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Implementing a Surgical Infection Prevention Practice in an Integrated Healthcare System

Tammy Peacock
itpeacock@me.com

Tammy Peacock DNPc, MAPSY, RN, NEA-BC, CENP, CPPS, CLSSBB

Implementing a Surgical Infection Prevention Practice in an Integrated Healthcare System

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Committee Chair:

Dr. Marjorie Barter

Committee Member:

Dr. Mary Bittner

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Abstract

Problem: One of the most preventable health care associated infections (HAI) is surgical site infection (SSI). Approximately sixty percent of SSI's could be prevented. The devastation of an SSI to the patient can be catastrophic. The cost to the health care system for treating SSI's can be substantial (Ban et al., 2017).

Context: The rate of surgical site infections has been on the increase over the past three years. The concern for the amount of harm affecting our patients was worrisome. The cost of reputation and the bottom line to the organization was recognized by senior leadership. The support from all key stakeholders was steadfast.

Intervention: An evidenced based change of practice was designed and implemented across 21 medical centers to prevent surgical site infection.

Measures: There were six process measures: The use of chlorhexidine wipes preoperatively, hair clipping outside the operating room, weight based antibiotics, normothermia, antibiotic re-dosing, surgical skin prep. An additional process measure was added half way through the project and that was smoking cessation. There was one outcome measure, surgical site infection rate.

Conclusions: The aim of the project was a 30 percent increase in compliance of the process measures. This aim was realized after the role out of the project. The reduction of SSI across all surgical lines was the proposed outcome measure. The outcome measures are expected to correlate with the increased standardization of the process measures hardwired into the nursing workflows.

Key words: surgery, SSI bundle, post operation, adults, usual care, efficacy, prevention.

Section II. Introduction

Kaiser Permanente was founded in 1945 and has over four million members in Northern California. There are three parts to Kaiser Permanente; Kaiser Foundation Health Plan, Kaiser Foundation Hospitals, and The Permanente Medical Group. Kaiser Permanente Northern California (KPNC) employs approximately 83,500 people including physicians, nurses and ancillary staff. KPNC has 21 medical centers and 242 medical office buildings. KPNC builds on over 70 years of innovation, to ensure every member receives the best quality care possible (Kaiser Permanente, 2017). The area of coverage in Northern California is quite vast and diverse in the communities they serve (see Appendix A). The mission of the organization is to provide affordable, high quality care for its communities and the members they serve.

Problem Description

The incidence of surgical site infection (SSI) is approximately 160,000 to 300,000 annually in the United States (US). The financial burden of SSI is substantial and is one of the costliest of all hospital-acquired infections. Estimated costs vary from $3.5 to $10 billion in the US. Moreover, SSI's increase emergency department visits, readmissions, and extend hospital stays, by 9.7 days per infection. An estimated 60 percent of SSI's are projected to be preventable with the use of evidence-based measures (Ban et al., 2017). The care bundle methodology is an accepted practice for prevention of SSI, which originated with the Institute for Healthcare Improvement (IHI) in 2001 (Tanner et al., 2015)

These methods include proper hair clipping when applicable, normothermia, good skin assessment, antibiotic prophylaxis, and effective skin preparation. Despite level one clinical evidence, the incidence of SSI and its associated morbidity and mortality is not decreasing. The Surgical Infection Prevention (SIP) project has found little change in SSI rates after 10 years,

although reporting a compliance rate of 95-100%. The National Institute for Health and Clinical Excellence (NICE) developed a guideline utilizing evidenced-based interventions. Sustained reduction of SSI's can only be reached with consistent compliance (Leaper, Tanner, Kiernan, Assadian, & Edmiston, 2015).

In 2009 the World Health Organization (WHO) introduced their surgical safety checklist. While largely a patient safety intervention, it has related phases, and uses the pre-, intra-, and postoperative periods. The WHO safety checklist has been widely adopted and, perhaps if combined with a bundle, could offer a more robust effect on SSI rates (Leaper et al., 2015).

The cost of surgical complications is well-documented (Ban et al., 2017). However, with the onset of value-based purchasing that seeks to reward hospitals that perform with high quality and lower costs, the cost of reducing surgical complications and death has become an area of focus. Centers for Medicare & Medicaid Services, (n.d.) Retrieved November 11, 2018 from https://www.cms.gov/newsroom/fact-sheets/cms-hospital-value-based-purchasing-program-results-fiscal-year-2018. Patients who experience a major surgical complication present a challenge for clinicians who strive to improve quality while decreasing costs (Pradarelli et al., 2016).

The literature supports bundles of care (Ban et al., 2017). As clinicians, we do not know which patient requires a specific element of the bundle. For example, a homeless patient who does not have routine access to bathing facilities might need the chlorhexidine wipes, and the person who has a high stress response will require close glucose monitoring. In order to provide the best care, the entire bundle should be applied to all patients, every time. With this practice,

and by using evidenced based practices, the journey to higher quality care with overall decreased costs may be within reach.

Currently, our organization, has a high rate of surgical site infections (SSI) in hospitals across the region (see Appendix B). An estimated cost of $40 million dollars was spent on SSI in 2015. The greater cost was the resulting harm to our patients. The target population for the Surgical Site Infection Prevention project is all surgical patients in Kaiser Permanente Northern California including obstetrical surgeries.

Available Knowledge

There were two PICOT (*population, intervention, comparison, outcomes, and time*) questions used for this project: 1) In adult surgical patients, (*population*) how does use of a universal SSI bundle, (*intervention*) compared to usual standard of care, *(comparison*) affect the number of SSI (*outcomes*) within 30 days' post operation (*time*)? 2) In adult surgical patients, (*population*) which elements of an SSI bundle (*intervention*) provide the best evidence *(comparison*) in preventing SSI (*outcomes*) within 30 days' post operation (*time*)?

A systematic search was conducted on February 15, 2017 using these databases: Cochrane database, CINAHL, PubMed, SCOPAS, and Evidenced-Based Journals and key words: *surgery, SSI bundle, post operation, adults, usual care, efficacy, prevention*. Thirty-one articles were found and duplications were excluded. Evidence was narrowed down to the strongest evidence that was most relevant to the PICOT question. While many of the articles in this review addressed the prevention of SSI, not all addressed the use of a SSI prevention bundle.

Employing the second PICOT question, another systematic search was conducted on March 25, 2017 using the key words: *surgical, infection, prevention, and intervention*. The CINAHL, PubMed, SCOPAS, and Cochran database was used and 3,106 articles were found.

This was narrowed down to the most recent and relevant articles to the PICOT question, with duplicates removed.

Bert et al. (2017) conducted a study to examine the rate of SSI's after implementing an evidenced based bundle from January 1, 2012 through December 31, 2012. This was a retrospective surveillance study using data from 37 hospitals, and 3,314 surgical operations. There were two cohorts of surgery types: colon and hip replacements.

The main source of data for the study was patient records. The sample was allocated into two separate groupings. This study looked at whether patients who received an SSI bundle consisting of antibiotic prophylaxis, normothermia, trichotomy, and preoperative shower, had a decreased rate of SSI. The follow up for colon surgery was 30 days, and for hip replacement 365 days. A univariate analysis using chi-square test to identify the two groups, and then a multivariate logistical regression was performed. The univariate analysis showed surgical site infection (SSI) was significantly reduced with bundle implementation. Multivariate analysis showed a statistically relevant decrease of SSI in colon surgeries with a p value <0.001, but not in hip replacement surgeries with a p value <0.151 (Bert et al., 2017).

Further data analysis demonstrated that in the Piedmont region of Italy, examination of SSI's associated with achievement of a surgical bundle was correlated to a decrease in infection rate. Implementation of effective preventative interventions was found to promote appropriate behaviors and improve the quality of care for patients. The use of a bundle was recommended to all surgical categories for improvement in health care quality (Bert et al., 2017).

Tanner et al. (2015) conducted a meta-analysis of quasi-experimental studies, randomized control trials, and cohort studies to assess the usefulness of care bundles to reduce surgical site infections (SSI) in colorectal surgeries. There were 95 articles reviewed with 16 studies that

evaluated the validity of care bundles implemented for patients receiving colorectal surgery. This meta-analysis, which included 8,515 patients, revealed an SSI rate of 7 percent for the patient cohort who utilized a care bundle, and 15.1 percent in the non-care bundle cohort.

The Tanner study represented the first meta-analysis to date that examined the use of a surgical care bundle to reduce SSI in colorectal surgeries. There were two main limitations noted: 1) failure of the uniformity of SSI data collection, and 2) failure to report use of care bundles. Most of the studies reviewed had used a care bundle of evidenced-based interventions that included: maintenance of normothermia, glucose control, hair removal, and antibiotic management. The authors of the review reported that realization of an operational surgical care bundle requires the health care organization to commit both fiscally and logistically to cover consumables and extra staffing. The review suggested that a multidisciplinary approach using evidenced-based approaches will result in diminished risk of infection (Tanner et al. 2015).

Crolla et al. (2012) conducted a prospective quasi-experimental study in a large teaching hospital. The purpose of this study was to measure the effects of surgical site infection rate (SSI), which are associated with substantial mortality and morbidity, after implementing a bundle of care centered on the criteria from the Centers for Disease Control (CDC).

Variables were examined using a univariate Fishers exact test or T-test. Those variables with a p value of 0.2 were included in a logistical regression analysis. A Kaplan Meier survival analysis was used to compare mortality. A total of 1,537 colorectal surgeries were completed during the course of the study. The increased use of the bundle correlated with the decrease of SSIs. There was a statistically significant difference in the 6-month mortality rate in patients with no SSI ($p<0.001$), versus the patient with an SSI. The implementation of the bundle was associated with a decrease in SSI of 36 percent. (Crolla et al., 2012). The recommendation was

that a bundle should be limited to three to five evidenced based recommendations. All bundle elements should be followed for every patient. Compliance helps to create a culture of safety in the operating space, therefore improving patient safety by decreasing infection rate (Crolla et al., 2012).

With the recommendation to limit a bundle to three to five evidenced-based interventions, the next step was to determine the interventions that show the most effect on decreasing SSI. (Ban et al. 2016) performed a critical review of the evidence in order to update a preexisting guideline. A panel of subject matter experts both internally and externally, from the infectious disease and surgical areas, reviewed the literature to develop new recommendations to update the guide.

Smoking cessation continues to show better overall outcomes for patients who smoke cigarettes. Smoking vasocontricts the blood vessels leading to tissue hypoxia and hypovolemia. This affects the healing process, and increases the risk of SSI. There is no evidence to show the same effect from smoking marijuana, or electronic cigarettes at this time. The American College of Surgeons (ACS) does recommend that all types of smoking be stopped four to six weeks prior to the surgery date (Ban et al., 2016).

The World Health Organization (WHO) conducted a meta-analysis on 14 different interventions in SSI prevention. This review consisted of fourteen separate PICOT questions, one for each intervention. After each meta-analysis for each intervention the evidence was weighted and rated from conditional low to strong recommendation (Allegranzi et al., 2016).

The WHO recommends intensive glucose control as patients often show hyperglycemia due to the stress of surgery. This results in release of cortisol, and catecholamines. Also seen is a slow-down in insulin secretion. While there is agreement to monitor glucose levels in surgical

patients there has not been consensus on a standard treatment. The WHO cautions that this may be difficult to implement due to the needed equipment and medication costs surrounding this measure. Therefore, the strength of evidence was conditional low due to the difficulty of implementation (Allegranzi et al., 2016).

The most prominent change in the ACS guidelines was noted in glucose control. The short term glucose control is now showing more importance in SSI prevention than long term use. Moreover, the importance of glucose control of all surgical patients regardless of diabetic status has been demonstrated (Ban et al., 2016).

Allegranzi et al., (2016) performed a meta-analysis of 69 Randomized Control Trials (RCTs) investigating antibiotic prophylaxis and continued use of antibiotics. While the evidence has long shown the efficacy of antibiotic prophylaxis, many surgeons continue the use of antibiotics days after the surgery, which poses the risk of increased antimicrobial resistance. Prolonged use of antibiotic prophylaxis is not recommended. The strength of evidence given was a strong recommendation.

Four randomized control studies were systematically reviewed by Ban et al. (2016), and found no evidence to support any additional benefit of prophylaxis post wound closure. The administration of antibiotics within one hour of incision is supported by the literature, or two hours if using vancomycin. Therefore, the recommendation is to stop antibiotic prophylaxis immediately following the surgery (Ban et al., 2016).

Maintenance of normothermia of the surgical patient is shown to decrease SSI. This commonly occurs during and after surgery. Hypothermia is considered an unintended adverse event of regional and general anesthesia. Hypothermia may be connected to impaired wound healing, decreased drug metabolism, and decreased immune function. The strength of evidence

given was conditional- recommendation low due to costs of equipment (Allegranzi et al., 2016). Ban et al. (2012), notes that maintenance of normothermia has evidence to show preventative effects for SSI for both long and short cases.

Perioperative oxygenation was given a strength of evidence rating of strong recommendation. Maintaining adequate tissue oxygenation was confirmed through the meta-analysis of 11 RCTs to decrease risk of SSI. In patients that have an endotracheal tube in place, 80 percent fraction of inspired oxygen (Fi02), should be used in the operative and postoperative phase for 2-6 hours if possible (Allegranzi et al., 2016).

The use of antimicrobial sutures was rated conditional moderate by Allegranzi et al. (2016), and was felt to add significant additional cost to the medical center. Ban et al. (2016), found there was evidence of reduction in SSI with the use of antimicrobial suture, compared to normal suture, in multiple randomized control studies.

Hair removal should be avoided if possible, however clipping hair is recommended over shaving, outside of the operating theater (Ban et al., 2016).

The other interventions addressed by Allegranzi et al. (2016), -were rated conditional low and included: 1) normovolemia, 2) disposable drapes, 3) wound protectors, 4) adhesive incise drapes, 5) wound irrigation, 6) negative-pressure wound therapy, 7) wound drain removal and antimicrobial prophylaxis, and 8) wound dressings.

Similarly Ban et al., (2016) showed lower evidence to recommend the use of: 1) wound protectors, 2) surgical attire, 3) wound closure, 4) perioperative bathing, and 5) wound care.

The John's Hopkins Nursing Evidenced-Based Practice (JHNEBP) Research Appraisal Tool (Johns Hopkins Hospital/The Johns Hopkins University, 2012) was utilized to critically appraise the level and strength of studies in this search. The articles revealed a level of evidence

between level II and III, and appraisal levels between A and B, indicating good quality (see Appendix C). While many articles discussed different individual interventions that could be used to prevent SSI, few discussed the efficacy of using a bundled approach versus usual care. The studies did show a decrease in SSI in very specific surgery types, however, it was clear that the use of bundles is only successful with good compliance of the entire bundle.

Updated Literature Review

Only one year has passed since the original literature search for this DNP project, therefore there is little new literature on SSI prevention. Many of the articles were commentaries on the most recent recommendations by the CDC, ACS, and WHO. However, one article of interest included a discussion on tailoring antibiotic prophylaxis to the patient. Extensive guidelines exist on pre-operative preparation of the patient to prevent surgical site infections. One preventative measure is antimicrobial prophylaxis. There is an abundance of studies to determine the correct antibiotic for different surgeries. More and more we are screening our patients who are nasal carriers of Staphylococcus aureus and treating them before surgery. Understanding human microbial interaction may lead to more specificity in how we determine what type of antibiotic to use for prophylaxis. Screening the patient of the microbiome before surgery helps predict the probability of infection. This would allow providers to customize the therapy of the potential pathogen for the patient. Using the multifaceted relationship that exists with our patients and their endogenous microbiota surgeons can personalize prophylaxis for their patients to prevent surgical site infections (Gaines, Luo, Gilbert, Zaborina, & Alverdy, 2017; Spencer & Edmiston, 2014).

Rationale

Theoretical framework. Kotter's model of change was originally published in 1995. The theory included eight steps for transforming organizations. They include: 1) Establish a sense of urgency 2) Create a powerful coalition 3) Develop a strategy and vision 4) Communicate the change vision 5) Empower action 6) Generate short-term wins 7) Consolidate gains and create more change, and 8) Make it a part of the culture. Twenty years later Kotter's model of change is still used extensively (Appelbaum, Habashy, Malo, & Shafiq, 2012).

One of the interesting aspects of the first publications of Kotter's change theory is there were no references or footnotes. A bibliography has not been found and yet this work had tremendous practical and academic success. Kotter's book *Leading Change* (1996) became a bestseller and has been citied over 4,000 times in Goggle Scholar (Appelbaum et al., 2012).

Kotter's theory is relevant in healthcare today as we embrace many quality improvement projects. First, if you do not establish a sense of urgency, people will not change without a need to do so. The second step is to create a group that not only has formidable energy, but has the influence to lead the change within the organization. A clear vision must be developed that clearly explains why the change is needed and how the change will be achieved.

Communication is key and using every opportunity to get the word out regarding the change is paramount. Involve people by having them think about how to change rather than how to stop the change. As you generate short-term wins call out the achievements people make, then take these gains and consolidate them to create momentum for change and to develop people as change agents. Finally, the new approaches must be embedded into the culture or a drift to the old comfortable way may occur (Appelbaum et al., 2012). Kotter's change theory was used for this project, with a sense of urgency as to the increasing SSI's.

Specific Aim

Increase the use of standard surgical site infection prevention bundle by 30 %, into the perioperative and perinatal operational nursing workflow utilizing evidenced based measures in an integrated healthcare system, by November 30, 2018.

Section III: Methods

Context

Kaiser Permanente has the capacity to lead the nation in creating an evidenced based SSI prevention practice through their integrated system. We are already a leader in quality care as designated by our five star ratings for Medicare and our National Committee for Quality Assurance (NCQA) 5.0 rating for our NCAL health insurance plan. Current practices include a high degree of variation in the SSI prevention practices, incorrect practices in place, and drift from the standard practices. We have an opportunity to create an evidenced based practice that could be spread to any perioperative and maternal child health setting. With our integrated system we have the capability to implement, measure, and sustain our project over time. This will improve the quality of care we give to our patients by preventing undue harm.

Intervention

Planning began with development of a time line for the project (See Appendix D). There would be two phases for the project. Phase one will be the focus of this DNP project.

A work breakdown structure was developed to set the pace for completion of the project (See appendix E). Level I in the work breakdown structure is to: Implement a bundle of evidenced based practices to prevent surgical site infections in all surgical patients in Northern California Kaiser Permanente.

The level II items are the key items needed to accomplish the implementation of the surgical site infection prevention bundle. What analytics are needed? What equipment will be needed? Patient education material will need to be developed and standardized. Evaluation of recourses to implement the program needs assessment.

Level III development of the work breakdown structure is to start outlining the next steps under each major item. For the analytics question, we need to know what data sources are already available, and how best to present the data.

Planning and Preparation

A multidisciplinary team was formed that included surgeons, frontline nursing staff, infection prevention, business consultant, regional leadership, and an analysist. After the extensive literature review the team then had to decide on which elements to include in our bundle. The team took all recommended elements and made a summary table of the three most respected sources. The bundle was developed based on the literature review and the recommendations of the American College of Surgeons (ACS), the World Health Organization (WHO), and the Centers for Disease Prevention (CDC) (See appendix F).

The team conducted a Strengths, Weakness, Opportunities, and Threats Analysis (SWOT) (see Appendix G) and a GAP analysis (see Appendix H) to determine areas of focus for potential threats and barriers. Potential weaknesses include documentation challenges and leadership turnover, while a real threat is work stoppage. Existing gaps include moving clipping to outside the OR and getting accurate weights on patients for weight based antibiotics. Currently, nurses are asking how much the patients' weigh.

Prior to starting the pilot, we wanted to provide as many resources as possible to streamline the pilot process. The team developed educational competencies for the front line staff, along

with learning modules, a resource guide for all bundle elements, and a playbook for implementing the bundle (See Appendix I). This DNP student then went out to thirteen medical centers to observe current practices, and to determine how to operationalize the bundle elements chosen. While many facilities had the supplies and equipment to provide the bundle very few were actually using then for patient care (See Appendix J).

A medical center pilot site was selected that showed opportunity for improving the SSI rates in both perioperative and Maternal Child Health (MCH). The site also demonstrated strong leadership to support the pilot.

A communication plan was established for the pilot site staff (See appendix K). The bundle includes five pre-op elements; maintenance of normothermia, chlorhexidine bathing, weight-based antibiotic dosing, clipping outside the operating room, glucose monitoring, and two intra-op elements; surgical skin prep in the operative room, and surgical scrub.

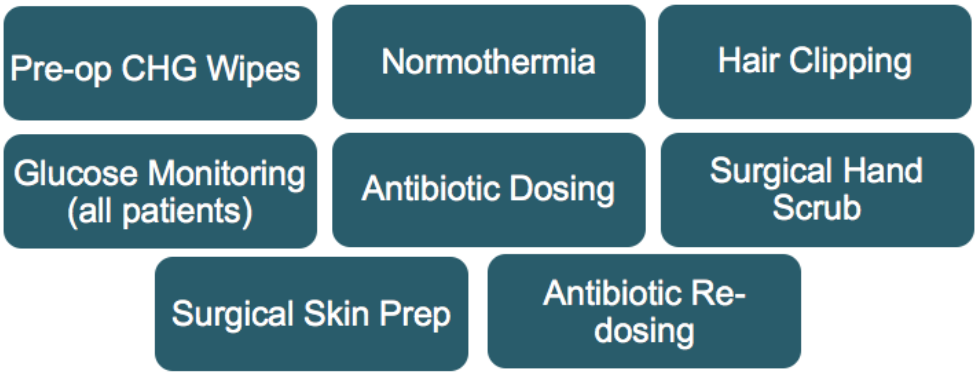


Figure 1. SSI Bundle Elements

Embedding the bundle into a standard workflow for nursing is considered a reasonable approach which ensures the bundle is integrated into the culture. Explaining the "why" for using these bundles to the nursing staff will help to reinforce this culture of SSI prevention, and lead to high quality care at lower costs for both clinicians and patients (See appendix L). The why for all

bundle elements were defined for each element. The team then developed a website to house all the resource materials and literature to support the project in one location (See appendix M).

Pilot Phase

The project began testing at one alpha site. There were four small workgroups in the following areas: 1) Pre-operative unit 2) intra-operative unit 3) post anesthesia care unit, and 4) maternal child health. These four workgroups utilized innovation and simulation to create standard workflows that will incorporate the surgical site infection prevention evidenced based elements. During the kickoff meeting these four groups developed a cause and effect diagram for each of the four areas previously discussed. This would be the starting ground for each team to begin designing workflows to incorporate the bundle.

The implementation phase of the alpha pilot site was slower than anticipated. It took three weeks to get local teams together that included frontline staff. Many topics in the workgroup meeting were outside the scope of this project. The alpha site team utilized this time to discuss staffing issues and medication shortages. Our team questioned whether the pilot site should even be continued at this particular medical center. A special meeting with the senior leadership of the pilot site was held, to share our concerns. The following week's progress was outstanding. The pilot site began developing workflows, an escalation policy, and handoff tools. These workflows were then tested and refined through small tests of change. A safety summit was held to roll out the bundle to the rest of the staff. The peri-op educator shared a story of her own SSI experience. This really made an impact on the staff as they heard first-hand the story of their own colleague who has suffered an SSI, and the months it took to recover. This pilot continued with small tests of change until a final workflow has been sustained (see Appendix

N). The final workflow and SSI bundle was tested again at a beta site to ensure sustainability and ability to spread to all 21 medical centers in our organizations' region. Both pilot sites had a peri-op educator which was essential for the successful roll out of the bundle.

After the alpha and beta sites were completed the size of the project (with both perioperative and perinatal) was deemed too large for one team to accomplish. The decision was made to set up a separate team for Maternal Child Health (MCH). There were other areas needing attention besides SSI prevention. The basics of aseptic technique and proper surgical attire required re-education. The SSI prevention bundle will be implemented after this new education took place. There were two additional process measures for MCH vaginal prep and azithromycin for second line antibiotics. The regional structure is such that there is not a set cesarean team, therefore many MCH nurses are only in the Operating Room (OR) perhaps once a quarter. This helped explain the need for reeducation for nursing on surgical attire and aseptic technique. Two separate workgroups were formed to ease the burden on the team. This DNP student remained on both teams to ensure the bundle was successfully applied to all operating rooms across the region.

The Team also determined the magnitude of implementing glucose control was much more complicated than earlier thought. The decision was made to continue glycemic testing at both the alpha and beta sites, testing protocols that could be implemented region wide. Glucose control will be implemented in phase two in 2019.

Bundle Implementation

The plan to spread this intervention to regional hospitals for perioperative was a wave roll out. There would be three medical centers for each wave and the team would devote five to

eight weeks to assist the medical centers with implementation. What was found was that some sites required more time than others, therefore the schedule had to remain flexible.

	Medical Centers	Start	End
Wave 1	ANT, ROS, FRS	2/13	5/29
Wave 2	RWC, SFO, SAC	4/3	6/19
Wave 3	CVL, SRO, SSC	6/19	8/22
Wave 4	VAC, GSAA, WCR	6/26	9/4
Wave 5	SCL, RCH, PLS	8/28	11/6
Wave 6	SRF, SJO, SSF	9/25	11/12

Figure 2. Wave schedule

For each wave we would go out to the medical centers and conduct a site visit assessment, and attend their surgical services committee meeting to gain support from local senior leadership (see Appendix O). This gave the medical center a baseline assessment, and allowed for a better structure for planning the project roll out. MCH determined one single roll out region wide would be more efficient for them. Weekly calls were held for each wave as the medical center was implementing the bundle. After the implementation of wave two we started having monthly collaborative calls for all medical centers (regardless of their wave or department) to share their challenges and successes. A dashboard was also created to determine compliance with the process measures, additionally weekly reports were sent out to each medical center to ascertain their opportunities (See appendix P). After wave three, the smoking cessation project was merged into the SSI project as this was also listed in the literature as SSI prevention. This bundle element would only be for peri-op as MCH rarely has currently

smoking patients. The development of the dashboard continued to evolve with our analyst building a comprehensive dashboard for the medical centers.

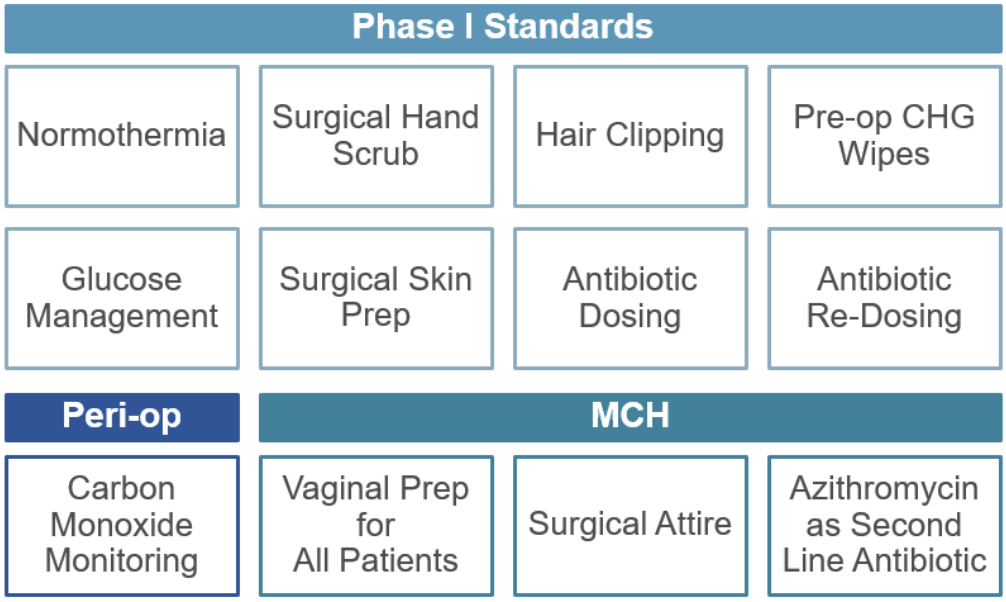


Figure 3. Final phase one bundle elements

The weekly dashboard was placed on our website for the medical centers to benefit by having all things SSI in one place. All waves have now rolled out and the sustainability planning and development of phase-two is under way (See appendix Q).

Study of the Intervention

This DNP project utilized implementation science to transform evidence into practice. Portions of lean and IHI improvement methodology was utilized to create standard workflow, and decrease variation to ensure all patients received the appropriate interventions.

The strategy utilized for decreasing SSI was to implement a bundle of process measures that combined together with consistent practice would achieve a decrease in SSI. Implementation science (Braithwaite, Churruca, Long, Ellis, & Herkes, 2018) was used to apply evidenced based practices. There are three main elements that can influence the adoption of a new practice: 1) The organization (including resources, leadership, and staff), 2) environmental situation (pay

for performance, regulatory issues, and public reporting), 3) practice qualities (evidence, cost, and usability). Other strategies to include are measure performance, local barriers, and transforming the evidence into practice. Additionally, ensure all patients receive the same interventions by education, engaging staff and leadership, then sustaining your practice change with consistent evaluation (O'Hara, Thom, & Preas, 2018).

Proposed Measures and Data Sources

The regional team used a three-tiered measurement strategy to ensure we had the data needed to understand opportunities and improve performance. The tiers were: Medical record level reports for the medical centers, an operational dashboard on the website, and an executive dashboard for senior executives.

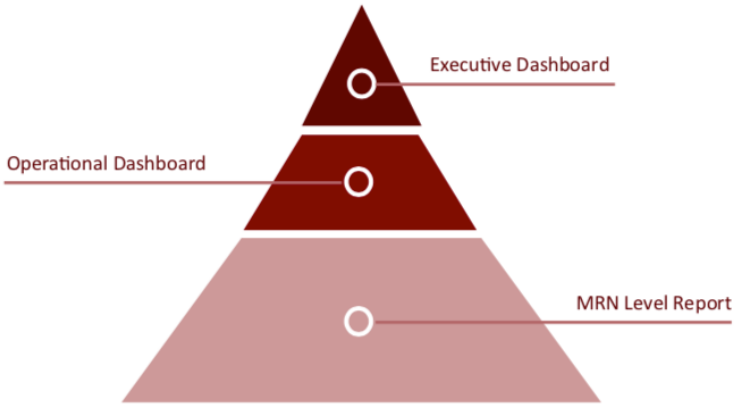


Figure 4. Measurement Strategy

All bundle elements were listed as separate process measures. The process measure documentation was pulled directly from the electronic medical record (EMR).

The outcome measure will be all surgical cases SSI to include inpatient and outpatient surgeries. The surgical cases SSI rate will be reported from the National Surgical Quality

Improvement Program (NSQIP) except Cesarean section SSI outcomes data which will be reported from the National Healthcare Safety Network (NHSN).

The NSQIP program is affiliated with the American College of Surgeons (ACS). This is a data collection program that specifically targets surgical patients. Approximately 150 data points are collected for each patient. These data include patient demographics, pre-operative co-morbidities and laboratory data, intra-operative information, and surgical complications. All patients are followed for 30 days' post operation. The data are collected from the patients' medical record, not by administrative data. National Surgical Quality Improvement Program. (n.d.) Retrieved October 7, 2017, from https://www.facs.org/quality-programs/acs-nsqip. Using this methodology, a more accurate picture of surgical complications can be noted for quality improvement projects. The data are risk adjusted and allow for hospitals to benchmark against other hospitals participating in the program. The risk adjustment utilizes a very stringent statistical process to produce an odds ratio for each outcome. The NSQIP Program uses a systematic sampling methodology which covers approximately 25 percent of our total surgeries done each year.

NHSN is one of the nation's most widely used healthcare-associated infection (HAI) tracking systems, and is a program under the Centers for Disease Control and Prevention (CDC). NHSN also provides risk adjusted data; however much less data for each patient is utilized. NSQIP does not gather data for cesarean sections, therefore NHSN data will be used for outcomes for our cesarean sections patients National Healthcare Safety Network (n.d.) Retrieved October 7, 2017 from: https://www.cdc.gov/nhsn/about-nhsn/index.html. All other surgical outcomes will be from the NSQIP data sets.

The primary goal is to be able to correlate the increased use of the process measures with the decrease in outcome measures. There are several recommendations for interventions for the prevention of surgical site infections. The most highly recommended processes from the literature review are the ones chosen for this project.

Analysis

Weekly reports of the process measures were gathered by an automated pull of the data from the EMR and reported to the medical centers for analysis. This showed the percent compliance for each bundle element, and whether targets are being met. A more formal dashboard was sent out monthly (until we were able to integrate to the website) to reflect all medical center's work and was correlated to the outcome measure of all cases of surgical site infections (SSI). The local medical centers then looked at each of the cases that did not meet the metric to determine any opportunity for improvement. A percent compliance will be employed to measure success. A target of 90 percent was used for all process measures except hair clipping in the OR, which was set at five percent. The rationale for the five percent target for hair clipping is that some clipping still remains to be completed in the OR. For each process measure the medical center is not only able to see their local data but see where they rank in the region (see Appendix R).

For both the process and outcomes measures we are using Tableau (statistical software) in a statistical control chart. We are also providing different methods of viewing the data for the types of SSI at each facility (See Appendix S). The medical centers are able to break down the data by specialty and types of surgery. A dedicated data analyst helping to support us with the data. These charts and dashboards allowed frontline staff to see their progress and provide a

format for discussion on opportunities for improvement. This data are also presented to leadership to show the efficacy of the project.

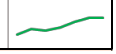
NCAL Roll-up	Temp in Preop	Weight in Preop	CO Monitor in Preop	Warming in Preop	CHG Wipes in Preop	First Antibiotic	Surgical Skin Prep	Hair Clipping in OR*	Antibiotic Redose	Temp in Postop	Warming in Postop
All Facilities, Aug 2018	99%	98%	61%	78%	79%	99%	98%	8%	79%	99%	64%
YTD Change											

Figure 5. High Level Process Measures

Ethical Considerations

The heart of nursing is to treat our patients with compassion, respect and dignity. Nursing also looks to advance health and human rights and to reduce disparities. Nurses' primary commitment is to the patient for whom he/she advocates, protects and promotes health and safety of the patient (American Nurses Association, 2017). These values are shared by Kaiser Permanente, and the Jesuit Catholic trainings of care for the individual person, and respect for self and others that are integrated in the curriculum for the University of San Francisco (n.d.) Retrieved October 16, 2018 from https://www.usfca.edu/

Surgical safety in the prevention of infection is in alignment of all entities involved. This project aims to improve the care delivery for our patients and the communities in which we serve, and to ensure all patients receive standard surgical site infection prevention. This strategic initiative to prevent SSI will increase the quality of care we provide our patients and prevent harm that could dramatically impact their lives. This project has been determined to meet the standards of a non-research evidenced based practice change and was authorized by the supervising faculty on September 9, 2017 (See Appendix T). There are no conflicts of interest identified for this project.

Section IV: Financial

Financial Plan

This project uses cost avoidance by preventing adverse events using evidenced based medicine. Evidenced based practice (EBP) models have emerged from many institutions and nurse leaders in the past 30 years. These models guide the development of evidenced-based practices and protocols that collectively lead to the best quality care and outcomes while aligning with provider preferences and patient needs. Nurse leaders today need to understand these models and how they affect the return on investment (ROI) while implementing and sustaining their efforts. There are few health systems that have mastered operationalizing EBP models consistently. Without strong nursing and organizational leadership implementing EBP is unlikely (Tucker, 2014). Our organization has a slight edge over most institutions as we have our own Improvement Institute that provides strong organizational support for performance improvement to implement EBP's. SSI bundles are backed by evidence and can show a return on investment and as well as improve patient satisfaction. The Adverse Events Prevented Calculator from the Institute for Healthcare Improvement (IHI) was utilized (Adverse Events, 2018) to calculate the ROI for the SSI project. (see appendix U).

While the financial results of this project will not be fully realized for at least two years once fully implemented, the overall impact on quality patient care will be appreciated immediately.

Approximately 48% of hospital revenue is derived from surgical admissions. Surgical admissions cost two and one half times more than medical admissions, and have longer length of stays. (Clark, 2014). Using the combined statements of operations and changes in net worth (Kaiser Foundation Health Plan, 2018), the projected surgical revenue for the next two years shows an annual growth of 11.9% (See appendix V). With the prevention of SSI more operating room time will be available for other surgeries, and decreased length of stay resulting in

increased revenue for the hospitals. This helps leadership to appreciate the overarching ROI for this project.

Section V: Results

Results

Current data shows that as the bundle was rolled out the compliance of the process measures have indeed decreased SSI throughout the region. The aim of this project was to increase the use of a standard SSI prevention bundle by 30 percent by November 30, 2018. Currently this DNP project has already exceeded the target. Over all bundle compliance has improved 40 percent region wide. Specifically, the use of CHG wipes in pre-op has gone from 22% to75% compliance, and pre-op warming has improved from 48% to 85%. The project began with the following process measures based on the literature: normothermia, CHG wipes before surgery, clipping outside the operating room, glucose control, weight based antibiotic prophylaxis, surgical skin prep, antibiotic re-dosing. After preliminary evaluations from the two pilot sites the decisions was made to continue testing and then refining a protocol for glucose control. Glucose control would be tabled until phase two due to its complexity. Smoking cessation was a separate project that was rolled into the SSI project as this better fits into the nursing workflow and met criteria for SSI prevention. Contextual elements that interacted with our interventions included the operating environment, traffic in the OR, surgical attire, laminal air flow, flashing of instruments, and temperature/humidity issues in the operating room. These other elements have been addressed concurrent with the implementation of this project. This has created a better awareness of the complexity of the perioperative space. There is still opportunity for fine tuning, however the work seems to be hardwired into nursing workflows and is sustaining well.

Section VI: Discussion

Summary

The aim of this project was to develop a SSI prevention bundle based on evidence in the literature, implemented across all of 21 medical centers, while being measured and evaluated. The project was put into operation in both the perioperative and MCH departments. Two pilots tested and then refined the bundle elements, and workflows. The SSI project has spread to all medical centers in our organization. Substantial compliance with the process measures has occurred across all sites. This finding is starting to correlate with a decrease in SSI.

Lessons Learned

There are cultural differences across medical centers and between perioperative and perinatal departments. These differences must be addressed in order for the project to be successful. While implementing glucose control seemed very straight forward, it turns out it is more complex than first realized. A great deal of work has been done with the pilot sites, endocrinology and anesthesia departments to develop a treatment protocol for phase two of the project. Including subject matter experts from all areas was critical.
Communication is key. Establishing daily huddles, real time data feedback, and continuous collaboration among the medical centers was an essential factor.

Key findings indicate that this type of work must involve the frontline staff who do the work and can develop workflows that are operationally realistic.

Challenges with analytics led to the exclusion of patients who were having surgery on areas that prevented the use of CHG wipes. This took time and many subject matter experts to ensure accuracy.

Another challenge was collecting the process measures from the EMR. There are many different places to document information in the EMR. Therefore, educating staff as to where to document the data in the EMR has been essential. Many of our medical centers lack a perioperative educator. The importance of a peri-op educator was a critical lesson learned as we spread this out to other medical centers without an educator. The medical centers without an educator struggled much more than other medical centers. This finding was escalated to senior leadership. We developed a resource guide that shows specifically where to document the data so we can easily pull information for the EMR (see Appendix W). Development of order sets and potential changes to the nursing flowsheets would make it easier to do the right thing. These actions are currently in process. Relationships formed during this have improved cooperation between the perioperative and MCH departments. Clinicians want to do what is best for the patient, and this new relationship between the departments help to ensure that every patient gets the same prophylactic measures for SSI prevention.

Interpretation

The results were consistent with those found in the literature. The increased use of the evidenced based bundle correlates with a decrease in surgical site infections (See Appendix X). The impact on systems was minimal, as the new workflows were designed by the frontline staff. The impact on the people were best demonstrated by surgeons who had to relinquish hair clipping to the nurses. Decreasing variation across medical centers provides standard care for our members. There were a few surgeons who struggled with this new method. Decreasing variation across medical centers provides standard care for our members. This standard approach for care decreases the opportunity for complications. Kotter's theory of change fits well into our organization's improvement structure. In order to sustain surgical projects our organization is

creating a surgical safety committee at each medical center and the region to own the sustainability of all surgical improvement projects. The sustainment for this project will fall under this newly formed committee (See Appendix Y). This project provided staff development for our nursing clinical ladder program. Phase two will offer the same opportunities for other nurses advancing in the clinical ladder.

Limitations

As this is a non-research project conducted in a large integrated system, there are limitations to generalizability. Medical centers in the community may not have resources or funds to support this type of project. There were four limitations related to this project. First was the magnitude of implementing a glucose protocol for 21 medical centers. There were many factors to consider such as: Was the patient going home? How much insulin can you give if they are going home without causing hypoglycemia? Who will care for the admitted patient with hyperglycemia? What type of insulin should be used? Should there be a different protocol for diabetics versus non-diabetics? All of these questions could not be answered in the time allowed for phase one of the project. Research for outpatient surgery along with more evidence will be needed to answer these significant answers.

The impact on labor relations for this project was not factored. During this project our organization was in contract negotiations, and there was pushback from frontline staff for implementation of the bundle. Front line nurses viewed changes in workflows as more work.

Leadership turnover also impacted the timeline for some medical centers, as there must be leadership sponsorship to be successful. Medical centers assigned waves had to remain fluid, to allow for new leaders to be hired and acclimated.

Finally, the culture difference between perioperative and MCH is dramatically different. This was not realized until after the pilot sites were completed. This issue was mitigated by separating into two teams for rolling out the bundle.

Conclusions

The intent of this DNP project was to provide leadership, and support efforts to take evidenced based literature, and develop a bundle of practices to prevent SSI. This bundle would be used for all patients regardless of the operating room used for their surgery. This bundle would proactively prevent the surgical complication of a surgical site infection. This DNP project is a playbook for achievement, in turning evidenced based practice into clinical workflows as it relates to patient outcomes. This is a project that can be spread across all regions of Kaiser Permanente. The glucose protocol being developed for phase two provides research opportunity to establish a glucose protocol for both inpatient and outpatient surgical procedures. There has been little research in the outpatient glucose control domain.

SSI Project Innovation Ideas

Preventative SSI strategies could include an app for smartphones that would provide a daily checklist of items for the patient to follow to improve pre and postoperative care. Education for the bundle elements would help patients to understand what to expect before surgery. Postoperatively the app could integrate patient-reported outcomes, postoperative care, and increase patient satisfaction. This information would then upload to the patient's electronic medical record (EMR), and notify the provider if there was a trigger for concern. Many healthcare systems including Kaiser Permanente, already have apps for the patient to check labs, order prescriptions, and email the doctor. This would be another method of care for the patients electronically. Currently, there are 2.53 billion smartphone users worldwide and use is projected

to increase to 2.87 billion by 2020 (Staista, 2018). This platform would reach the majority of users receiving pre and postoperative care.

Design features of this interactive web-based SSI app would provide daily guidance to the patient. Based on the voice of the customer, most patients don't comprehend the instructions given to them immediately before or after surgery. This app would provide the platform to provide preoperative education, and daily guidance post-surgery. This simple to use app is not only for the patient but also for any caregiver (See appendix Z).

The use of the smartphone app could potentially reduce unnecessary emergency room and clinic visits. For the patient, the ease of pre, and post-op care in the comfort of their own home without needless hours waiting in a healthcare environment would increase patient satisfaction. Patients like the freedom to check in with their physician when it is suitable for them (Armstrong, Semple, & Coyte, 2014). The use of this type of app is currently being investigated for its feasibility within our organization.

Section VII: Other

Funding

There was no outside funding for this project. Funding for this project was incorporated into existing resources and employee roles.

Section VIII: References

References

American Nurses Association (2017) Retrieved from http://nursingworld.org/DocumentVault/Ethics-1/Code-of-Ethics-for-Nurses.html

Appelbaum, S. H., Habashy, S., Malo, J. -., & Shafiq, H. (2012). Back to the future: Revisiting kotter's 1996 change model. *Journal of Management Development, 31*(8), 764-782. doi:10.1108/02621711211253231.

Allegranzi, B., Bischoff, P., de Jonge, S., Kubilay, N. Z., Zayed, B., Gomes, S. M., . . . Solomkin, J. S. (2016). New WHO recommendations on preoperative measures for surgical site infection prevention: An evidence-based global perspective. *Lancet Infectious Diseases, 16*(12), e287. doi:10.1016/S1473-3099(16)30398-X

Armstrong, K. A., Semple, J. L., & Coyte, P. C. (2014). Replacing ambulatory surgical follow-up visits with mobile app home monitoring: Modeling cost-effective scenarios. *Journal of Medical Internet Research, 16*(9)10.2196/jmir.3528 Retrieved from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4211032/

Armstrong, K., Coyte, P., & Semple, J. (2015). The effect of mobile app follow-up care on the number of in-person visits following ambulatory surgery: A randomized control trial. *Studies in Health Technology and Informatics, 216*, 894.

Ban, K. A., Minei, J. P., Laronga, C., Harbrecht, B. G., Jensen, E. H., Fry, D. E., . . . Duane, T. M. (2017). American college of surgeons and surgical infection society: Surgical site infection guidelines, 2016 update. *Journal of the American College of Surgeons, 224*(1), 59-74. doi:10.1016/j.jamcollsurg.2016.10.029

Bert, F., Giacomelli, S., Amprino, V., Pieve, G., Ceresetti, D., Testa, M., & Zotti, C. M. (2017). The "bundle" approach to reduce the surgical site infection rate. *Journal of Evaluation in Clinical Practice,* doi:10.1111/jep.12694

Braithwaite, J., Churruca, K., Long, J. C., Ellis, L. A., & Herkes, J. (2018). When complexity science meets implementation science: A theoretical and empirical analysis of systems change. *BMC Medicine, Vol 16, Iss 1, Pp 1-14 (2018),* (1), 1. doi:10.1186/s12916-018-1057-z

Centers for Medicare & Medicaid Services value-based purchasing retrieved from: https://www.cms.gov/newsroom/fact-sheets/cms-hospital-value-based-purchasing-program-results-fiscal-year-2018

Crolla, Rogier M P H, van der Laan, L., Veen, E. J., Hendriks, Y., van Schendel, C., & Kluytmans, J. (2012). Reduction of surgical site infections after implementation of a bundle of care. *PloS One, 7*(9), e44599. doi:10.1371/journal.pone.0044599

DeFeo, J, & Juran, J.M. (2014) Juran's quality essentials for leaders. New York: McGraw Hill

Gaines, S., Luo, J. N., Gilbert, J., Zaborina, O., & Alverdy, J. C. (2017). Optimum operating room environment for the prevention of surgical site infections. *Surgical Infections, 18*(4), 503-507. doi:10.1089/sur.2017.020

Johns Hopkins Hospital/The Johns Hopkins University (2012). research appraisal tool. In S. L. Dearholt & D. Dang (Eds.), *Johns Hopkins nursing evidence-based practice: Model and guidelines* (2nd ed., pp. 237-240). Indianapolis, IN: Sigma Theta Tau International Honor Society of Nursing.

Kaiser Permanente (2017). Retrieved from https://share.kaiserpermanente.org/article/northern-california-fast-facts/

Kotter, J. P. (1996). *Leading change* Boston : Harvard Business School Press, 1996]. Retrieved from http://search.ebscohost.com/login.aspx?direct=true&AuthType=sso&db=cat00548a&AN=iusf.b1446716&site=eds-live&scope=site&custid=s3818721

National Healthcare Safety Network (2017). Retrieved from https://www.cdc.gov/nhsn/index.html

National Surgical Quality Improvement Program (2017). Retrieved from http://www.faces.org/quality-programs/acs-nsqip

Leaper, D. J., Tanner, J., Kiernan, M., Assadian, O., & Edmiston, C. E., Jr. (2015). Surgical site infection: Poor compliance with guidelines and care bundles. *International Wound Journal, 12*(3), 357-362. doi:10.1111/iwj.12243

O'Hara, L. M., Thom, K. A., & Preas, M. A. (2018). Update to the centers for disease control and prevention and the healthcare infection control practices advisory committee guideline for the prevention of surgical site infection (2017): A summary, review, and strategies for implementation. *American Journal of Infection Control, 46*(6), 602-609. doi:10.1016/j.ajic.2018.01.018

Pradarelli, J. C., Healy, M. A., Osborne, N. H., Ghaferi, A. A., Dimick, J. B., & Nathan, H. (2016). Variation in medicare expenditures for treating perioperative complications: The cost of rescue. *JAMA Surgery, 151*(12), 1-9. doi:10.1001/jamasurg.2016.3340

Statista (2018). Retrieved from: https://www.statista.com/statistics/330695/number-of-

smartphone-users-worldwide/

Tanner, J., Padley, W., Assadian, O., Leaper, D., Kiernan, M., & Edmiston, C. (2015). Do surgical care bundles reduce the risk of surgical site infections in patients undergoing colorectal surgery? A systematic review and cohort meta-analysis of 8,515 patients. *Surgery, 158*(1), 66-77. 10.1016/j.surg.2015.03.009

Tucker, R., P. (2014). Determining the return on investment for evidence-based practice: An essential skill for all clinicians. *Worldviews on Evidence-Based Nursing, 11*(5), 271-273. 10.1111/wvn.12055 Retrieved from http://0-search.ebscohost.com.ignacio.usfca.edu/login.aspx?direct=true&db=ccm&AN=103906829&site=ehost-live&scope=site

University of San Francisco (2018) Retrieved from: https://www.usfca.edu/

Section IX: Appendix

Appendix A

KP NCAL Coverage Area

Appendix B

Baseline SSI Data

Appendix C

Evaluation Table

Citation	Conceptual Framework	Design/ Method	Sample/ Setting	Variables Studied and Their Definitions	Measurement	Data Analysis	Findings	Appraisal: Worth to Practice
(Allegranzi et al., 2016)	None	Systematic review and Meta-analysis	There was variation in the amount of study's used for each intervention.	SSI and SSI mortality were the primary outcomes identified in the search	Quality of SSI interventions based on RCTs	Cochran Collaboration Tool, and the Newcastle-Ottawa Quality Assessment Scale	Strength of SSI interventions	**Strengths**: The meta-analysis of evidenced based practices also took into consideration of the cost for lesser developed countries**.** **Limitations:** The cost of use was factored into the recommendations as well as the evidence**.** **Critical Appraisal Tool & Rating:** JHNEBP Level III Quality Rating B
Ban, K.A, et al. (2016)	None	Critical Literature Review	The number of articles reviewed is not listed in the article. There were 134 references listed	Prehospital interventions, hospital interventions	None	Review with an expert panel in Infectious Disease and General Surgeons	Updated SSI Guidelines	**Strengths:** Recent high quality studies are guiding new recommendations for prevention of SSI. **Limitations:** Due to independent interpretation of the evidence there are different interpretations of the evidence. **Critical Appraisal Tool & Rating:** JHNEBP Level III Quality Rating B
Bert, F., et al. (2016)	None	Retrospective review of medical records from 37 hospitals	3314 surgical operations	Use of bundle of interventions versus no interventions	Surgical Site Infections	Univariate and Multivariate logistical regression -colon surgeries with a *p* value <0.001 -hip	The use of a surgical bundle was correlated to a decrease in SSI	**Strengths:** The bundle was analyzed in two very different types of surgeries**.** **Limitations:** All surgeries analyzed were in the same region therefore may have some similarities in demographics **Critical Appraisal Tool & Rating:** JHNEBP

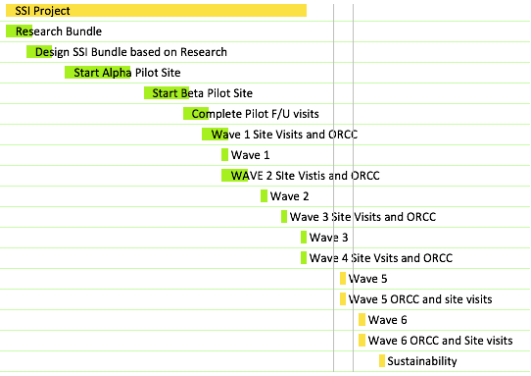
						replacement surgeries with a *p* value of 0.151		Level II Quality Rating B
Crolla, R., et al. (2012)	None	Prospective quasi experimental cohort study	1537 Colon Surgeries	Use of bundle of interventions versus no interventions	Surgical Site Infections	Logistic regression	Bundle usage improves Patient Safety and decreases SSI	**Strengths:** Increased compliance for bundle used correlated with decreased SSI **Limitations:** Only one type of surgery was used for this study **Critical Appraisal Tool & Rating:** JHNEBP Level II Quality Rating A
(Leaper, Tanner, Kiernan, Assadian, & Edmiston, 2015)	None	Systematic review	The number of articles reviewed is not listed in the article. There were 77 references listed	Compliance of the use of bundles	None	Review with an expert panel	Success to bundle usage requires surveillance and outcomes measurement	**Strengths:** To be successful in bundle use you need to measure outcomes and constantly reviewing the evidence for updated literature **Limitations:** Only two guidelines were fully addressed. **Critical Appraisal Tool & Rating:** JHNEBP Level III Quality Rating B
(Pradarelli et al., 2016)	None	Retrospective cohort study	Medicare surgical patients	Evaluate differences across hospitals in the costs of care for major surgical procedures	Eight surgical complications	Multiple Logistic Regression	Higher Medicare payments were not associated with improved clinical performance	**Strengths:** The cost of rescue does not imply better outcomes. **Limitations:** Administrative data was used which can have flaws in coding **Critical Appraisal Tool & Rating:** JHNEBP Level II Quality Rating A

Tanner, J., et al. (2015)	None	Systematic review and Meta-analysis	95 full test articles in 13 separate studies	Use of bundle of interventions versus no interventions	Surgical Site Infections	Cochrane Review Manger version 5.2	The use of a surgical bundle was correlated to a decrease in SSI	**Strengths:** The first meta-analysis looking at the efficacy of the use of surgical bundles to prevent SSI **Limitations:** Failure of the consistency of SSI data collection, and failure of some studies to report use of care bundles **Critical Appraisal Tool & Rating:** JHNEBP Level II Quality Rating A

Appendix D

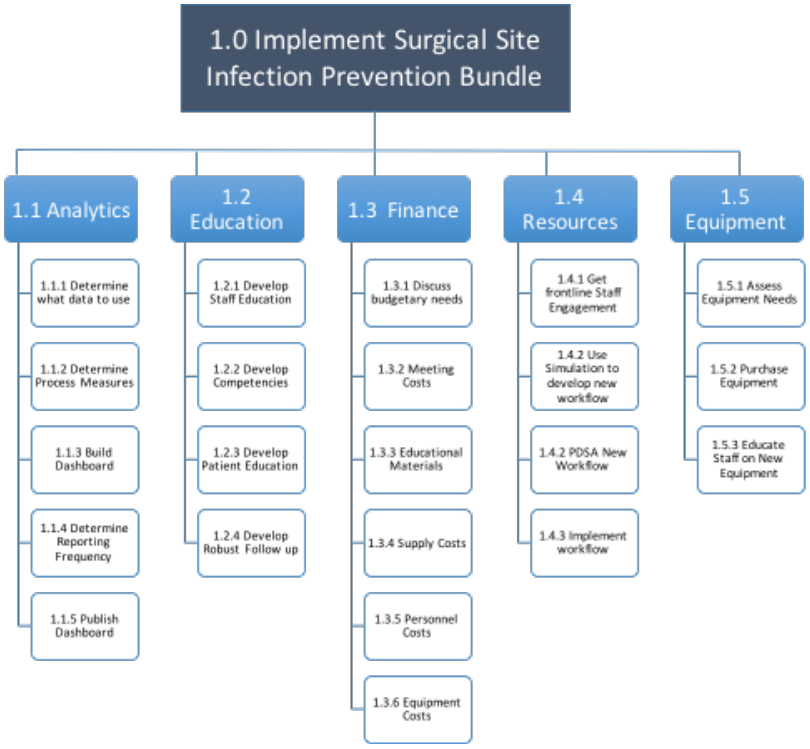
Gantt Chart

SSI Project	03/20/17	06/20/18	328	0%
Research Bundle	03/20/17	04/20/17	24	100%
Design SSI Bundle based on Research	04/21/17	05/21/17	21	100%
Start Alpha Pilot Site	06/28/17	09/30/17	68	100%
Start Beta Pilot Site	10/15/17	12/15/17	45	100%
Complete Pilot F/U visits	12/16/17	01/10/18	18	100%
Wave 1 Site Visits and ORCC	01/11/18	02/11/18	22	100%
Wave 1	02/15/18	02/15/18	1	100%
WAVE 2 SIte Vistis and ORCC	02/16/18	03/30/18	31	100%
Wave 2	04/15/18	04/16/18	1	100%
Wave 3 Site Visits and ORCC	05/06/18	05/07/18	1	100%
Wave 3	06/12/18	06/12/18	1	100%
Wave 4 Site Vsits and ORCC	06/15/18	06/15/18	1	100%
Wave 5	08/06/18	08/06/18	1	0%
Wave 5 ORCC and site visits	08/06/18	08/06/18	1	0%
Wave 6	09/10/18	09/10/18	1	0%
Wave 6 ORCC and Site visits	09/10/18	09/10/18	1	0%
Sustainability	10/01/18	10/01/18	1	0%



Appendix E

Work Breakdown Structure



Appendix F

Expert Peri-op Recommendations

Prevention Measure	WHO (2016)	ACS (2016)	CDC 2017
Normothermia	x	x	x
Nasal Decolonization (cardiac & ortho)	x	x	x
MBP with antibiotics (colorectal)	x	x	x
Hair removal when necessary (pre-op)	x	x	x
Glucose control	x	x	x
Prophylactic Antibiotic	x	x	x
Pre-op Bathing	x	x	x
Case Cancelation		x	
Smoking Cessation	x	x	x
Enhanced Nutritional Support	x	x	
Surgical Skin Prep	x	x	x
FIO2 >/= 50%	x	x	
Antibiotic Redosing	x	x	x
Surgical Hand Prep	x	x	x
Wound protector (Colorectal and hepatobiliary)	x	x	
Antimicrobial Sutures	x	x	
Clean Closing Tray (Colorectal)		x	
Skin sealants	x		
Normovolaemia	x		x
Laminar Air flow	x		

Appendix G

SWOT Analysis

Appendix H

GAP Analysis

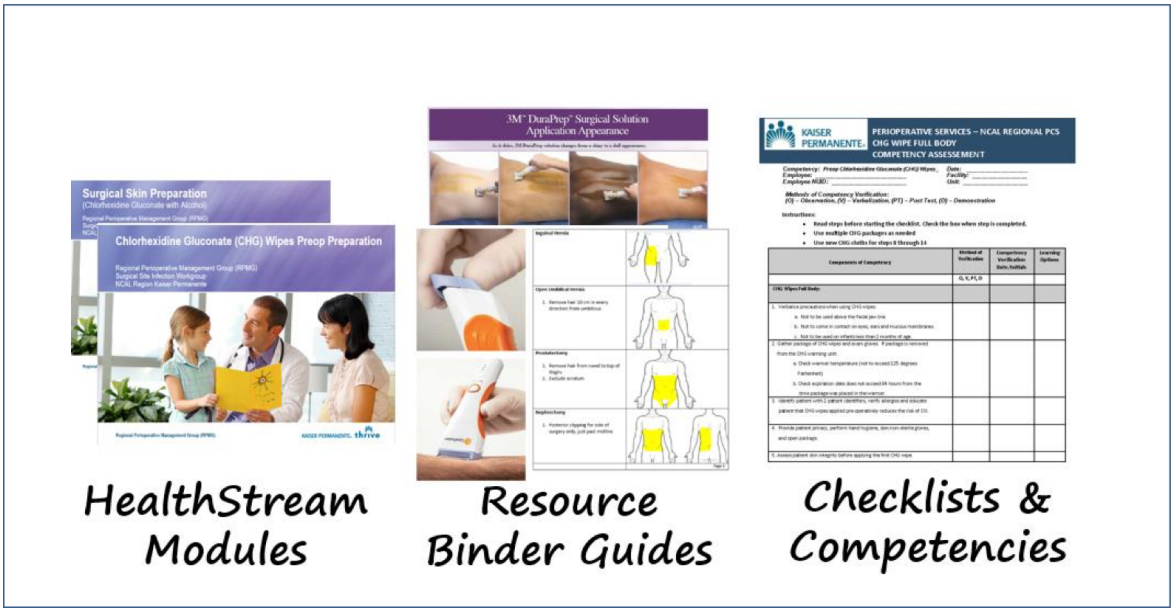
Gap Analysis

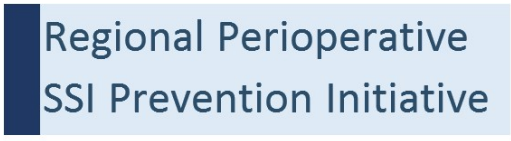
Implementing a Surgical Infection Prevention Practice in an Integrated Healthcare System

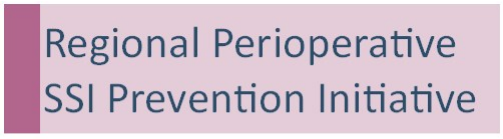
BUSINESS REQUIREMENT	DESCRIBE EXISTING SITUATION	GAP BETWEEN EXISTING & NEW	NEW CAPABILITIES NEEDED TO REDUCE OR ELIMINATE GAP	ISSUES & RISKS
Weight Based Antibiotic dosing	Not all medical centers routinely weigh their patient before surgery	Ensuring all patients are weighed day of surgery	Change of workflow.	Inadequate number of scales in pre-op. Inaccurate antibiotic dosing if not weighted
Maintenance of Normothermia	Currently not all medical centers have forced air warmers in Pre-op	Moving from warming some patient to all patients.	Increase number of forced air warmed in many medical facilities to provide warming for all patients.	Induction of anesthesia drops temperature of patients approximately one degree which increases risk of infection.
Glucose Monitoring	Only diabetic patients are having glucose tested	Literature shows that all patients should have glucose tested to control stress hyperglycemia	Increase number of glucose monitors to meet the new demand.	Hyperglycemia increase risk of infection Funding for increased monitors
Chlorhexidine Bathing	Variation in who and how chlorhexidine bathing is completed	Need standard process for chlorhexidine bathing that meets the recommendations by the manufacture for use.	Education and training for staff	Variation of staffing at different medical centers
CO Monitoring	Currently many medical centers are being selective regarding which smokers they test.	Standardization of practice to measure all smokers. The literature shows even stopping smoking for 24 hours decreases complications.	Education and training for staff	Smoking increases risk of infection and many other surgical complications
Clipping outside of the operating room	Variation in practice across medical centers	The literature shows clipping should take place outside of the operating room to decrease chance of infection.	Increased number of clippers. Education for physicians	Culture change for physicians to allow nurses to complete clipping outside the OR

Appendix I

Resource Guides

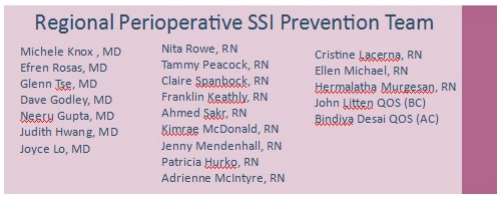






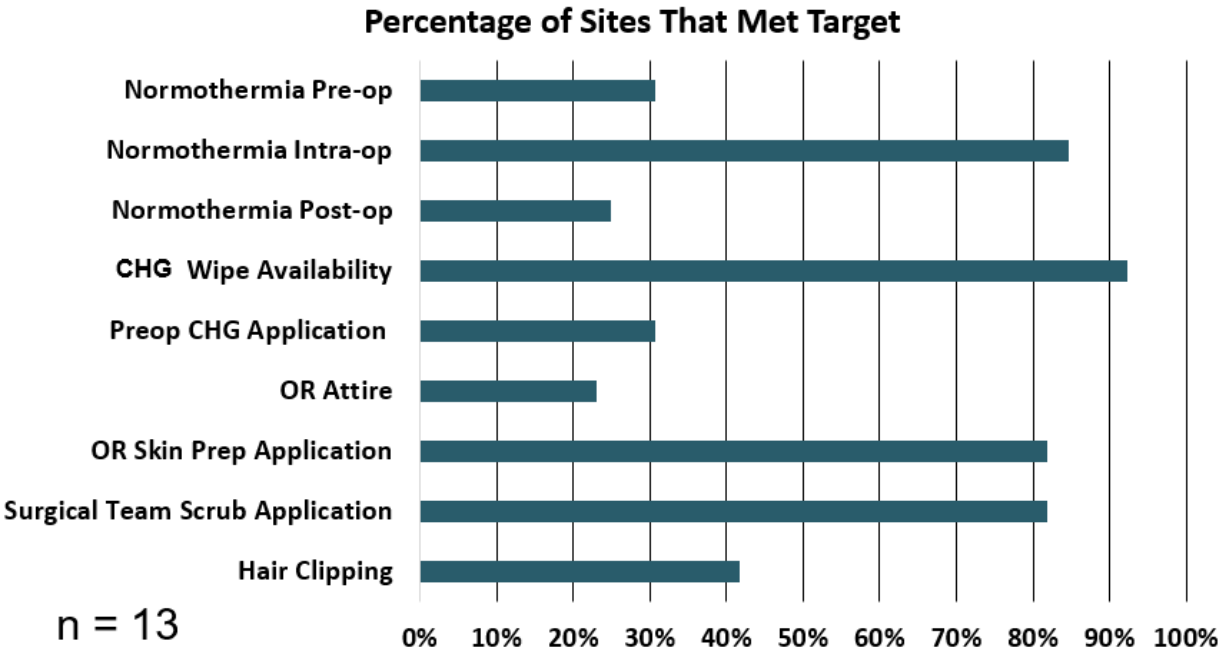
SSI Prevention Bundle Expectations

SSI Resource Binder



Appendix J

Baseline Assessment



Appendix K

Communication Plan

Communication Plan				
Stakeholder	What Need to Know	What to Communicate	Medium	By When
Medical Center Senior Leadership	Expectations of staff envolment during projet	Specifics of time staff needs to particapate in project. Necessary equipment needed for	In person with email follow up	As needed
Improvement Advisior	Details of project implimentation, how to involve frontline staff, need for educator	project progress	In person, email, and webex	Continous
NCAL Regional Senior Leaders	Status updates	High level progress	In person with email follow up	Monthly
Regional Perioperative Medical Group	Status updates	High level progress	In person with email follow up	Quarterly

Appendix L

"The Why"

Preop

Hair Clipping

GOAL: Remove hair by clippers only when necessary and outside of the OR

Stakeholders

- Preop RN
- PCT
- CNA
- PA
- Surgeon
- Patient

Process Metrics

- % clipped in Preop
- % clipped in OR

Resources

- Clipping Check List
- Clipping Competency
- Clipping Binder
- Clipping guide & Carefusion instructions

Who?

- The RN, PCT, CNA, PA, and Surgeon can perform the activity

When?

- Hair at the surgical site should be left in place unless it interferes with the surgical procedure.
- Clipping is performed after patient admission to the pre-op unit and before application of CHG wipes

Where?

- Clipping should only take place in the pre-op unit
- Exclusions to this rule include:
  - Emergent cases/situations
  - Patients with extreme anxiety
  - Special procedures (e.g. neurosurgery or urogynecology)

Why?

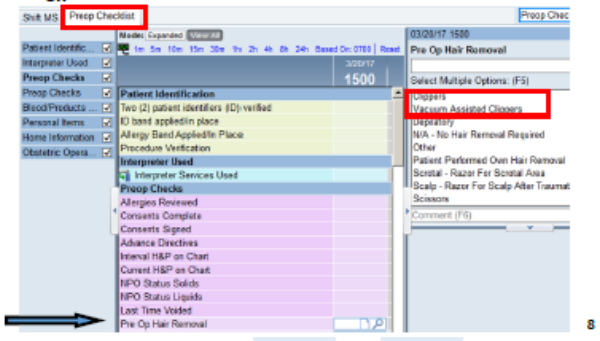
- Hair clipping is conducted to decrease the risk of SSI in patients where hair is likely to enter the surgical field without clipping

How?

- See clipping guide and binder

Where and How to Document?

- In the Preop Checklist
- Under the "Pre Op Hair Removal section
- Select "clippers" or "vacuum assisted clippers"
- **Only document hair clipping in optime when clipping is performed in the OR**



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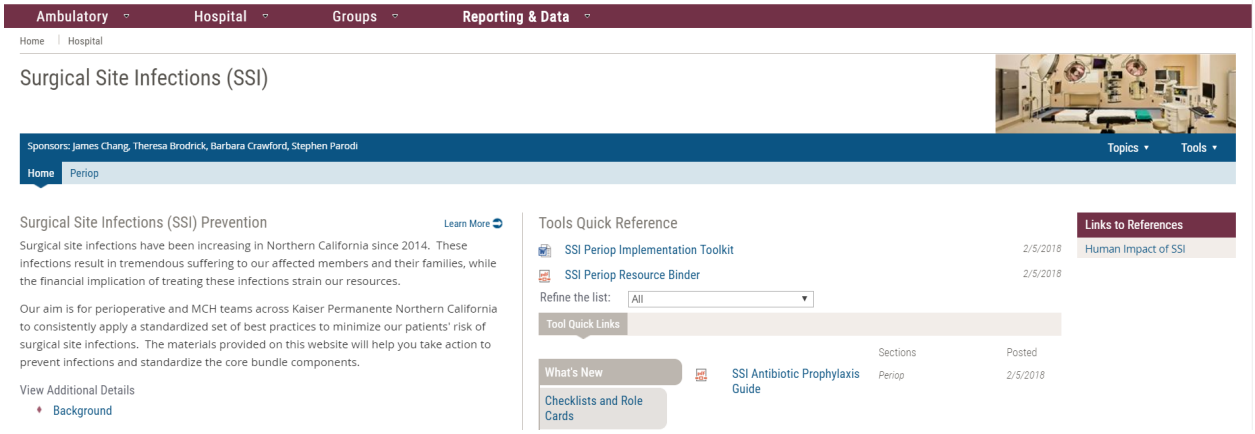
Appendix M

Website



Appendix N

Bundle Workflow

Appendix O

Site Visit Assessment

Facility:	Date: Shifts observed: Types of procedures observed:			Observer:
Bundle Component	**Observation Questions**	**Response**		**Notes / Opportunities**
Carbon Monoxide (CO) Monitoring	Do you have enough CO Breathalyzers to support the current order	yes	no	
	Does the nurses consistently perform CO assessment when orders are received?	yes	no	
	If CO testing was performed, was the CO PPM correctly documented?	yes	no	
	If patient had a low CO level (<10 PPM) were they congratulated?	yes	no	
	If patient had a high CO level (>=10 PPM) were they told to quit for at least a week after surgery?	yes	no	
Antibiotic Dosing/Redosin	Are patient weights consistently assessed in preop?	yes	no	
	Are weight measurements consistently recorded before incision time?	yes	no	
Warming Device (Normothermia)	Are there sufficient warming blower units in preop area?	yes	no	
	Do you have enough supply of warming blankets to consistenty warm all patients?	yes	no	
	Are warm blankets used as a substitute for a forced air warming device?	yes	no	
	For all patinets, is forced air warming administered for 30 minutes in preop before OR arrival?	yes	no	
Hair Removal	Is hair only clipped when needed?	yes	no	
	Do you currently only clip hair in preop?	yes	no	
	Is the proper clipping technique being followed?	yes	no	
	Do you have an ample supply of clippers to clip all patients in preop?	yes	no	
	When required, is clipping being correctly documented?	yes	no	
CHG Wipe Application	Is a nurse doing the CHG wipe application?	yes	no	
	Are CHG wipes being applied to all patients?	yes	no	
	Is the proper CHG wipe technique being followed?	yes	no	
	Did the CHG wipe application coincide with the RN skin assessment?	yes	no	
	Are nurses documenting the required information properly?	yes	no	
Surgical Hand Scrub	Do physicans and surgical staff scrub for 3 minutes?	yes	no	
	Do physicians and surgical staff use correct technique?	yes	no	
Waterless Surgical Hand	Do physicians and surgical staff use correct technique?	yes	no	
Surgical Skin Prep	Is the correct surgical skin prep or paint technique followed?	yes	no	
	Is the required information properly documented?	yes	no	
Antibiotic Dosing/Redosin g	If appropriate, was prophylactic antibiotic administered within 1 hr prior to incision or (2 hrs for vancomycin or fluoroquinolones)	yes	no	
	If appropriate, was antibiotic re-administered at the appropriate interval?	yes	no	
Warming Device (Normothermia)	Is a warming device used throughout the course of surgery/procedure?	yes	no	
Warming Device (Normothermia)	Are there sufficient warming blower units in PACU?	yes	no	
	Was forced air maintained in the PACU until patient became normothermic?	yes	no	
	Was the required information properly documented?	yes	no	

Appendix P

Weekly Report

Medical Center

Summary Overall

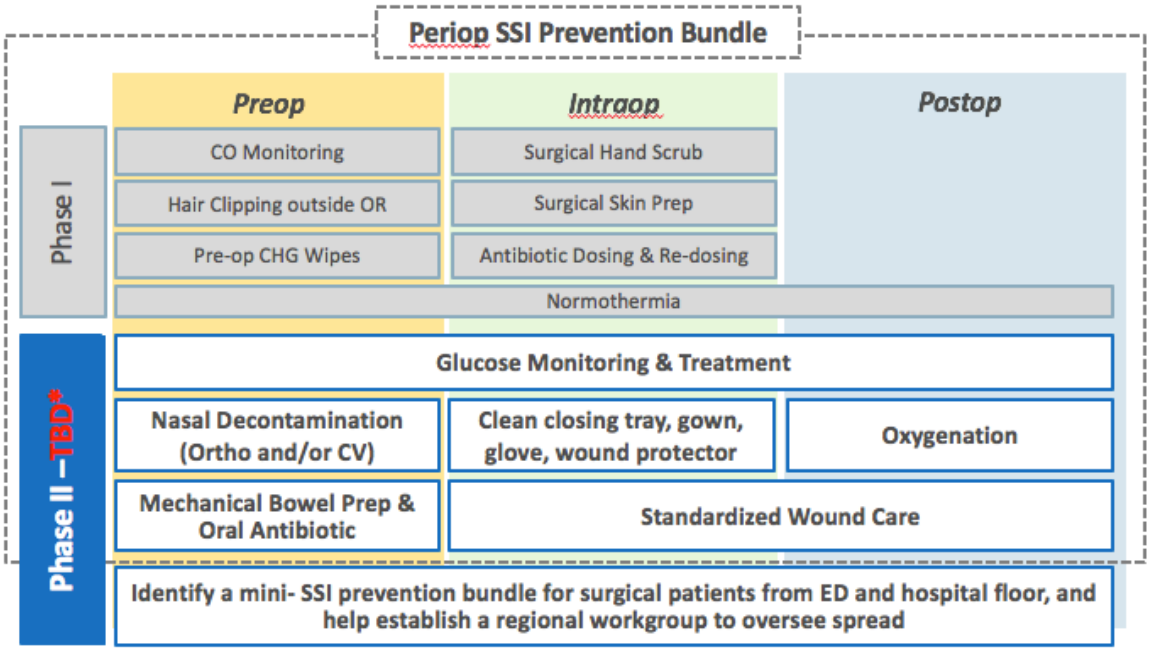
Surgeries Completed between 05/29/2017 and 08/29/2017

Below summary with MCH exclusion (no MCH cases)

Facility Name	Total Surgery Cases	% of Time Body Temperature Was Assessed in Pre-Op	% of Time Temperature Was Assessed in PACU	% of Time a Warming Device Was Used in Pre-Op	% of Time a Warming Device Was Used in PACU	% of Time CHG Wipes Were Applied in Pre-Op	% of Time Hair Clipping was Performed in Pre-Op	% of Time Hair Clipping Was Performed in the OR	% of Time Blood Sugar Was Assessed in Pre-Op	% of Time Blood Sugar Was Assessed in PACU	% of Time Surgical Skin Prep was Applied	% of Time Weight Assessed in Preop	% of Time Antibiotic Administered Before Incision Time At Correct Dose per Weight
	1302	97%	96%	47%	22%	51%	25%	8%	18%	6%	96%	97%	79%

Appendix Q

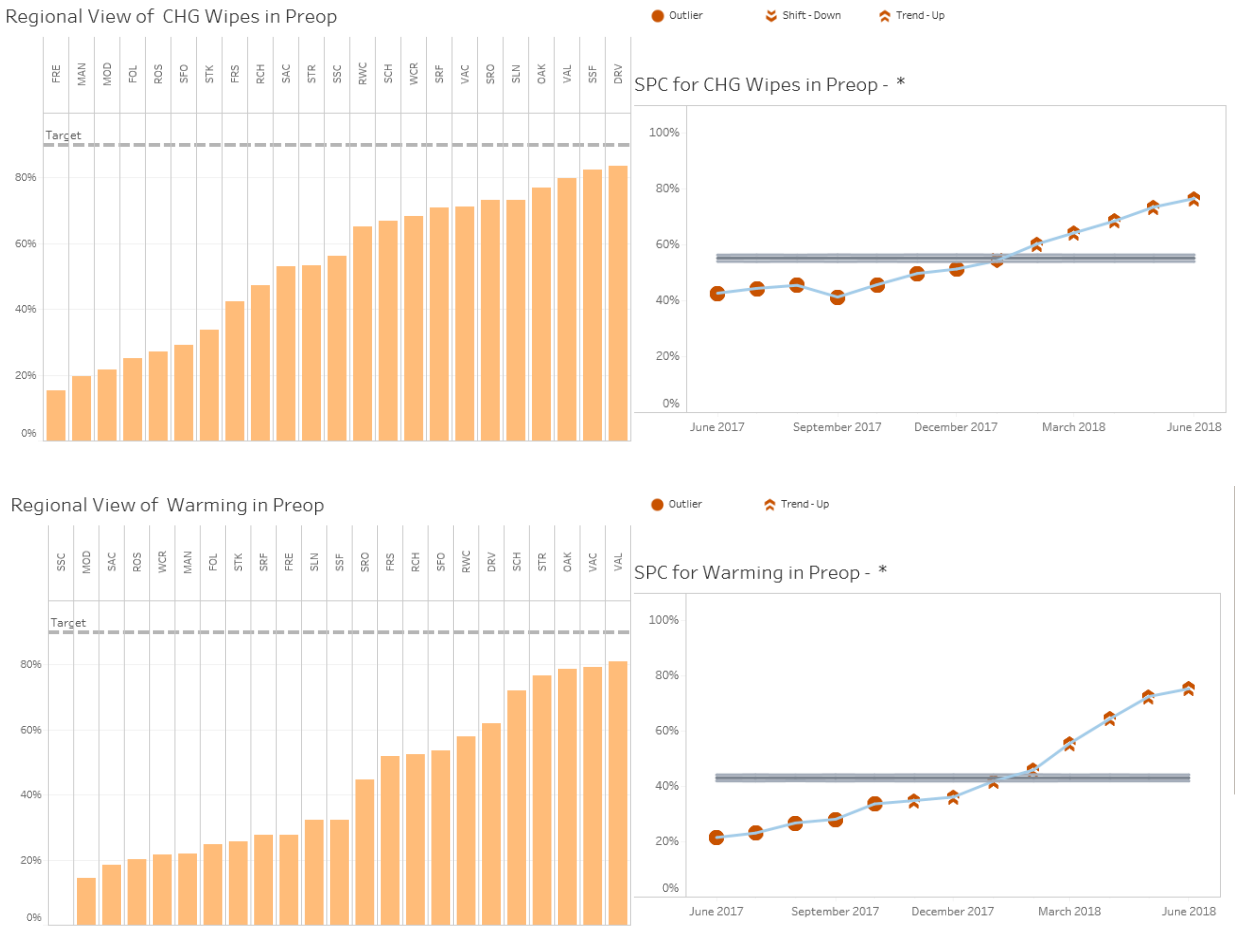
Phase II



*Phase II protocols for SSI prevention will be identified and developed in 2019; Practices shown on slide will be considered but *do not* represent exhaustive list of protocols under consideration for Phase II.

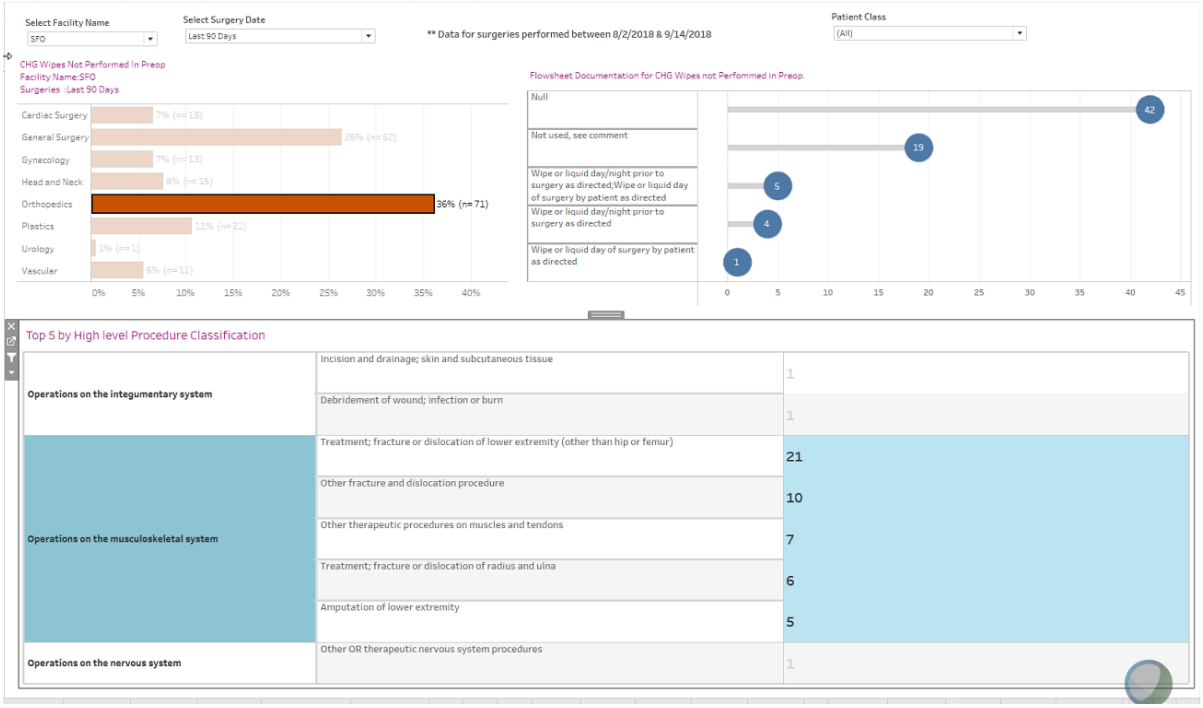
Appendix R

Process Measures



Appendix S

Drill Down Process Measures



Appendix T

Signed IRB

DNP Statement of Non-Research Determination Form

Student Name: Tammy Peacock

Title of Project: Implementing a Surgical Infection Prevention Practice in an Integrated Healthcare System

Brief Description of Project: The project is aimed to implement a standardized workflow of evidenced based practices to prevent surgical site infections for all surgical patients, in an integrated healthcare system. Based on extensive literature review a bundle of elements will be hardwired into the perioperative workflow for all surgeries to include cesarean sections. In our healthcare system it is rare for the main OR and Maternal Child Health to partner on this type of strategic initiative.

A) Aim Statement: To decrease surgical site infections 20% across all surgical services by August 2018.

B) Description of Intervention: The main intervention will be a preoperative surgical site prevention bundle for all surgical patients. This bundle will include; maintenance of nomothermia, antibiotic weight based dosing, chlorhexidine skin preparation, clipping outside the operating room, and glucose monitoring.

C) How will this intervention change practice? By empowering nurses to reduce SSI's by applying evidence based practices to reduce patient harm.

D) Outcome measurements: The outcome measure for this project is all surgical cases SSI. This is an outcome measure from the National Surgical Quality Improvement Program in which Kaiser Permanente Northern California is enrolled. For measurement of cesarean section, we will use the National Healthcare Safety Network Data. Initial data for the pilot will be done weekly. Then a dashboard will be provided monthly with process and outcomes measures. Data will be analyzed over

time.

To qualify as an Evidence-based Change in Practice Project, rather than a Research Project, the criteria outlined in federal guidelines will be used:
(http://answers.hhs.gov/ohrp/categories/1569)

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

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

Comments:

EVIDENCE-BASED CHANGE OF PRACTICE PROJECT CHECKLIST *

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

Project Title:	**YES**	**NO**
The aim of the project is to improve the process or delivery of care with established/ accepted standards, or to implement evidence-based change. There is no intention of using the data for research purposes.	**X**	
The specific aim is to improve performance on a specific service or program and **is a part of usual care**. ALL participants will receive standard of care.	**X**	
The project is **NOT** designed to follow a research design, e.g., hypothesis testing or group comparison, randomization, control groups, prospective comparison groups, cross-sectional, case control). The project does **NOT** follow a protocol that overrides clinical decision-making.	**X**	
The project involves implementation of established and tested quality standards and/or systematic monitoring, assessment or evaluation of the organization to ensure that existing quality standards are being met. The project does **NOT** develop paradigms or untested methods or new untested standards.	**X**	
The project involves implementation of care practices and interventions that are consensus-based or evidence-based. The project does **NOT** seek to test an intervention that is beyond current science and experience.	**X**	
The project is conducted by staff where the project will take place and involves staff who are working at an agency that has an agreement with USF SONHP.	**X**	
The project has **NO** funding from federal agencies or research-focused organizations and is not receiving funding for implementation research.	**X**	
The agency or clinical practice unit agrees that this is a project that will be implemented to improve the process or delivery of care, i.e., **not** a personal	**X**	

research project that is dependent upon the voluntary participation of colleagues, students and/ or patients.		
If there is an intent to, or possibility of publishing your work, you and supervising faculty and the agency oversight committee are comfortable with the following statement in your methods section: "*This project was undertaken as an Evidence-based change of practice project at X hospital or agency and as such was not formally supervised by the Institutional Review Board*."	**X**	

ANSWER KEY: If the answer to **ALL** of these items is yes, the project can be considered an Evidence-based activity that does NOT meet the definition of research. **IRB review is not required. Keep a copy of this checklist in your files.** If the answer to ANY of these questions is **NO**, you must submit for IRB approval.

*Adapted with permission of Elizabeth L. Hohmann, MD, Director and Chair, Partners Human Research Committee, Partners Health System, Boston, MA.

STUDENT NAME (Please print):
Tammy Peacock

Signature of Student: _____*Tammy Peacock*_____ **DATE_9/4/2017__**

SUPERVISING FACULTY MEMBER (CHAIR) NAME (Please print):
Marjorie Barter

Signature of Supervising Faculty Member (Chair):

___*Dr. Marjorie Barter*_____**DATE___9/9/17_____**

Appendix U

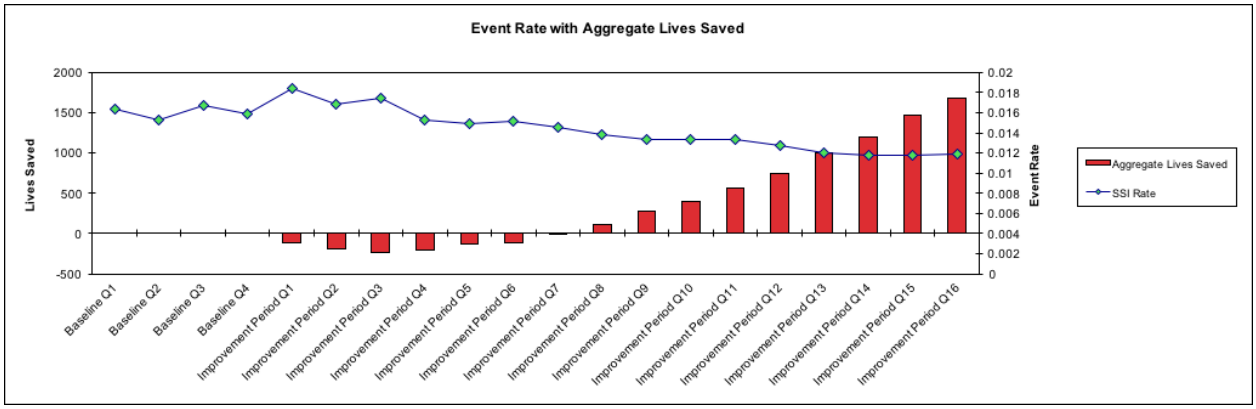
Adverse Events Prevention Calculator

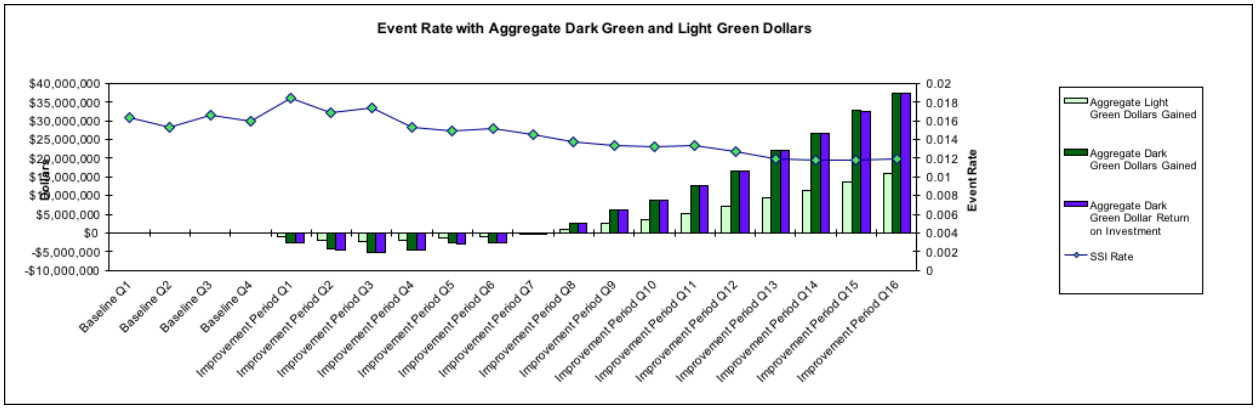
Adverse Event ("AE") Name:	**SSI**
Absolute Increase in Mortality Rate per AE:	**1.6**
Plan for Excess Capacity:	**More Patients**
Additional "Pure Variable Cost" per AE:	**$21,000**
Additional "Sticky Variable Cost" per AE:	**$3,600**
Additional Gross Revenue per AE:	**$4,000**
Number of "Opportunity Patients" Foregone per AE:	**1.00**
‹ Number of "Opportunity Patients" Foregone per AE:	**2.00**
Total Net Revenue of Average "Opportunity Patient":	**$15,000**
"Dark Green Dollars" Gained per AE Prevented:	**$35,600**
"Light Green Dollars" Gained per AE Prevented:	**$15,000**
Total Potential Gains per AE Prevented:	**$50,600**
Improvement Project Initial Costs:	**$25,000**
Improvement Project Recurring Annual Costs:	**$10,000**
Annual Opportunity Investment Rate of Return:	**5%**

Period	Number of Events	Number of Patients or Patient-Days	Period Adverse Event Rate	Period Adverse Events Avoided	Period Lives Saved	Aggregate Lives Saved	Period Dark Green Dollars Gained	Aggregate Dark Green Dollars Gained	Period Light Green Dollars Gained	Aggregate Light Green Dollars Gained	Period Cost of Improvement Work *(includes opportunity cost)*	Aggregate Cost of Improvement Work *(includes opportunity cost)*	Aggregate Return on Improvement Project ($)	Aggregate Return on Improvement Project (% of investment)	Notes
Baseline Q1	560	34288	0.016	#N/A	#N/A	#N/A	#N/A			#N/A					By definition, no events are prevented in baseline periods
Baseline Q2	544	35588	0.015	#N/A	#N/A	#N/A	#N/A			#N/A					
Baseline Q3	560	33588	0.017	#N/A	#N/A	#N/A	#N/A			#N/A					
Baseline Q4	520	32672	0.016	#N/A	#N/A	#N/A	#N/A			#N/A					
Improvement Period Q1	640	34824	0.018	-71.246	-113.993	-113.993	-$2,536,355	-$2,536,354.64	-$1,068,688.75	-$1,068,688.75	$27,837.49	$27,837.49	-$2,564,192.13	-9211%	
Improvement Period Q2	568	33744	0.017	-52.187	-83.500	-197.493	-$1,857,874	-$4,394,228.89	-$782,812.18	-$1,851,500.94	$2,872.31	$30,709.80	-$4,424,938.69	-14409%	
Improvement Period Q3	624	35880	0.017	-25.786	-41.258	-238.752	-$917,994	-$5,312,223.03	-$386,795.28	-$2,238,296.22	$2,907.56	$33,617.35	-$5,345,840.39	-15902%	
Improvement Period Q4	544	35588	0.015	22.410	35.857	-202.895	$797,810	-$4,514,413.44	$336,155.73	-$1,902,140.49	$2,943.24	$36,560.59	-$4,550,974.03	-12448%	
Improvement Period Q5	520	34824	0.015	48.754	78.007	-124.888	$1,735,645	-$2,778,768.08	$731,311.25	-$1,170,829.25	$2,979.36	$39,539.95	-$2,818,308.03	-7128%	
Improvement Period Q6	510	33588	0.015	3.428	5.485	-119.404	$122,033	-$2,656,734.94	$51,418.46	-$1,119,410.79	$3,015.92	$42,555.88	-$2,699,290.82	-6343%	
Improvement Period Q7	500	34288	0.015	71.671	114.673	-4.730	$2,551,482	-$105,253.22	$1,075,062.52	-$44,348.27	$3,052.94	$45,608.82	-$150,862.04	-331%	
Improvement Period Q8	480	34824	0.014	74.251	118.801	114.071	$2,643,326	$2,538,072.93	$1,113,761.02	$1,069,412.75	$3,090.40	$48,699.22	$2,489,373.71	5112%	
Improvement Period Q9	470	35259	0.013	105.859	169.374	283.444	$3,768,566	$6,306,639.42	$1,587,879.14	$2,657,291.89	$3,128.33	$51,827.55	$6,254,811.88	12069%	
Improvement Period Q10	460	34625	0.013	69.280	110.847	394.292	$2,466,351	$8,772,990.78	$1,039,192.99	$3,696,484.88	$3,166.72	$54,994.27	$8,717,996.51	15853%	
Improvement Period Q11	450	33577	0.013	109.817	175.707	569.998	$3,909,471	$12,682,461.78	$1,647,249.02	$5,343,733.90	$3,205.58	$58,199.85	$12,624,261.93	21691%	
Improvement Period Q12	440	34689	0.013	112.102	179.363	749.362	$3,990,835	$16,673,296.74	$1,681,531.59	$7,025,265.48	$3,244.92	$61,444.77	$16,611,851.97	27035%	
Improvement Period Q13	430	35880	0.012	156.001	249.601	998.963	$5,553,633	$22,226,929.97	$2,340,014.00	$9,365,279.48	$3,284.75	$64,729.52	$22,162,200.45	34238%	
Improvement Period Q14	420	35588	0.012	124.000	198.400	1197.363	$4,414,400	$26,641,329.97	$1,860,000.00	$11,225,279.48	$3,325.06	$68,054.57	$26,573,275.39	39047%	
Improvement Period Q15	410	34824	0.012	170.607	272.972	1470.335	$6,073,622	$32,714,951.98	$2,559,110.40	$13,784,389.88	$3,365.86	$71,420.44	$32,643,531.54	45706%	
Improvement Period Q16	400	33588	0.012	134.579	215.326	1685.661	$4,791,007	$37,505,958.83	$2,018,682.66	$15,803,072.54	$3,407.17	$74,827.61	$37,431,131.23	50023%	

*Past period 4 is estimated

P	Average Baseline AE Rate:	0.016
Q	Average Improvement Period AE Rate:	0.014
R	% Reduction in Average AE Rate:	11.75%
S	Aggregate AE Prevented:	1053.54
T	Aggregate Lives Saved:	1685.66
U	Aggregate Light Green Dollars Gained:	$15,803,073
V	Aggregate Dark Green Dollars Gained:	$37,505,959
W	Aggregate Cost of Improvement Work:	$74,828
X	Aggregate Return on QI Investment ($):	**$37,431,131**
Y	Aggregate Return on QI Investment (% of QI Investment Cost):	**50023%**




Event Rate with Aggregate Dark Green and Light Green Dollars
$40,000,000
$35,000,000
$30,000,000
$25,000,000
$20,000,000
$15,000,000
$10,000,000
$5,000,000
$0
-$5,000,000
-$10,000,000
Dollars
0.02
0.018
0.016
0.014
0.012
0.01
0.008
0.006
0.004
0.002
0
Event Rate
Baseline Q1
Baseline Q2
Baseline Q3
Baseline Q4
Improvement Period Q1
Improvement Period Q2
Improvement Period Q3
Improvement Period Q4
Improvement Period Q5
Improvement Period Q6
Improvement Period Q7
Improvement Period Q8
Improvement Period Q9
Improvement Period Q10
Improvement Period Q11
Improvement Period Q12
Improvement Period Q13
Improvement Period Q14
Improvement Period Q15
Improvement Period Q16
Aggregate Light Green Dollars Gained
Aggregate Dark Green Dollars Gained
Aggregate Dark Green Dollar Return on Investment
SSI Rate

Appendix V

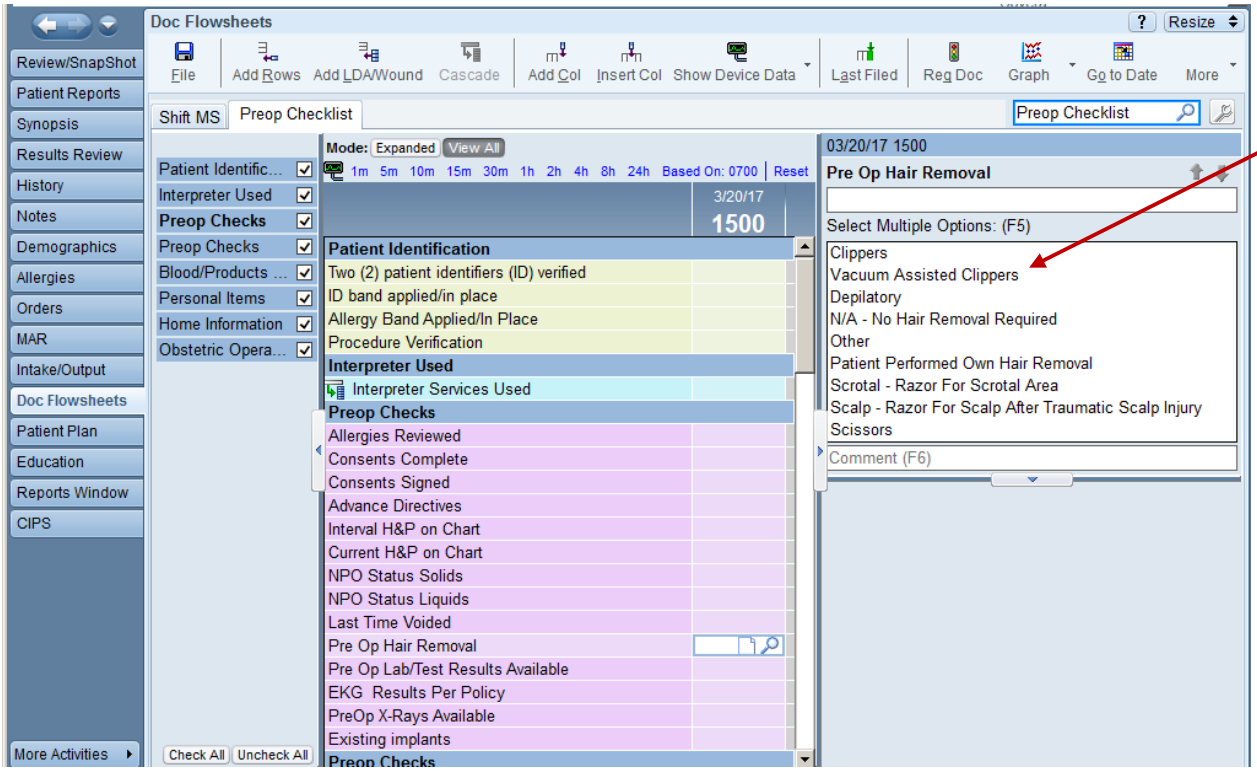
Projected Revenue

Surgical Department Budget

	2020	2019	2018	Percent of Budget	Annual Growth
Revenues:					11.9%
Members' Dues	$ 8,296	$ 7,413	$ 6,623		
Medicare	2,826	2,525	2,256		
Copays, deductible, fees and other	1,064	951	849		
Total Operating Revenues	$ 12,186	$ 10,888	$ 9,729		
Expenses:					
Labor	5,170	4,619	4,128	45%	
Supplies	2,642	2,361	2,110	23%	
Facilities	1,379	1,232	1,101	12%	
Surgical Site Infections	2,298	2,053	1,834	20%	
Total Operating Expenses	11,489	10,265	9,172	100%	
Operating Income	$ 697	$ 623	$ 557		
Operating Margin			5.7%		

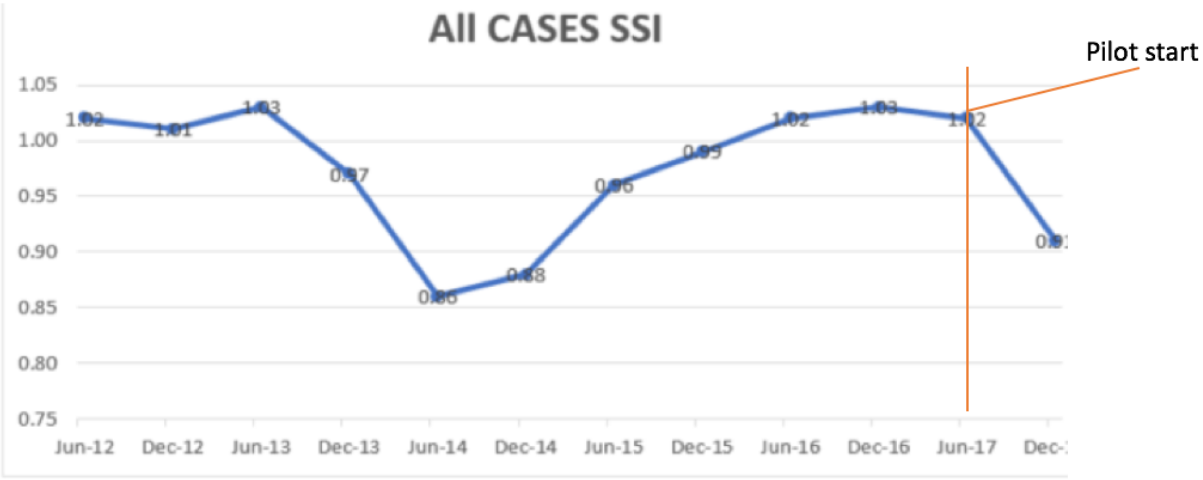
Appendix W

Where to chart



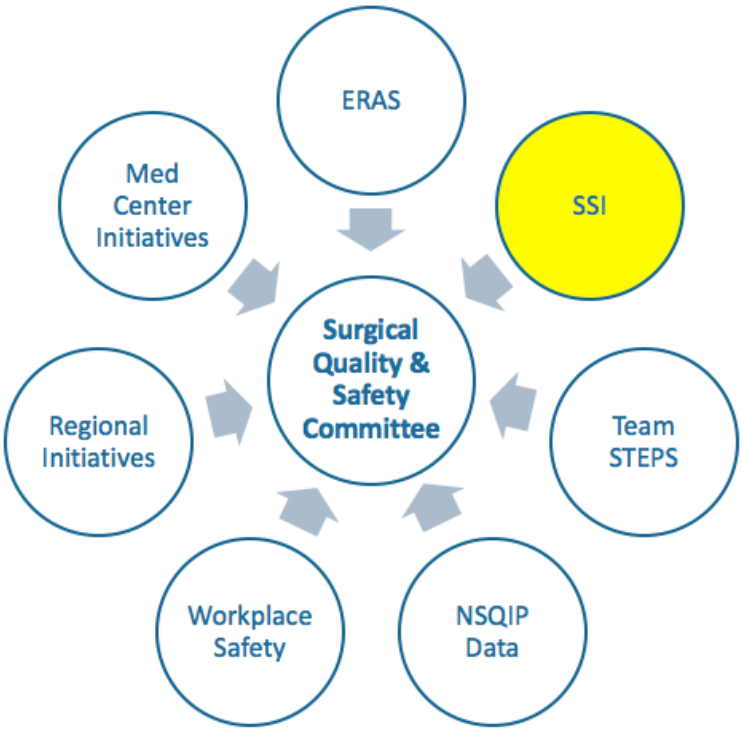
Appendix X

SSI Data



Appendix Y

Surgical Quality Committee



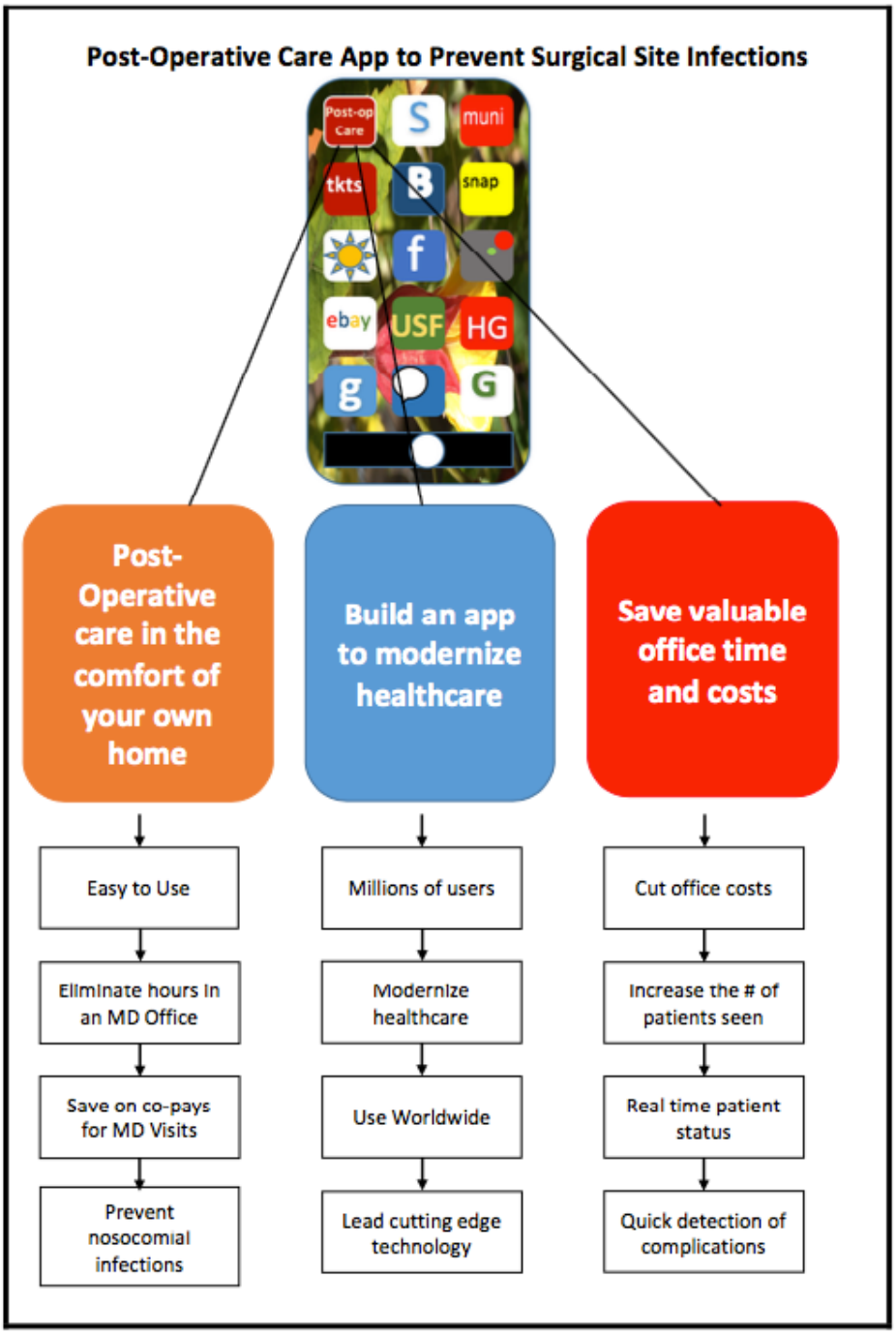
- ✓ 1 forum for all OR quality
- ✓ Proactive vs. Reactive
- ✓ Performance Improvement
- ✓ Improve Communication
- ✓ Increase Collaboration

DO talk about:

- ✓ Systems issues
- ✓ Performance Improvement projects
- ✓ Sustainability
- ✓ Data (e.g., Quality, outcomes, SAR)
- ✓ Regional initiatives
- ✓ Medical center priorities
- ✓ Educational topics

Appendix Z

SSI App



Appendix AA

Letter of Support

Franklin Keathley
1950 Franklin Street Oakland CA 94512
510-987-2820 franklin.h.keathley@kp.org

9/26/2017

San Francisco University School of Nursing
2130 Fulton Street
San Francisco CA, 94117

Dear San Francisco University School of Nursing,

I am writing support for Tammy Peacock's proposed evidence based change of practice as partial fulfillment of her Doctor of Nursing Practice (DNP) degree through the University of San Francisco's Executive Leadership DNP Program. The project is titled Implementing a Surgical Infection Prevention Practice in an Integrated Healthcare System. This change of practice will start with two pilot sites and then spread to all 21 medical centers in Northern California.

As the Regional Director of Patient Safety and a sponsor of surgical safety, and Tammy's direct supervisor, I am very aware of, and support this performance improvement project. The surgical site infection prevention practice is evidenced based and requires a reliable implementation plan to ensure success. This project is patient centric and based on preventing surgical harm.

This letter also verifies that Kaiser Permanente has an existing contract with the University of San Francisco School of Nursing.

Sincerely,

Franklin Keathley