There were no costs to participants involved in the intervention.

Payment

There was no payment to individuals participating in the intervention.
Confidentiality

All intervention participants’ identities remained anonymous, all paper questionnaires and documents were scanned, and electronic documents were filed in the hospital department of Infection Control’s password protected access-only files. Pretest and posttest Speak Up surveys used the last five numbers of individuals’ mobile phone numbers, which were only used to compare the pretest and posttest survey answers. Hand hygiene audits conducted only documented the staff’s discipline if observed by the auditor as well as compliance entering or exiting patient care areas. Data was stored in a protected electronic spreadsheet without personal identifiers. No participants were identified in any reporting of the results.

Results

Speak Up Training Data

The data from the pre- and post-tests at the Speak Up training prior to the HH compliance auditing were analyzed using Intellectus software. Most of the participants of the Speak Up training sessions were RNs (83.33%), as seen in Table 2.

Table 2

Frequency Table for Nominal Variables

<table>
<thead>
<tr>
<th>Discipline Variable</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>RN</td>
<td>15</td>
<td>83.33</td>
</tr>
<tr>
<td>HSA</td>
<td>1</td>
<td>5.56</td>
</tr>
<tr>
<td>CLERK</td>
<td>1</td>
<td>5.56</td>
</tr>
<tr>
<td>SOS</td>
<td>1</td>
<td>5.56</td>
</tr>
<tr>
<td>Missing</td>
<td>0</td>
<td>0.00</td>
</tr>
</tbody>
</table>

Note. Due to rounding errors, percentages may not equal 100%.

A two-tailed paired samples t-test was conducted to examine whether the mean difference of Pretest Overall and Posttest Overall was significantly different from zero.

Assumptions
**Normality.** A Shapiro-Wilk test was conducted to determine whether the differences in pretest overall and posttest overall could have been produced by a normal distribution (Razali & Wah, 2011). The results of the Shapiro-Wilk test were not significant based on an alpha value of .05, $W = 0.93, p = .222$. This result suggests the possibility that the differences in pretest overall and posttest overall were produced by a normal distribution cannot be ruled out, indicating the normality assumption is met.

The result of the two-tailed paired samples $t$-test was significant based on an alpha value of .05, $t(17) = -5.43, p < .001$, indicating the null hypothesis can be rejected. This finding suggests the difference in the mean of pretest overall and the mean of posttest overall was significantly different from zero. The mean of the pretest overall was significantly lower than the mean of the posttest overall. The results are presented in Table 3, and a bar plot of the means is presented in Figure 4.

**Table 3**

*Two-Tailed Paired Samples $t$-Test for the Difference Between Pretest Overall and Posttest Overall*

<table>
<thead>
<tr>
<th></th>
<th>Pretest Overall</th>
<th>Posttest Overall</th>
<th>$t$</th>
<th>$p$</th>
<th>$d$</th>
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<tbody>
<tr>
<td>$M$</td>
<td>4.41</td>
<td>4.94</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$SD$</td>
<td>0.47</td>
<td>0.12</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$t$</td>
<td>-5.43</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$p$</td>
<td>$&lt; .001$</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$d$</td>
<td>1.28</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note.* $N = 18$. Degrees of Freedom for the $t$-statistic = 17. $d$ represents Cohen’s $d$.

**Figure 4**

*The means of Pretest Overall and Posttest Overall with 95.00% CI Error Bars*
Hand Hygiene Compliance Data

Frequencies and percentages were calculated for the PCU, and healthcare workers (HCWs) audits were conducted from 7a.m. to 3p.m. Hand hygiene audits indicated either yes or no, and whether they were entering (IN) or exiting (OUT) split by the three-month time periods before and after the implementation of training.

From July to September 2022, there were 226 HH audits with an 89.79% compliance rate in the PCU, as shown in Table 4. The most frequently observed HCWs were RNs, numbering 156 (66.38%). All of the audits occurred during the day shift, which was 7 a.m. to 3 p.m. Of the 226 audits, 130 instances (55.32%) were HCWs leaving a patient’s room in the PCU.

After training, from October to December 2022, there were 340 audits with 94.71% HH compliance rate. The most frequently observed HCWs were 247 RNs as well (72.65%). Like before, all of the audits occurred during the day shift. Of the 340 audits, 210 instances (61.76%) were HCWs leaving a patient’s room in the PCU.

Table 4
Month Recode Frequency Table for Nominal Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Pre</th>
<th></th>
<th>Post</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit PCU</td>
<td>226</td>
<td>96.17</td>
<td>340</td>
<td>100</td>
</tr>
<tr>
<td>OR</td>
<td>9</td>
<td>3.83</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>----</td>
<td>----</td>
<td>------</td>
<td>----</td>
<td>----</td>
</tr>
<tr>
<td>Missing</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>235</td>
<td>100</td>
<td>340</td>
<td>100</td>
</tr>
</tbody>
</table>

**HCW Type**

<table>
<thead>
<tr>
<th>HCW Type</th>
<th>Count</th>
<th>Percentage</th>
<th>Count</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>RN</td>
<td>156</td>
<td>66.38</td>
<td>248</td>
<td>72.94</td>
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<tr>
<td>HSA</td>
<td>31</td>
<td>13.19</td>
<td>39</td>
<td>11.40</td>
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<tr>
<td>EVS</td>
<td>7</td>
<td>2.98</td>
<td>17</td>
<td>5.29</td>
</tr>
<tr>
<td>Other</td>
<td>4</td>
<td>1.70</td>
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<td>0.29</td>
</tr>
<tr>
<td>Transport</td>
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<td>0</td>
<td>2</td>
<td>0.59</td>
</tr>
<tr>
<td>LVN</td>
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<td>0</td>
<td>1</td>
<td>0.29</td>
</tr>
<tr>
<td>OT/PT/SP</td>
<td>14</td>
<td>5.96</td>
<td>9</td>
<td>2.66</td>
</tr>
<tr>
<td>RT</td>
<td>3</td>
<td>1.28</td>
<td>4</td>
<td>1.18</td>
</tr>
<tr>
<td>Physician</td>
<td>11</td>
<td>4.68</td>
<td>10</td>
<td>2.94</td>
</tr>
<tr>
<td>Dietary Tech</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>0.88</td>
</tr>
<tr>
<td>CM</td>
<td>2</td>
<td>0.85</td>
<td>2</td>
<td>0.59</td>
</tr>
<tr>
<td>Physician Assistant</td>
<td>1</td>
<td>0.43</td>
<td>1</td>
<td>0.29</td>
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<tr>
<td>Spiritual Services</td>
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<td>0</td>
<td>2</td>
<td>0.59</td>
</tr>
<tr>
<td>Student</td>
<td>1</td>
<td>0.43</td>
<td>1</td>
<td>0.29</td>
</tr>
<tr>
<td>SW</td>
<td>1</td>
<td>0.43</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Imaging</td>
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<td>0.43</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Lab Tech</td>
<td>2</td>
<td>0.85</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>OR Tech</td>
<td>1</td>
<td>0.43</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Missing</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>235</td>
<td>100</td>
<td>340</td>
<td>100</td>
</tr>
</tbody>
</table>

**Shift 7AM to 3PM**

<table>
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<th>Shift 7AM to 3PM</th>
<th>Count</th>
<th>Percentage</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>235</td>
<td>100</td>
<td>340</td>
<td>100</td>
</tr>
<tr>
<td>Missing</td>
<td>0</td>
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</tr>
<tr>
<td>Total</td>
<td>235</td>
<td>100</td>
<td>340</td>
<td>100</td>
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</table>

**Hand Hygiene Yes No**

<table>
<thead>
<tr>
<th>Hand Hygiene Yes No</th>
<th>Count</th>
<th>Percentage</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>211</td>
<td>89.79</td>
<td>322</td>
<td>94.71</td>
</tr>
<tr>
<td>No</td>
<td>24</td>
<td>10.21</td>
<td>18</td>
<td>5.29</td>
</tr>
<tr>
<td>Missing</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>235</td>
<td>100</td>
<td>340</td>
<td>100</td>
</tr>
</tbody>
</table>

**IN OUT**

<table>
<thead>
<tr>
<th>IN OUT</th>
<th>Count</th>
<th>Percentage</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Out</td>
<td>133</td>
<td>56.60</td>
<td>216</td>
<td>63.52</td>
</tr>
<tr>
<td>In</td>
<td>102</td>
<td>43.410</td>
<td>124</td>
<td>36.470</td>
</tr>
<tr>
<td>Missing</td>
<td>0</td>
<td>0</td>
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</tr>
<tr>
<td>Total</td>
<td>235</td>
<td>340</td>
<td>340</td>
<td>100</td>
</tr>
</tbody>
</table>

*Note.* Due to rounding error, percentages may not sum to 100%.
A Chi-square Test of Independence, as seen in Table 5, was conducted to examine whether the three-month time periods prior and after the training were independent of HH compliance, and the results, as seen in Table 5, showed they were independent of each other. The two three-month time periods used during the calculations: July to September of 2022 (Pre) and October to December 2022 (Post). There were two options for the Hand Hygiene category: Yes and No. The results of the Chi-square test, were significant based on an alpha value of .05, $\chi^2(1) = 4.97$, $p = .026$, suggesting that the results in Table 4 and the observed and expected frequencies for hand hygiene compliance, as seen in Table 5, are related to one another. The following level combinations had observed values that were greater than their expected values: the post-intervention result Yes and pre-intervention No. The following level combinations had observed values that were less than their expected values: the pre-intervention result Yes and post-intervention result No.

**Table 5**

<table>
<thead>
<tr>
<th>Month Recode</th>
<th>Yes</th>
<th>No</th>
<th>$\chi^2$</th>
<th>df</th>
<th>$p$</th>
</tr>
</thead>
</table>

*Note.* Values formatted as Observed [Expected].

**Discussion**

The purpose of this project was to increase hand hygiene compliance through Speak Up educational training since focusing on accountability in an encouraging environment has been shown to decrease healthcare-associated infections (HAIs). The evidence supporting Speak Up for Hand Hygiene as a performance improvement project has not been routinely implemented in hospital settings. The one-hour training from this project sought to educate and empower staff to connect their daily work with the importance of Speaking Up for Hand Hygiene when opportunities are identified.
The results from this project are statistically significant and show that incorporating Speak Up for Hand Hygiene increases HH compliance and reduces healthcare associated infections. Prior to training, HH compliance for the PCU was 89.79%, and post-training, the compliance rate was 94.71% that coincided with a reduction in HAIs.

This project was similar to the performance improvement plan conducted by Linam et al. (2017), which was a hospital-wide and multi-modal intervention. This project’s selected unit did not have such a wide intervention; however, both their study and this project showed similar results with increased HH compliance rates.

When Lee et al. (2021) performed their systematic review, they found that a significant barrier for increasing HH was cultural disinclination to contradict authority figures. The nurses’ willingness to speak up is based on many things, and this project did not have the same socio-cultural barriers as their study. Samuel et al. (2012) observed through anonymous surveys that the hierarchical culture in a healthcare setting created barriers for a Speak Up environment. Similarly, this project did not find this to be a contributing factor.

When Morrow et al. (2016) performed their meta-synthesis of eleven articles and discovered four themes regarding the fear of speaking up, such as power dynamics, and commented that nurse managers can have a significant positive or negative effect on whether staff is comfortable speaking up. While the above studies discussed possible barriers regarding the staff culture, it must be noted that for this project, the hospital administration as well as frontline staff embraced Speak Up and encouraged the culture that supported it. For this sort of performance improvement project to be successful, this project indicates there should be strong leadership that embodies the purpose, structure, and environment of Speak Up in order to create a safe space for all staff and providers.
Additional to the success of this project, the researcher used TeamSTEPPS, an evidence-based framework for training and education from the Agency for Healthcare Research and Quality (AHRQ) (Agency for Healthcare Research and Quality, 2013). TeamSTEPPS incorporates team-building into the training, which supports that necessary aspect of Speak Up culture. The training also indicated to “tell a story of harm,” using a real occurrence of losing a patient to an avoidable HAI in order to convey the severity of not speaking up regarding HH compliance. The level of support could be attributed to this storytelling along with the TED talk video on leadership by Sivers (2010). These complementary additions might have added an emotional connection to the need for Speak Up for HH.

To keep the high rate of HH compliance, the institution from this project will need to ensure continued support from the hospital administration and unit leadership along with proactive participation from staff and providers. This support should include the commitment to a culture of safety that encourages Speak Up. Annual and on-boarding education should be provided to current staff and new-hires to reinforce the institution’s commitment to Speak Up for Hand Hygiene. With these efforts, this sustainability plan for increased HH compliance is feasible and will directly correlate with a continual reduction in lower HAIs along with the belief that “zero harm” is achievable.

Limitations

One of the limitations was the necessary small-scale aspect of this project. The ideal study would be a facility-wide approach. The researcher selected one unit, the PCU, that had committed leadership and standardized communication, such as “shift huddles,” to ensure the Speak Up training’s continual influence. Consequently, the lack of implementation of the project facility-wide allowed for possible risk from other units. Hence, this increased the risk of
infection from a transferred patient from units without Speak Up training, and thus potentially lower HH compliance rates. Therefore, if this project were to be implemented elsewhere or continued, awareness should be spread to the whole facility.

Additionally, the institution’s physician champions were not identified for the chosen unit. Due to the diversity of physicians, without a single leader representative, it was difficult to reach all physicians who worked within the facility. Awareness of the Speak Up training could not be disseminated to contractual and/or private practice physicians who care for patients within the chosen unit. As for the project’s participants, a possible reduction in participation in Speak Up education training could have been attributed to technological difficulties with the collection of pre-tests. The application where participants filled out the Speak Up-related pre-test did not work, and thus, they had to complete a paper version, which may have affected participation.

The implications of this study provide a successful example of how this Speak Up training can be implemented in a way that improves HH compliance rates, which subsequently reduces HAIs. Other facilities can achieve similar results if they develop a method to foster a culture of Speak Up for Hand Hygiene while utilizing training from AHRQ’s TeamSTEPPS.

Future research and/or implementation could expand knowledge and address the above limitations by recruiting and educating with a top-down approach. If executives and all leadership are onboard, they can create a standardized implementation of Speak Up for Hand Hygiene training and commitment. With their support, there can be more “Speak Up champions” that would be able to provide accountability and personalization of necessary processes. If a facility has staffing constraints, there is the possibility of creating an electronic learning module that provides required Speak Up for Hand Hygiene education for all staff and providers.
Conclusion

Hand hygiene (HH) has been shown to be the single most effective method of reducing patient harm in hospitals (H. R. Rep. No.110-122, 2008). However, there are many barriers that staff and providers may face that are attributed to reduced HH compliance rates. One solution identified by the researcher was creating a sense of community and an environment that encourages accountability amongst staff and providers. This can be achieved by using an evidence-based methodology like the Agency for Healthcare Research and Quality’s (AHRQ) TeamSTEPPS training. With educational training, HH compliance audits and the leadership’s commitment to fostering a culture of Speak Up, the project’s selected unit saw a significant increase in HH compliance rates, which was correlated with a reduction in healthcare-associated infections (HAIs). This project collected HH compliance rate data from the three months prior to training (89.7%). After the three months following the Speak Up training using the framework of the communication module of TeamSTEPPS along with “stories of harm,” the unit’s HH compliance rate increased to 94.71%. Due to the success of this project, the hospital has begun a facility-wide implementation of Speak Up for Hand Hygiene.
References

Agency for Healthcare Research and Quality (2013). *TeamSTEPPS 2.0: Team strategies & tools to enhance performance and patient safety.*

https://doi.org/10.1086/503164


Goedken, C. C., Livorsi, D. J., Sauder, M., Mark, W., V. W., Chasco, E. E., Chang, N.-C., Perencevich, E., & Reisinger, H. S. (2019). The role as a champion is to not only monitor but to speak out and to educate: The contradictory roles of hand hygiene champions. 14(1), 110. https://doi.org/10.1186/s13012-019-0943-x


https://doi.org/10.1097/pg9.0000000000000035


https://doi.org/10.1016/S0196-6553(99)70049-0


https://doi.org/10.1097/01.CCN.0000503425.05594.02


https://doi.org/10.1016/j.jhin.2007.06.004


https://doi.org/10.1016/S1473-3099(16)30256-0


https://doi.org/10.1080/108107398127337

## Appendix A

### Pretest and Posttest Likert Scale Survey Questionnaire

List Participant Discipline (i.e. EVS, RN, MD, RT, PT): ______________________
Participant Number (last 5 of cellphone number) ______________________

<table>
<thead>
<tr>
<th>5</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly Disagree</td>
<td>Disagree</td>
<td>Undecided</td>
<td>Agree</td>
<td>Strongly Agree</td>
</tr>
</tbody>
</table>

1. **Do you feel your work environment supports speaking up for patient safety?**
   - [ ] [ ] [ ] [ ] [ ]

2. **Do you feel leadership supports speaking up for patient safety?**
   - [ ] [ ] [ ] [ ] [ ]

3. **Do you feel you have the tools/resources to speak up for patient safety?**
   - [ ] [ ] [ ] [ ] [ ]

4. **Do you have a good understanding of what culture of safety means?**
   - [ ] [ ] [ ] [ ] [ ]

5. **Do you have a good understanding of what speaking up means?**
   - [ ] [ ] [ ] [ ] [ ]

6. **Would you feel comfortable asking a peer to perform hand hygiene?**
   - [ ] [ ] [ ] [ ] [ ]

7. **Would you feel comfortable asking a leader to perform hand hygiene?**
   - [ ] [ ] [ ] [ ] [ ]
## Appendix B

### Project Timeline

<table>
<thead>
<tr>
<th>Research Activity</th>
<th>2022</th>
<th>2023</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>May</td>
<td>June</td>
</tr>
<tr>
<td>Contact Primary Advisor for Review</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Proposal Defense</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Start IRB Application Process</td>
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<td></td>
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<tr>
<td>IRB Approval</td>
<td></td>
<td></td>
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<tr>
<td>Pretest on Speak-Up for Hand Hygiene Education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Speak-Up for Hand Hygiene Education Inservice using AHRQ TeamSTEPPS</td>
<td></td>
<td></td>
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<tr>
<td>Posttest on Speak-Up for Hand Hygiene Education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post Intervention Data Collection</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Analyze Hand Hygiene Results</td>
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<td></td>
</tr>
<tr>
<td>Writing</td>
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</tr>
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Appendix C

Curriculum Presentation

The project curriculum and presentation will be taken directly from Agency for Healthcare Research and Quality (AHRQ) TeamSTEPPS 2.0 Self-Paced Course seven modules. The curriculum will utilize the video in module 1 (introduction) slide 8 and the presentation to staff will utilize module 3 (communication).

https://www.ahrq.gov/teamstepps/instructor/onlinecourse.html

- Module 1: Introduction (PowerPoint, 4 MB)
- Module 2: Team Structure (PowerPoint, 2.26 MB)
- Module 3: Communication (PowerPoint, 4.74 MB)
- Module 4: Leading Teams (PowerPoint, 3.88 MB)
- Module 5: Situation Monitoring (PowerPoint, 5.16 MB)
- Module 6: Mutual Support (PowerPoint, 3.9 MB)
- Module 7: Pulling It All Together (PowerPoint, 1.99 MB)

After the TeamSTEPPS training, the researcher will show the video from the DHHS, “Partnering to Heal: Teaming-up Against Healthcare-Associated Infections.”

Appendix D

Citi Certificate

This is to certify that:

Priya Pandya Orozco

Has completed the following Citi Program course:

Students conducting no more than minimal risk research
(Curriculum Group)
Students - Class projects
(Course Learner Group)
1 - Basic Course
(Stage)

Under requirements set by:

San Jose State University

Completion Date 29-Jan-2022
Expiration Date 28-Jan-2027
Record ID 47026082

Not valid for renewal of certification through CME.

Verify at www.citiprogram.org/verify?w6a838793-5cf3-4a4e-b091-822fad619b19-47026082