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Improving Compliance in the Use of Catheter Kit Supplied Hand Sanitizer Prior to the Insertion of an Indwelling Urinary Catheter

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Improving Compliance in the Use of Catheter Kit Supplied Hand Sanitizer Prior to the
Insertion of an Indwelling Urinary Catheter

Antonette Prado

University of San Francisco

Clinical Leadership Theme

The Clinical Nurse Leader (CNL) curriculum element for this performance improvement project centers on *Care Environment Management*. Undertaking the CNL role function of a System Analyst/Risk Anticipator, I conducted a microsystem analysis in the Operating Room department wherein I identified a clinical issue in performing hand hygiene. The hand sanitizers provided in the catheter insertion kits are not being utilized by the staff prior to the insertion of an indwelling urinary catheter.

The global aim of this improvement project is to improve patient safety and quality of care in the Operating Room (OR). The process begins with educating the staff nurses with an evidence-based practice in the proper method of insertion of indwelling urinary catheters, which is performing hand hygiene prior to urinary catheter insertion as well as posting signage in several strategic areas within the department. The process ends with a 100% compliance by the staff with hand hygiene prior to catheter insertion by December 31, 2016.

Statement of the Problem

Through the years, several studies have demonstrated the importance of hand hygiene in the prevention of hospital-acquired infections as well as in the spread of infections or cross contamination. For example, the journal *Hospital Employee Health* (2013) published two case studies of hospitals that have significantly reduced common nosocomial infections including CAUTI by promoting hand washing. In addition, a study by Allen, Dos Santos, Mischel, Salmonsens, & Tibbits (2014) showed that hand sanitizing is just as effective as hand washing in decreasing the rate of healthcare-associated infection with exception to C-Diff and norovirus. The Centers for Disease Control and

Prevention (CDC) (2012) recommends performing hand hygiene before and after having direct contact with any of the following: when hands will be moving from a contaminated body site and after glove removal; intact skin, blood, body fluids or excretions, mucous membranes, non-intact skin or wound dressings, and equipment within the vicinity of the patient.

The critical role that hand washing or sanitizing plays in preventing infections cannot be emphasized enough. For this reason, non-compliance by nurses in the use of the hand sanitizer provided in the catheter insertion kit puts patients at risk as it increases the likelihood of the development of CAUTI.

Project Overview

Catheter-associated urinary tract infection (CAUTI) is one of the most common infections acquired in a health care setting and accounts for 36% of all healthcare associated infections (Association for Professionals in Infection Control and Epidemiology, Inc. [APIC], 2014). The CDC (2012) guideline for prevention of CAUTI includes appropriate hand hygiene immediately before insertion of a catheter. The OR is supplied with a sterile catheter kit, which includes a sterile hand gel packet for hand hygiene use before catheter insertion. The standard process for catheter insertion involves the use of a hand gel included in the urinary catheter kit. However, there is variation in the process used by staff when inserting a urinary catheter.

This performance improvement project aims to educate all OR staff nurses on the practice of hand hygiene prior to the insertion of an indwelling urinary catheter. As previously stated, hand hygiene is a critical step in the prevention of hospital-acquired

infections therefore non-compliance with hand hygiene put patients' safety at risk and compromises the quality of care provided.

Data Source/Rationale

This project will be taking place in a 400+ bed tertiary hospital in Los Angeles, California. The microsystem involved is the main OR department, which consists of 23 operating room suites. Surgical specialties (General, Plastic, Urology, Neurosurgery, Orthopedic, Spine, Ophthalmology, Head and Neck, Maxillofacial, Gynecology, and Cardiac) are supported in the OR 24 hours a day, seven days a week. Surgery is provided to a wide range of patient population from neonates to geriatrics on an elective, urgent, and emergent basis. The OR is responsible for delivering care to patients undergoing surgical intervention in the safest and most effective manner, at the least possible cost. Although the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) Hospital Compare (2015) rated the hospital's CAUTI rates as "No Different Than National Benchmark", the organizational goal of 0% in CAUTI is still not met. To push for a more concerted and focused effort in the fight against CAUTI, a CAUTI tiger team was created in 2015 wherein every inpatient unit hospital-wide was represented. However, despite the tiger team activities, CAUTI rates remain high particularly in the Intensive Care Unit (ICU) with incidence rates from May 2015 to May 2016 showing non-significant changes. This project will focus on the CAUTI rates in the ICU because 50% to 60% of the OR inserted urinary catheter patients go to ICU post recovery from anesthesia. The ongoing challenge with CAUTI therefore calls for further efforts in education and training of the staff on the evidence-based recommendations in the prevention of CAUTI. One of the evidence-based recommendations for the prevention of

CAUTI is proper hand hygiene prior to insertion of the indwelling urinary catheter (CDC, n.d.).

During three shifts in the OR, and with the help of two other OR staff, 20 staff nurses were directly observed during the insertion of an indwelling urinary catheter. Results of the direct observation showed a drift in the proper procedure of urinary catheter insertion. Out of the 20 staff nurses, 13 (65%) did not utilize the hand sanitizer included in the catheter insertion kit. Upon opening of the catheter insertion kit, the hand sanitizer found inside was simply discarded in the trash or just set aside by the staff nurse. Furthermore, none of the other members of the surgical team reacted or commented about performing hand hygiene prior to catheter insertion.

In addition to direct observation, an informal interview was conducted among 15 staff nurses, over a two-day period, who were not directly observed performing catheter insertion. Among those nurses, nine (60%) admitted to non-use of the hand sanitizer. Some of the reasons reported for non-use were “It does not make any difference,” “Nobody is using it anyway,” and “no time”.

I began my microsystem needs assessment utilizing different tools such as process mapping (see Appendix A), fishbone diagram (see Appendix B), and SWOT analysis (see Appendix C). Through process mapping, I was able to clearly identify the need to standardize insertion practices of urinary catheters and create a visual of the variance as well as where to possibly incorporate improvement efforts. Process mapping gave me a picture of how I could implement an evidence-based process improvement that would increase nursing adherence to proper sterile technique during urinary catheter insertion utilizing evidence-based practice and per department policy and procedure. The SWOT

analysis showed the strengths as well as the potential benefits (through identified opportunities) of my global aim, which I could incorporate into the education part of my project.

For example, CAUTI prevention is a national initiative and is tied to reimbursements that impact the entire organization while lack of support from leadership is one of the weaknesses. The fishbone diagram (see Appendix B) illustrated the different factors that could be contributing to non-use of the alcohol hand sanitizer from the catheter kit such as: nursing missing scheduled in-services, lack of auditing, lack of reminder system, and staff not educated on evidence. By identifying causes, potential solutions emerged and most importantly, identified the low hanging fruit that I could address immediately.

This process improvement project will incorporate staff education, creation, and testing of a reminder system (signage), evaluation of staff adherence, and the effectiveness of the signage as a reminder to comply with hand sanitizing prior to urinary catheter insertion.

To estimate a cost analysis for this project, I calculated the cost for my time spent on the project at \$8,100 plus \$500 for two OR staff nurses who conducted the direct observation at five hours each and the cost of printing posters, which will serve as reminders for the staff at \$200. Benefits to my employer, includes reduction in length of stay (LOS), treatment costs, and wasted supply. According to the Centers for Disease Control and Prevention (CDC) (n.d.), CAUTI's impact on LOS is 2-4 days. The average cost of one inpatient day at this project site is \$3,146 (KFF.org, 2014); the average cost of treatment is \$758 per infection (CDC, 2009). The estimated cost for a packet of hand

sanitizer is 0.50 cents each. Calculating three days (on average) for impact of a single CAUTI on LOS, the total employer benefit came out to \$10,196.50 per CAUTI or \$22,024.44 per year based on the medical center's CAUTI rate in 2015.

Considering the calculated costs and employer benefits, the net benefit of this project is \$13,624.44 in the first year (conservative given the year of the data used for inpatient stay per day and cost of treatment). The net benefit is projected to increase to \$17,974.44 in the second year. For every dollar of paid hours spent on this project, I saved my employer \$1.68. Qualitative benefits of this performance improvement project include improved patient satisfaction, improved patient outcomes, improved hospital reputation, and increased staff empowerment through education on best-practice methods.

Methodology

According to HealthyPeople.gov (2016), appropriate education and training promotes adherence and acceptance of best practices (such as hand hygiene) to prevent hospital-acquired infections. The objective of this performance improvement project is to educate all OR staff nurses in the use of the hand sanitizer provided in the catheter insertion kit prior to insertion of an indwelling urinary catheter. Posting of new signage in strategic areas (on the cabinet doors inside every OR suite where the insertion kits are stored, on the wall in the main supply room located within the department, and in the main hallway inside the department) will serve as reminders. The expected change in practice among OR nursing staff is the utilization of the hand sanitizer from the catheter insertion kit prior to insertion of a urinary catheter 100% of the time.

The change theory that will guide this performance improvement project is Kurt Lewin's change theory (Change Management Coach, n.d.). Lewin's theory explains the three phases of change as unfreezing, change or transition, and freezing. According to Lewin, the first stage is creating an awareness and urgency for the change. It is at this stage when nursing education session with the OR staff will occur to create awareness of the variance in the use of the hand sanitizer included in the catheter insertion kit. Every Tuesday from 7:30AM to 8:30AM and again from 2:30PM to 3:30PM, an in-service is held for all the OR staff on the morning and evening shifts. The OR staff includes the Registered Nurses (RNs), Certified Scrub Technicians (CSTs), orderlies or nursing attendants, and ward clerks. The OR educator usually presides over the in-service and at least one manager attends. A binder is kept in the OR front desk where the minutes of the in-service are filed. It is the responsibility of the staff who missed the in-service to read the minutes. A one-hour education session on this project will be conducted during the shift in-service (see Appendix D for PowerPoint presentation). At this time, I will talk about the background and move on to introduce the problem, which is the non-use of the hand sanitizer provided in the catheter insertion kit. In addition, I will state my purpose and what I hope to accomplish. Importance of hand hygiene will be reviewed including evidence-based practices, and recommendations on proper hand asepsis as well as proper method of urinary catheter insertion, the organizational policy and procedure, nursing quality indicators, costs and impact of non-compliance to the organization and the patient. The purpose and the posting of signage (see Appendix E) in every OR suite, supply room, and main hallway will also be announced. The value of teamwork will be

emphasized as all team members play a role in delivering high quality care. The session will end with the question and answer portion.

During the change or transition phase, the actual implementation of the new behavior is expected to take place. I will be going around the unit to support the staff, educate as needed, answer any questions, and continue to raise awareness among the staff nurses and other members of the surgical team (scrub techs, surgeons, anesthesiologists, and the nurse anesthetists). Effectiveness of the education session will be evaluated by directly observing the staff, for the period of nine days, in the use the hand sanitizer included in the catheter insertion kit. At the same time, a survey (see Appendix G) will also be distributed to evaluate their use of the hand sanitizer, the effectiveness of the signage, and to collect feedback and recommendations.

As the new behavior transitions into the refreezing phase, changes and revisions will continue depending on staff evaluation and feedback until the change is finally hardwired, as evidenced by nurses using the hand sanitizer from the sterile catheter kit when inserting indwelling urinary catheters 100% of the time. A progress update will be provided to the staff after the initial nine-day evaluation. After which, quarterly updates will be incorporated into the in-service as a method of appraising staff about the department's compliance with hand sanitizing, CAUTI incidences, and patient satisfaction.

Literature Review

Earlier studies have since documented how “clean” patient care such as lifting patients, taking the patient's pulse, blood pressure, or temperature contributes to contamination of nurses' hands. A literature review of hand hygiene studies indicated

that pathogens resulting in healthcare associated infections are present on patients particularly in the perineal and inguinal areas, as well as in their immediate environment, (patient gowns, bed linen, and bedside furniture) (Pittet, et al. 2006). Furthermore, microbes are able to survive on hands for various lengths of time. As such, incorrect or inadequate hand washing can result in hands remaining contaminated by microorganisms (Pittet, et al. 2006).

The CDC and APIC have both published guidelines and recommendations on how to prevent CAUTI. The CDC (2012) issued core prevention strategies for CAUTI, which include performing hand hygiene before and after catheter insertion. Similarly, the APIC (2014) implementation guide to preventing CAUTI provides prevailing scientific knowledge and best practices, which healthcare professionals can utilize to improve CAUTI prevention and elimination.

Evidence-based prevention programs are being adopted by hospital organizations in order to prevent healthcare associated infections. Septimus & Moody (2016) examined the bundle of evidence-based practices recommended to prevent device-related healthcare-associated infections, particularly catheter-line associated bloodstream infections (CLABSI) and catheter-associated urinary tract infection (CAUTI). The authors concluded that hand hygiene, in conjunction with a multifaceted approach is critical to reducing both CLABSI and CAUTI. Meanwhile, Amine, Helal, and Bakr (2014) assessed the strength of the recommended intervention practices when used as a bundle to reduce CAUTI. The bundle consists of hand hygiene, use of personal protective equipment, disposable gloves, cleaning urethral meatus before insertion, indication for catheter, aseptic urine sampling, and placement of bag below level of the bladder. The

six-month intervention study showed that adherence to the bundle reduced the prevalence of CAUTI.

Despite the strength of evidence supporting the link between hand hygiene and infection prevention, many health care workers including nurses fail to perform adequate hand hygiene. McLaughlin and Walsh (2012) examined the reasons for compliance and non-compliance by health care workers on hand hygiene using an online survey. Their findings revealed that one of most frequent reason that health care workers wash their hands was the belief that their hands were dirty. The authors also assessed how health care workers decide that their hands needed washing. The authors found that the top reasons that prompted healthcare workers to hand wash included the knowledge that they had to wash their hands after a certain event, and when they knew they touched something dirty (McLaughlin & Walsh, 2012).

The APIC (2014) recommends the development and implementation of a mandatory CAUTI educational program for all health care workers as one strategy preventing CAUTI. The education should include information about CAUTI including a definition of CAUTI, evidence-based reduction strategies, importance of handling devices and sterile technique, and adequate hand hygiene.

Compliance to appropriate hand hygiene is an important component of a successful CAUTI prevention program. The CDC (2002) has pointed out the various literatures that support an association between in-service education, workshops, and performance feedback on improved hand hygiene compliance. The CDC further recommends that strategies to improve hand hygiene compliance should be multimodal, such as education, wall posters, and performance feedback.

There is some literature to support the role of multimodal approaches in improving hand hygiene compliance. Sansam et al. (2016) conducted a hand hygiene program that included an education program consisting of three sessions and promotion of the program using posters. The authors assessed hand hygiene compliance at six months, one year and two years. The authors found that compliance improved significantly at six months and one year. However, the compliance rate at year two was less than year one.

Studies also suggest that hand hygiene promotional campaigns using posters need to have messages that are adequately designed in order to be persuasive. Mackert et al. (2014) compared the effect of two hand hygiene posters on perceived impact on compliance. Two poster concepts were tested: one poster (“Protect Everyone”) featured hands wearing a variety of gloves and points out that hand hygiene provides a similar protective gear function as other gloves, another featured a timeline concept showing advancements in medicine over time with a reminder that hand hygiene is a new advancement for preventing infection. After five months, the authors administered a survey to hospital staff assessing their opinions on the posters. The authors found that hospital staff found the “Protect Everyone” poster concept more effective in terms of likability, impact on behavioral intention, and impact on social pressure (Mackert et al. 2014).

Timeline

The project began on May 24, 2016, the start of summer semester and is expected to complete at least one Plan-Do-Study-Act (PDSA) cycle before the end of the semester in August 2016, followed by evaluations until December 31, 2016. I will be leading the

project. However, data used in the SWOT analysis, process mapping, fishbone diagram, and ideas for the signage are from information provided by the staff through informal interviews and group discussions. Four weeks of preparation preceded introduction of the project beginning with the collection of data, needs analysis, formulation of the aim statement, literature search, and cost analysis. The education session was scheduled for one day and one month to follow up on all the staff nurses who missed both in-service. At this time, 100% of staff nurses would be educated on hand hygiene prior to catheter insertion. The next three weeks following the education session will be an evaluation in the form of direct observation and survey after which the first update will be given to the staff. Project monitoring, evaluation, and feedback will continue until December 31, 2016.

Expected Results

The project is laid out over a five-month period with the collection of post intervention data wrapping up on December 31, 2016. The expected result of this project is a behavior change among the staff nurses in compliance with hand hygiene.

Two forms of interventions were provided in order to promote this change in behavior, both of which were based on the results of the fish bone diagram (see Appendix B) and the process mapping (see Appendix A). The first was an education session regarding the evidence showing the relationship of hand hygiene with the development of hospital acquired infections, hand hygiene prior to urinary catheter insertion, CAUTI rates and costs, and impact of CAUTI to the patient as well as the organizations. The second intervention was posting signage in multiple strategic area within the OR

department that serve as reminders for the staff on the use the hand sanitizer included in the catheter insertion kit.

By the 6th of August, 100% of the staff nurses are expected to have undergone or have met the first intervention that is the education session. 100% of the staff nurses are expected to have adopted use of the hand sanitizer before catheter insertion by the end of December 2016.

Nursing Relevance

According to CA.gov (2016), the most common complication of hospital care is hospital-acquired infections (HAI) with an estimated 722,000 infections each year or approximately one in 25 patients and \$30 billion in healthcare costs. In addition, HAI such as CAUTI is a reportable event that is made available for viewing by the general public and potential consumers. In 2008, Medicare began penalizing hospitals when Medicare patients develop any of the eight identified conditions, one of which is CAUTI, if not present during admission (Peasah, McKay, Harman, Al-Amin, & Cook, 2013). Most importantly, development of CAUTI reflects the quality of nursing care delivered to the patient. In fact, the National Guideline Clearinghouse (2012) stressed that adhering to the recommended evidence-based nursing care strategies could prevent 20% to 69% of CAUTIs. With the validated and established relationship of proper hand hygiene to the development and spread of infections, the impact of this project is significant in improving the nursing practice, patient outcomes, and hospital revenue.

Summary

In summary, this project aimed to improve compliance in the use of hand sanitizer included in the sterile catheterization kit prior to insertion of an indwelling urinary

catheter. The intervention is being conducted in a large tertiary hospital in Los Angeles. The population in focus is the surgical patients in the main operating room department. A multipronged approach was utilized for the performance improvement project which includes a one-hour education session and posting of signage in strategic areas within the department. An initial direct observation of 20 nursing staff was performed as well as an informal interview of 15 nurses. More than half of the nursing staff observed was non-compliant with the use of hand sanitizer. Additionally, nurses cited “lack of time,” and “does not make any difference” as some of the reasons for non-compliance. These findings showed that the lack of compliance compromises the quality of care and puts patients at risk for CAUTI.

The team used evaluation survey and direct observation to collect post intervention data. Data for day shift nurses were collected for one week. A total of 34 nurses were surveyed to assess the effectiveness of the signage. Of the 34 nurses surveyed, 25 submitted their response (73.5%). All of the nurses (100%) surveyed acknowledged seeing the poster where it was displayed; while 80% said they paid attention to the poster. Seventy two percent said that the poster reminded them to use the hand gel and 48% said that the poster reminded them to remind others to use the hand gel (see Appendix H). In addition to the survey results, direct observation findings showed an increase in hand sanitizer compliance from 35% (baseline) to 80% (post-intervention) among the staff nurses (see appendix I).

This project demonstrated that a multipronged approach to improving hand gel use prior to catheterization is effective in improving hand hygiene practices related to CAUTI. The next phase of this project is to evaluate night shift nurses and incorporate

results to enhance education session and signage. Some of the ways to sustain the change that has been started by this project is by keeping the team together, that way the team can continue to be the champions in hand sanitizing and will continue to exert influence in the whole department. Another way of sustaining the change is by continuing to do regular audits and communicating to the staff the results. For example, performing quarterly audits on hand sanitizing compliance and sharing the results with the staff during in-service. This way, staff performance can be monitored and a timely education review can be conducted if needed or continued success could be celebrated (Health Quality Ontario, 2013). Along with sharing regular audits, CAUTI rates should also be incorporated for the staff to see the big picture results of their efforts, which is empowering.

There are limitations to the findings of this project. Improvements were only observed for day shift nurses, which is the same shift as the improvement team. The staff that were directly observed at baseline are not the same staff who were observed at post-intervention. Nevertheless, the project showed good promise for improving compliance in the use of hand gel in the operating room department.

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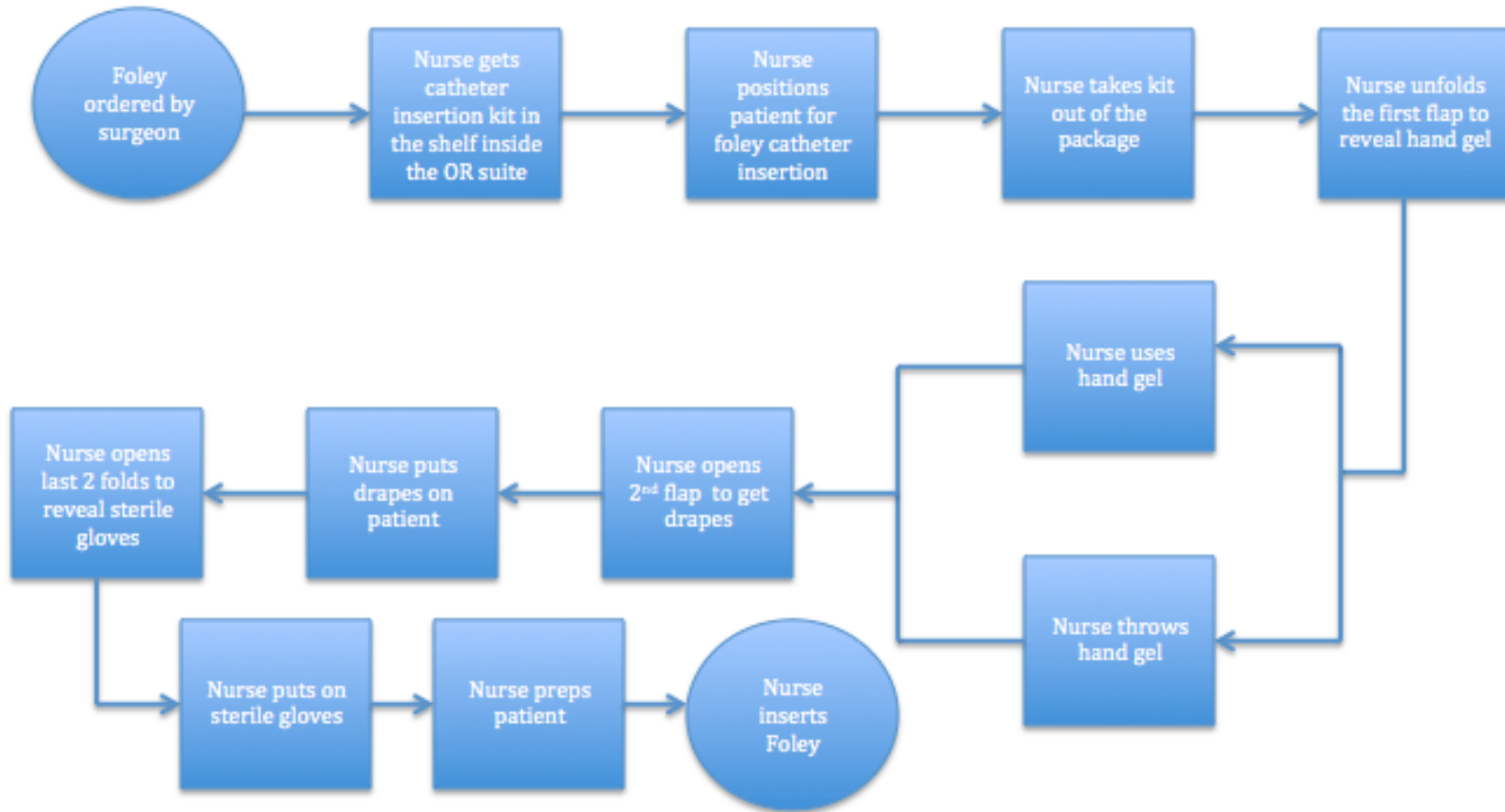
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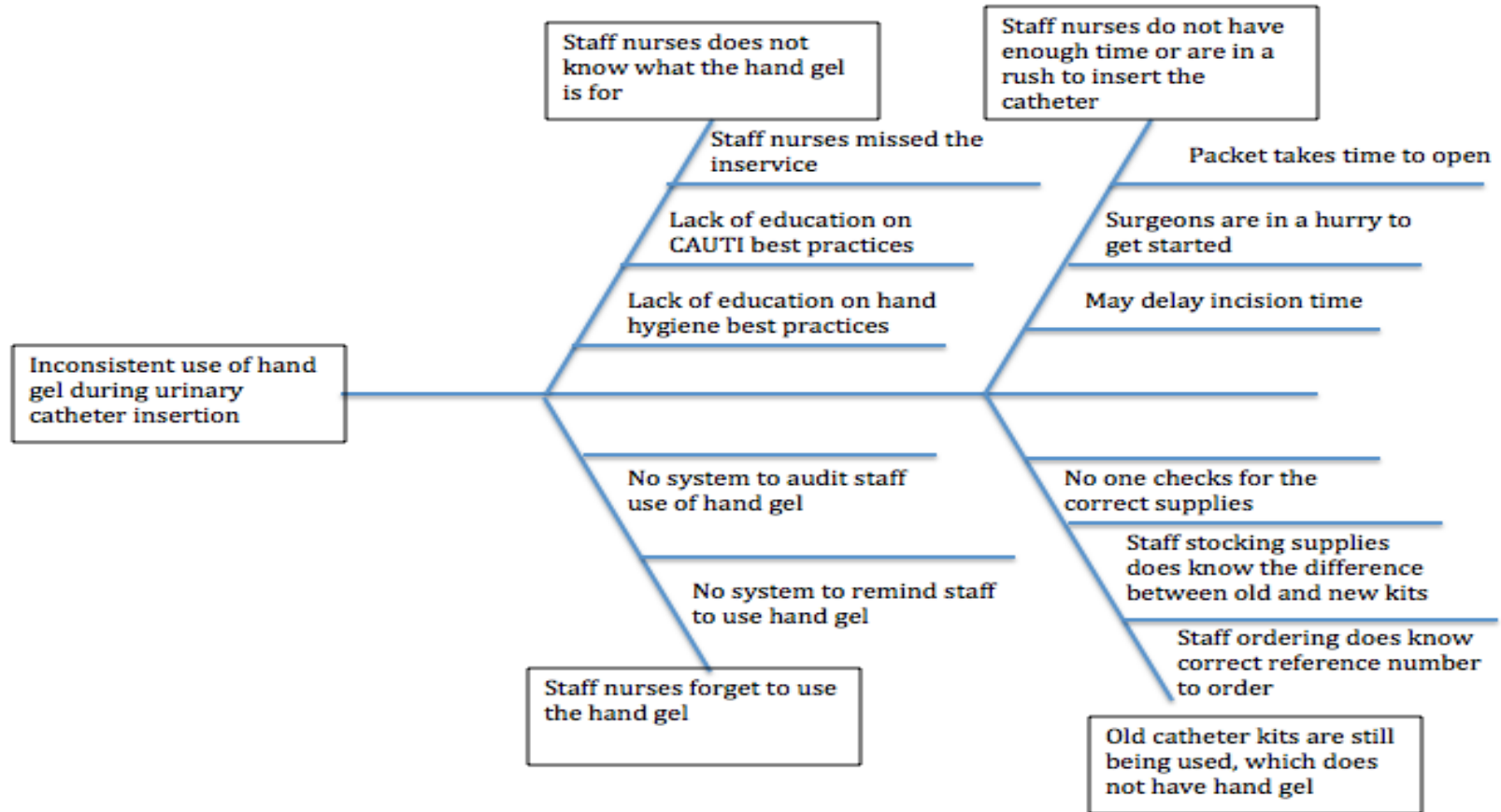
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**Appendix A
Process Map**



Appendix B Fishbone Diagram

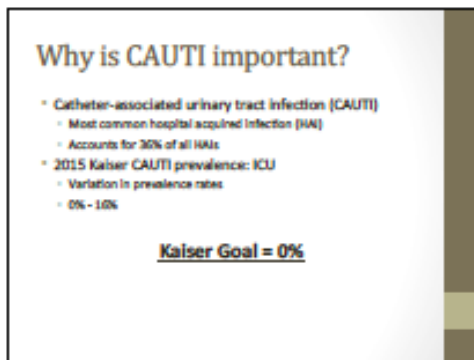


Appendix C
SWOT Analysis

Internal		External	
Strengths	Weaknesses	Opportunities	Threats
<ul style="list-style-type: none"> • Willingness of staff to participate • Strength and abundance of evidence • Low-cost to implement • Staff empowering and increases morale • Potential to increase team cohesiveness 	<ul style="list-style-type: none"> • Poor leadership buy-in • Surgeons and anesthesiologists uninformed of project • Resistance from some of the staff • Extra step in catheter insertion takes time • Inconsistencies in the supply of catheter insertion kits 	<ul style="list-style-type: none"> • Improves nursing practice and patient outcomes • Promotes culture of safety • Increases revenue • Promotes positive experience of care 	<ul style="list-style-type: none"> • Labor union issues interfere with implementation • Potential changes in penalties and reimbursements

Appendix D PowerPoint Presentation







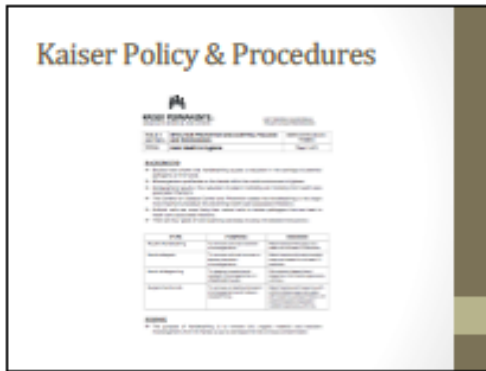
What do we need to do to improve compliance?

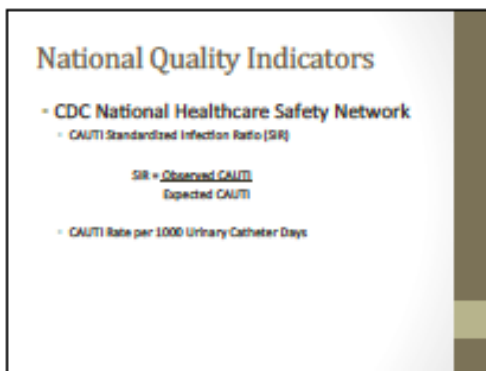
- Hand hygiene quality improvement project
- Purpose:
 - Improve compliance in the use of hand gel included in the catheterization kit.
- Project Aim:
 - Educate all OR staff nurses on the practice of hand hygiene prior to the insertion of an indwelling urinary catheter.

What do we know about CAUTI prevention?

- CDC, APIC, National Guidelines Clearinghouse
 - Must have appropriate indications
 - Leave catheters in place only as long as needed
 - Use aseptic technique and sterile equipment
 - Must maintain closed drainage system
 - Must maintain continuous urine flow
- **Hand hygiene**
 - Focus of this project!

Demonstration of proper catheterization
(LIVE DEMO)







**Appendix E
Gantt Chart**

Project Objectives	Responsible Party	2 nd Quarter 2016				3 rd Quarter 2016				4 th Quarter 2016															
		May		Jun		Jul		Aug		Sept		Oct		Nov		Dec									
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1. Team development & Data collection	Antonette																								
1.1 Direct observation	Antonette + 2 OR Staff																								
1.2 Informal interview	Antonette																								
2. Unit Needs Analysis	Antonette + 4 RNs																								
2.1 Fishbone diagram	Antonette + 4 RNs																								
2.2 Process mapping	Antonette + 4 RNs																								
2.3 SWOT analysis	Antonette + 4 RNs																								
3. Aims statement	Antonette + 4 RNs																								
4. Literature search	Antonette																								
5. Cost analysis	Antonette + Manager																								
6. Develop education curriculum & PPT	Antonette																								
7. Education session	Antonette																								

Project Objectives	Responsible Party	2 nd Quarter 2016								3 rd Quarter 2016								4 th Quarter 2016															
		May				Jun				Jul				Aug				Sept				Oct				Nov				Dec			
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
8. Evaluation of interventions	Antonette																																
8.1 Evaluation of hand gel compliance (Direct observation)	Antonette + 2 OR Staff																																
8.2 Evaluation of effectiveness of poster (Survey)	Antonette																																
9. Integrate evaluation results	Antonette																																
9.1 Enhance education method	Antonette																																
9.2 Enhance poster	Antonette + 4 RNs																																
10. Continuous improvement	Antonette + 4 RNs																																

	Completed
	Projected

Appendix F
Poster



Hand Sanitize before you Catheterize



Clean hands, safe hands.

Appendix G**Poster Evaluation Survey**

Check either “Yes” or “No” to the following statements:

1. I saw the poster when it was displayed.

Yes

No

2. I paid attention to the poster when I saw it.

Yes

No

3. The poster encouraged me to use the hand gel included in the catheter insertion kit.

Yes

No

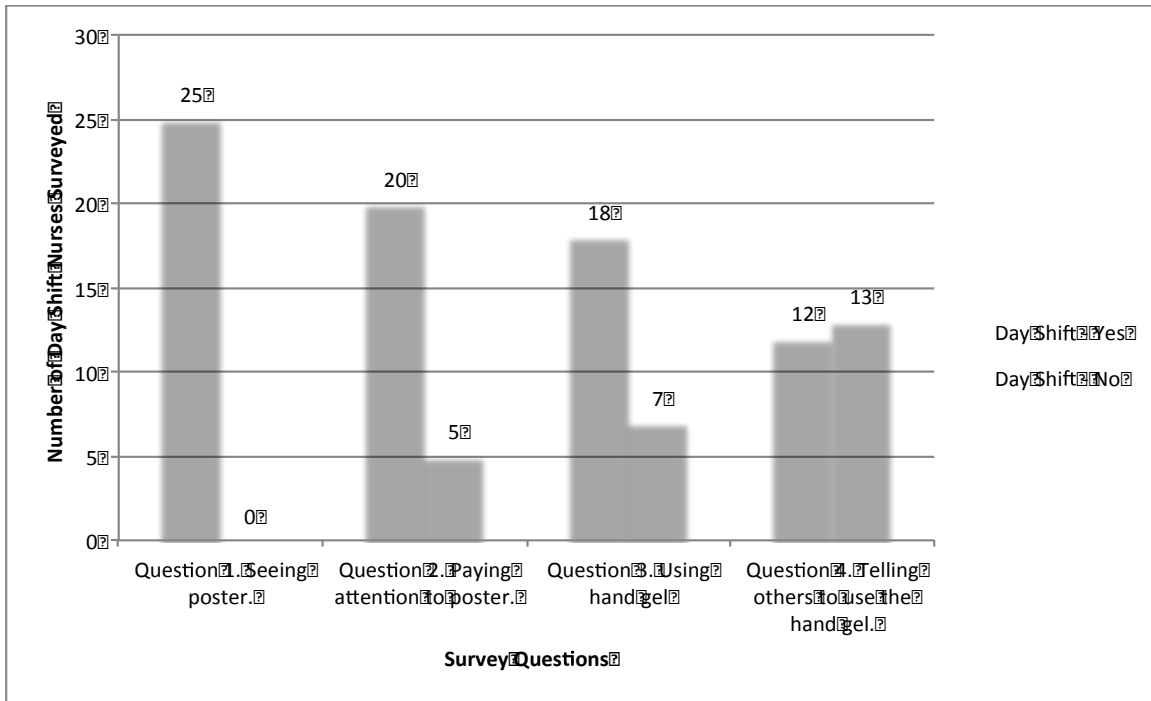
4. The poster encouraged me to observe other people and whether they are using the hand gel included in the catheter insertion kit.

Yes

No

Appendix H

Poster Evaluation Survey Results



Appendix I

Hand Gel Direct Observation Results

