5-1-2014

The Reduction of Central Line-Associated Bloodstream Infections in Intensive Care Units through the Implementation of the Comprehensive Unit-Based Safety Program

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THE REDUCTION OF CENTRAL LINE-ASSOCIATED BLOODSTREAM INFECTIONS IN INTENSIVE CARE UNITS THROUGH THE IMPLEMENTATION OF THE COMPREHENSIVE UNIT-BASED SAFETY PROGRAM

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Doctor of Nursing Practice

School of Nursing
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University of Nevada, Las Vegas
May 2014

UNLV
UNIVERSITY OF NEVADA LAS VEGAS

THE GRADUATE COLLEGE

We recommend the doctoral project prepared under our supervision by

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entitled

The Reduction of Central Line-Associated Bloodstream Infections in Intensive Care Units through the Implementation of the Comprehensive Unit-Based Safety Program

is approved in partial fulfillment of the requirements for the degree of

Doctor of Nursing Practice

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May 2014

ABSTRACT

Central line-associated bloodstream infections (CLABSIs) are one of the most significant healthcare-associated infections (HAIs) in the Intensive Care Unit (ICU) setting resulting in increased lengths of stay, increased healthcare costs, and higher mortality rates (Institute of Healthcare Improvement [IHI], 2012). Evidence that CLABSIs are largely preventable has created opportunities for healthcare organizations to implement evidence-based bloodstream infection prevention practices to reduce or eliminate these infections (Lissauer, Leekisa, Prease, Thom, & Johnson, 2012). Other efforts to reduce CLABSIs include implementation of safety programs to improve the safety culture in ICUs (Lissauer et al., 2012). One program, the comprehensive unit-based safety program (CUSP), was developed to improve the safety culture within ICUs and achieve the goal of reducing or eliminating CLABSIs (Pronovost et al., 2006). The CUSP is a framework designed to educate and improve awareness of patient safety and quality of care for nurses, physicians, and other bedside care providers through a five step process (Agency for Healthcare Research and Quality [AHRQ], 2011). The five steps of the CUSP program are: (1) educate on the science of safety; (2) identify defects and patient safety hazards; (3) partner senior executive with a unit; (4) learn from defects; and (5) implement teamwork and communication tools (AHRQ, 2011).

The seminal study by Pronovost et al. (2006) was conducted with a focus on reducing CLABSIs and improving the safety culture in 108 ICUs within the state of Michigan. The study intervention targeted the use of bundled evidence-based bloodstream infection prevention practices in conjunction with implementation of the CUSP (Pronovost et al., 2006). The study results demonstrated a 66% decrease from

baseline in the statewide CLASBI rates with continued sustainment at 18 months (Pronovost et al., 2006). Success of this seminal study and others resulted in a national program called *On the CUSP: Stop BSI* formulated to reduce or eliminate CLABSIs in hospitals nationwide (AHRQ, 2012). More than 1,000 hospitals participated in this program and achieved success in reducing nationwide CLABSI rates by 41% (AHRQ, 2012).

The reduction of CLABSIs through multiple collaborative cohort studies has been attributed to the use of evidence-based prevention bundles and improvement in the healthcare safety culture. The CUSP framework has been validated as an essential factor in the success of CLABSI reduction efforts. Continued progress in the reduction of CLABSIs emphasizes the preventability of these infections and will accelerate progress toward elimination.

The purpose of this project was to reduce or eliminate CLABSIs in the ICUS within our national investor-owned 49 hospital healthcare system through the implementation of the CUSP framework. The impact of the CUSP was evaluated using a pre-and post-implementation comparison of hospital CLABSI rates. Data was reported for 65 ICUs, representing 41 hospitals across the baseline pre-and post-CUSP implementation time periods. The total number of CLABSIs reported for the baseline pre-CUSP implementation time period of September 2012 to January 2013 was 71, with an infection rate of 1.10 per 1,000 catheter days. The data for the post-CUSP implementation time period of August 2013 to December 2013 revealed a decrease in the total number of CLABSIs to 42, and a resultant decrease in the infection rate to 0.73 per 1,000 catheter days. This decrease represented a 32.8% reduction in CLASBIs post-

CUSP implementation. The evaluation of the CUSP implementation success through the reduction or elimination of CLABSIs validated the potential replication of a systematic approach to address additional quality improvement (QI) initiatives throughout our healthcare system.

~Dedication~

I dedicate this doctoral scholarly project to my partner whose support and encouragement along this journey was deeply appreciated. I also dedicate this doctoral scholarly project posthumously to my loving parents, Lloyd James and Helen Hresko Basinger, who always believed in me.

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CHAPTER I – INTRODUCTION AND PROBLEM STATEMENT

Introduction

Central venous catheters (CVCs) are integral to the care of adult patients in Intensive Care Units (ICUs). CVCs provide vascular access for the administration of fluids, medications, total parenteral nutrition (TPN), blood products, and for hemodynamic monitoring and blood sampling (Kim, Holtom, & Vigen, 2011). Approximately 48% of all patients in ICUs have CVCs which translates into an estimated 15 million catheter days per year (Centers for Disease Control and Prevention [CDC], 2011). Although CVCs provide reliable vascular access, there are associated risks with their use. The most common risk associated with CVCs is central line-associated blood stream infections (CLABSIs) caused by microorganisms colonizing the external surface of the device or the fluid pathway when the device is inserted, or in the course of its use (Institute for Healthcare Improvement [IHI], 2012). CLABSIs are defined as laboratory-confirmed bloodstream infections associated with CVCs when a CVC has been in use 48 hours prior to the onset of an infection with no apparent source except the CVC (O'Grady et al., 2011). In 2009, approximately 18,000 CLABSIs occurred in ICU patients with CVCs (CDC, 2011). According to the IHI (2012), approximately 90% of all CLABSIs occur due to CVC use, resulting in increased lengths of stay, increased costs, and higher mortality rates. CLABSIs are one of the most significant healthcare-associated infections (HAIs) in the ICU setting, representing 10% to 20% of all HAIs (Bianco, Coscarelli, Nobile, Pileggi, & Pania, 2013). These infections are the leading cause of death among HAIs with reported mortality rates of 12% to 25% in adult ICU patients (Marra et al., 2010). CLABSIs are a significant source of preventable morbidity and mortality

responsible for approximately 28,000 deaths annually in the United States (Lissauer, Leekisa, Preas, Thom, & Johnson, 2012). In addition, CLABSIs represent a significant economic burden for healthcare organizations, prolonging a patient's hospitalization an average of seven days with an episodic cost of approximately $45,000 (Lissauer et al., 2012). The estimated annual cost of CLABSIs to the healthcare system in the United States is $2.3 billion (Pronovost, Marsteller, & Goeschel, 2011). As a result of these findings, The Joint Commission (TJC) mandated hospitals to implement protocols by January 1, 2010 that meet the requirements of the CLABSI national patient safety goal (NPSG) 7, the reduction of CLABSIs (TJC, 2010).

Evidence that HAIs are largely preventable has created opportunities to implement practices to reduce or eliminate the burden associated with such infections. CLABSIs are customarily preventable with adherence to evidence-based preventative guidelines (Kusek, 2012). As such, many healthcare organizations have undertaken efforts to reduce the incidence of CLABSIs to include the use of evidence-based central line insertion bundles (Lissauer et al., 2012). The IHI (2012) defines a care bundle as a set of three to five practices that have been proven to improve patient outcomes when all components are completed together every time. Care bundles can benefit patient care by delivering evidence-based practices to the bedside and ensuring uniform application of best practices to all patients (McPeake, Cantwell, Booth, & Daniel, 2012). Bundle approaches are broadly accepted as the standard model for prevention of CLABSIs with concentrated strategies on physician and patient preparation (Worth & McLaws, 2012). The five evidenced-based procedures recommended by the CDC and identified as having the lowest barriers to implementation and the greatest effect on the rates of CLABSIs are

(1) hand hygiene prior to catheter insertion; (2) use of maximal sterile barrier precautions; (3) chlorhexidine for skin antisepsis; (4) avoidance of the femoral site for insertion; and (5) prompt removal of catheters when no longer indicated (Agency for Healthcare Research and Quality [AHRQ], 2013).

Other efforts to reduce the incidence of CLABSIs, in addition to the use of evidence-based central line insertion bundles, include the implementation of safety programs to improve the safety culture within ICUs (Lissauer et al., 2012). One program, the comprehensive unit-based safety program (CUSP), was designed to improve the safety culture and includes communication and teamwork toward the common goal of eliminating CLABSIs (Pronovost, 2008). The CUSP program provides a pragmatic framework and tools that caregivers at the unit level can utilize to improve teamwork and relationships with senior hospital executives, to identify and resolve safety hazards, and to foster a culture of safety (Pronovost et al., 2008).

Although attempts to reduce the incidence of CLABSIs have been successful, CLABSIs continue to be identified (Marra et al., 2010). CLABSIs represent a principal challenge that result in significant morbidity, mortality, increased length of stay (LOS), and economic losses (Bianco et al., 2013). Reducing CLABSI rates in an ICU setting is a complex process that involves multiple performance measures and interventions (Marra et al., 2010).

Problem Statement

This project was conducted in a national investor-owned corporation comprised of 49 acute care hospitals and various other comprehensive healthcare services including ambulatory surgery centers, free-standing emergency departments, urgent care centers,

and diagnostic centers. Despite the implementation of central line bundles within our healthcare system, the CLABSI rates continued to prevail. Of the 49 acute care hospitals, 41 have CLABSI rates at greater than the system wide established target of 0.31 per 1,000 device days. This target is set at the standardized rates for CLABSIs in accordance with the CDC and through the National Health and Safety Network (NHSN) top 25th percentile benchmark (Dudeck et al., 2011). Although the use of evidence-based bloodstream infection prevention practices has reduced the number of CLABSIs in our ICUs, they have not been eliminated. Previous studies have been unable to determine if these remaining CLABSIs represent failures of the evidence-based bundle application or other patient associated risk factors related to their hospitalization (Lissauer, Leekisa, Preas, Thom, & Johnson, 2012). Baseline random observations of the evidence-based bundle utilization revealed inconsistent application and compliance in several of the ICUs within our healthcare system. Attempts to develop a valid and feasible measure of consistent compliance with evidence-based practices for CVC insertions have not been successful (Pronovost, Berenholtz, & Needham, 2008). CVCs are often placed randomly which makes the coordination of independent observations difficult, and self-reported compliance often overrates performance (Pronovost, Berenholtz, & Needham, 2008). Sustainment of lower CLABSI rates and progression toward elimination will require a focused commitment of our healthcare system hospitals.

CHAPTER II – REVIEW OF THE LITERATURE

CLABSI Multifaceted Intervention Studies

There have been many studies documented in the literature regarding the reduction of CLABSIs in ICUs nationwide. The majority of the studies have reported statistically significant decreases in CLABSI rates post-implementation of a quality improvement (QI) initiative (O'Grady et al., 2011). Some studies used approaches in which multiple strategies have been implemented together to improve compliance with the use of evidence-based guidelines. A seminal study conducted by Pronovost et al. (2006), known as the Keystone ICU project, included a collaborative cohort of 108 ICUs within the state of Michigan. The strategies in this study included the use of five evidence-based bloodstream infection prevention practices for CVC insertions, use of a checklist to ensure adherence and compliance to proper practices, and implementation of the CUSP to improve the safety culture (Pronovost et al., 2006). The period required for the implementation of each intervention was estimated to be three months and all hospitals started with implementation of the CUSP (Pronovost et al., 2006). Coterminous with the intervention, the median rate of infection decreased from 2.7 per 1,000 catheter days at baseline to zero within the first three months after the implementation of the intervention (Pronovost et al., 2006). The benefit from the intervention was sustained as the study results revealed a 66% decrease in statewide CLABSI rates from baseline at 16 to18 months post-implementation of evidence-based interventions (Pronovost et al., 2006). This study also emphasized how technical and adaptive components were needed to successfully implement a CLABSI prevention initiative (Pronovost, Berenholtz, & Needham, 2008).

Identifying methods for the sustainment of results from QI initiatives is important for the generalizability of research findings. A second collaborative cohort study was conducted by Pronovost et al. (2010) to evaluate the extent to which the participating ICUs in the initial Keystone ICU project had continued to sustain reductions in their CLABSI rates. As the participating Michigan ICUs continued to integrate the evidence-based interventions into practice, the study results revealed that the reduced CLABSI rates achieved in the initial 18 month post-implementation period were sustained for an additional 18 months (Pronovost et al., 2010). The median rate of infection remained at zero for the 18 month sustainability period with an over 60% CLABSI rate reduction at the end of the 36 month period (Pronovost et al., 2010). Sustainment of the results was attributed to ongoing feedback of progress through the reporting of infection data, improvements in the safety culture, maintaining the assembled teams, an assiduous belief in the preventability of CLABSIs, and continuing staff education (Pronovost et al., 2010). The results of these two collaborative cohort studies indicate that the broad use of the evidence-based interventions with achievement of comparable results could reduce the morbidity and costs associated with CLABSIs (Pronovost et al., 2010).

As results of the success with the seminal Keystone ICU project were disseminated, other healthcare organizations sought to evaluate and replicate the multifaceted intervention designed to improve the safety culture and the use of evidence-based bloodstream infection prevention practices to reduce CLABSIs. The Rhode Island (RI) ICU collaborative was created in 2005 as a QI platform to explore the replication of the Michigan Keystone ICU project (DePalo et al., 2010). Data was collected from the 23 ICUs in the 11 RI hospitals from January 2006 through June 2008. As in the

Keystone ICU project, each participating ICU implemented the bundled evidence-based bloodstream infection prevention practices and introduced the CUSP at the launch of the collaborative (DePalo et al., 2010). The statewide median rate of infection decreased from 1.95 per 1,000 catheter days at baseline to zero by March 2008 (DePalo et al., 2010). Study results revealed the use of a multifaceted intervention was associated with a 74% statewide CLABSI reduction and demonstrated the results achieved in the Keystone ICU project could be extended and replicated in RI (DePalo et al., 2010).

The first randomized controlled experimental evaluation using a multifaceted intervention involving a bundle of evidence-based bloodstream infection prevention practices and the CUSP to improve safety, teamwork, and communication was conducted in 45 ICUs from 35 hospitals within two Adventist healthcare systems (Marsteller et al., 2012). The intervention group started in March 2007 and the control group started seven months later in October 2007, with the study period ending in September 2008 (Marsteller et al., 2012). The median CLABSI rate in the intervention group decreased from 2.56 per 1,000 catheter days at baseline to zero at the end of the study period (Marsteller et al., 2012). Similar results occurred in the control group with the median CLABSI rate decreasing from 1.78 per 1,000 catheter days at baseline to zero at the end of the study period (Marsteller et al., 2012). This study demonstrated a causal relationship between use of the CUSP and the evidence-based infection prevention intervention and reduced CLABSIs in participating ICUs (Marsteller et al., 2012). The intervention group achieved a 70% reduction in CLABSI rates which were sustained at 19 months post-implementation with similar results replicated in the control group (Marsteller et al., 2012). This study established that the CLABSI rate reduction through

the implementation of the CUSP and the use of evidence-based bloodstream infection prevention practices were sustainable and able to be replicated (Matsteller et al., 2012).

After the replication of the Pronovost and colleagues studies (Pronovost et al., 2006 & 2010) in the RI ICUs and the two Adventist healthcare systems, the AHRQ funded and launched this program for implementation and dissemination throughout the United States (Sawyer et al., 2010). A two-year program called *On the CUSP: Stop BSI* was formulated in 2008 to prevent CLABSIs in hospitals nationwide and was organized as a state or region-level collaborative with centralized education, data collection, and program management functions (AHRQ, 2012). More than 1,000 hospitals and 1,800 hospital units, representing a total of 44 states, the District of Columbia, and Puerto Rico, participated in the program (AHRQ, 2012). The program structure included three main components: (1) a model to translate evidence into practice at the bedside to prevent CLABSIs; (2) the CUSP to improve the safety culture; and (3) a system to measure and report infection data (Sawyer et al., 2010). Results of the program revealed success in reducing CLABSIs nationwide by 41% from a baseline of 1.915 infections per 1,000 line days to a rate of 1.133 infections (AHRQ, 2012).

With the nationwide success of the *On the CUSP: Stop BSI* program (AHRQ, 2012), the state of Hawaii embarked on their own study to determine if a national ICU collaborative to reduce CLABSIs would succeed in the state (Lin et al., 2012). The study, which began in January 2009 and ended in December 2010, included the CUSP, a multifaceted intervention approach to CLABSI prevention, and infection rate monitoring (Lin et al., 2012). Data was collected and reported from 20 ICUs representing 16 hospitals across the state (Lin et al., 2012). The results revealed the overall mean

statewide CLABSI rates decreased 61% from 1.5 infections per 1,000 catheter days at baseline to 0.6 at 16 to 18 months post-implementation of the project, reinforcing the evidence that the *On the CUSP: Stop BSI* program can succeed in other states and substantially reduce CLABSI rates in hospitals (Lin et al., 2012).

The success of the initial Hawaii study was the catalyst to conduct a second study in the state. This cohort study continued the national *On the CUSP: Stop BSI* program interventions, extended the program beyond the adult ICUs, and implemented a series of tools to improve the maintenance of CVCs and sustain the collaborative model (Lin, Weeks, Holzmueller, Pronovost, & Pham, 2013). A total of 38 clinical areas were included in this study: the original 20 ICUs, 10 adult medical/surgical units, two operating room (OR) suites, two pediatric ICUs (PICUs), two neonatal ICUs (NICUs), and two emergency departments (Eds) (Lin et al., 2013). The 18 month time period for this phase of study was from January 2011 through June 2012. The CLABSI rates in the adult ICUs decreased from1.49 infections per 1,000 catheter days at baseline to 0.25 by the end of this study phase, signifying an 83% decrease for the 36 month study period (Lin et al., 2013). The CLABSI rates in the non-adult ICUs and the non-ICU clinical areas decreased from 2.54 infections per 1,000 catheter days at baseline to 0.33 by the end of this study phase, signifying an 87% decrease in the infection rate (Lin et al., 2013). The second Hawaii cohort study demonstrated successful extension of the program beyond the adult ICUs, continued sustainment of decreased statewide CLABSI rates, and the impact of the CUSP on the statewide ability to reduce infections (Lin et al., 2013).

The successes of the numerous studies conducted on the effects of multifaceted interventions to reduce CLABSIs, along with the nationwide success of the *On the*

CUSP: Stop BSI program (AHRQ, 2012), continued to influence additional healthcare organizations to seek opportunities to participate in collaboratives designed to reduce CLABSI rates. The state of Connecticut entered into a study to determine whether the multifaceted intervention from the Michigan Keystone ICU program could be implemented in the state with similar impact on ICU CLABSI rates (Hong et al., 2013). Seventeen ICUs from 14 hospitals within the state participated in the collaborative that included the multifaceted intervention to prevent CLABSIs, implementation of the CUSP, and measurement and performance feedback of CLABSI data (Hong et al., 2013). Participating hospitals and ICUs reported baseline data for May 2008 to April 2009 and post-implementation data for May 2009 to January 2011 (Hong et al., 2013). The overall mean (median) CLABSI rates in the 17 ICUs decreased from 1.8 (1.8) infections per 1,000 catheter days at baseline to 1.1 (0) at post-implementation of the intervention in January 2011 (Hong et al., 2013). The overall mean CLABSI rate was decreased by 41% which, once again, demonstrated that the Michigan Keystone ICU program could be replicated with associated reductions in CLABSIs (Hong et al., 2013).

Comprehensive Unit-Based Safety Program (CUSP)

Improving communication, teamwork, and the culture of safety in the ICUs was an integral part of the success in the CLABSI rate reduction studies and the eventual sustainment of the gains. These studies incorporated a technical component through the use of evidence-based practices and an adaptive, innovative component through use of the CUSP to successfully achieve the results (AHRQ, 2012). The Institute of Medicine (IOM) report *To Err is Human* (2000) identified patient safety as a nationwide issue and indicated improvement endeavors should focus on systems such as technology, practices,

procedures, and the culture in healthcare organizations. As a result, healthcare organizations began to implement initiatives to improve patient safety. One major initiative was the seminal study by Pronovost et al. (2005) to develop, implement, and validate the CUSP. The program was initially developed as an eight step process designed to impact the safety climate by staff empowerment and responsibility for safety in their environment (Pronovost et al., 2005). The eight step process in the program includes: (1) conduct a cultural survey; (2) educate staff on sciences related to safety; (3) identify the safety concerns of staff members; (4) senior executive adoption of a working unit; (5) implement improvements; (6) document results; (7) share stories; and (8) repeat the cultural survey (Pronovost et al., 2005). A pre-and post-implementation evaluation of the CUSP in two ICUs at Johns Hopkins Hospital resulted in safety culture improvement in both units and an associated reduction in ICU length of stay (LOS), medication errors, and nursing turnover (Pronovost et al., 2005). Based upon these results, the CUSP was disseminated to other units and clinical areas throughout the hospital with similar results (Pronovost et al., 2005). The CUSP was subsequently truncated into five sequential steps to facilitate utilization into the daily routines of staff members (Timmel et al., 2010). The five sequential steps include: (1) science of safety training; (2) identify safety hazards; (3) senior executive partnership; (4) learn from defects; and (5) implement teamwork and communication tools (Timmel et al., 2010).

A second study was conducted to validate the Pronovost et al. study (2005) and to evaluate the impact of the CUSP on the safety climate in a large ICU collaborative cohort (Sexton et al., 2011). This study further linked safety climate to clinical and operational outcomes and demonstrated that safety climate is responsive to interventions (Sexton et

al., 2011). Study results revealed significant improvements in the safety climate from 42.5% to 52.2% and provided further evidence that use of the CUSP and focused interventions to reduce bloodstream infections was associated with the resultant decreased CLABSI rates (Sexton et al., 2011).

In conclusion, the reduction of CLABSIs has been attributed to various factors including evidence-based prevention bundles, education in prevention efforts, statewide and national collaborative programs, and improvement in the healthcare safety culture. The CUSP framework has been demonstrated and validated to be an essential component of the successful CLABSI reduction efforts. Continued progress in the reduction of CLABSIs emphasizes the preventability of these infections and will accelerate progress toward elimination.

Needs Assessment and Description of the Project

Population Identification

The target population identified in this project will include registered nurses (RNs), physicians, and other healthcare team members who provide direct care to adult ICU patients with CVCs. Other healthcare team members who provide direct care to adult ICU patients include nurse practitioners (NPs), physician assistants (PAs), respiratory therapists (RTs), and nurse technicians (NTs). The patient population identified in this project will include all adult patients with a CVC in the ICU. The corporate clinical operations executives of our healthcare system elected to exclude patients admitted to a Pediatric Intensive Care Unit (PICU), Neonatal Intensive Care Unit (NICU), or any other clinical department outside of the adult ICUs to mitigate confounding from multiple settings. This decision was also in congruence with the

model established for the numerous collaborative cohort studies conducted to reduce CLABSIs.

Project Sponsor and Key Stakeholders

The patient, as the recipient of care, is the most important stakeholder in this project. Understanding the needs and potential contribution of all other stakeholders is an important component of this project. Team building is an essential part of the CUSP program as this approach empowers healthcare team members and eliminates the traditional hierarchal decision-making in hospitals (Evans, 2012). The identification and involvement of senior executive leadership is critical to provide authorization for potential resources required to assist in the resolution of unit-based patient safety issues (Evans, 2012). The identified healthcare system sponsor for this project is the Vice President of Quality. She will work with the project leader, the Doctor of Nursing Practice (DNP) student and author of this document, to ensure the established project goals and timeline are met in accordance with the project plan.

In addition to RNs, physicians, and senior executives, involvement and participation from other healthcare team members as internal stakeholders is needed. These additional team members and internal stakeholders include NPs, PAs, infection preventionists (IPs), pharmacists, RTs, quality and safety specialists, nutritionists, and other ancillary or support staff.

Efforts to eliminate HAIs by external stakeholders have further driven improvement nationwide. External stakeholders include CMS, TJC, CDC, professional healthcare organizations, hospital associations, and state or national legislators. Government agencies and payers have pressured healthcare organizations to reduce HAIs

through regulations, payment incentives, or reliance on market forces such as reporting high-quality and low-quality providers to consumers (Pronovost et al., 2011). The reduction of CLABSIs will be an integral element in the nationwide HAI reduction efforts.

Organizational Assessment

Early in 2006, our healthcare system instituted a focused plan to reduce or eliminate four HAIs, one of which was CLABSIs. The CLABSI rates for the healthcare system were above national established and published rates, effecting patient outcomes, LOS, and reimbursements. The evidence-based central line insertion bundle was implemented throughout the healthcare system in conjunction with monthly reporting of individual hospital bundle implementation achievement. It was evident during the implementation phase that a change in the culture was needed to not only implement the evidence-based central line insertion bundle and reduce CLABSI rates, but also to create a sustainable model for improvement.

Progress in CLABSI rate reduction has continued since the 2006 initial implementation of the evidence-based bundle approach. However, 41 out of our 49 acute care hospitals currently have CLABSI rates exceeding the healthcare system internal target. Preventable HAIs are an important focus of governmental agencies, accrediting bodies, pay-for-performance proposals, and consumer groups (Sawyer et al., 2010). Our healthcare system recognized that to reduce CLABSIs, the focus would need to be consistent compliance with evidence-based practices and improvements in the culture and teamwork within the ICUs. The CUSP framework was selected for implementation in our continuing efforts to reduce or eliminate CLASBSs across the healthcare system.

Team Selection and Formation

The foundation for this project is the assembled unit-based team for each participating ICU in the project. The individuals that comprise the unit-based teams are responsible for implementing and sustaining the initiative (AHRQ, 2012). The unit-based team composition of each participating ICU was required to include, at a minimum, a team leader, physician champion, executive champion, and bedside RNs from each scheduled shift. CUSP team member guidelines were developed and are presented in Appendix A.

The recommended project team leader is the ICU Manager/Director. The project team leader serves as the primary contact within the CUSP team who will organize and lead the team, articulate the goals of the project, develop decisions using the collective input of the CUSP team members, promote and facilitate good teamwork, and promptly disseminate information to the CUSP team members (AHRQ, 2012).

The recommended physician champion is the designated ICU Medical Director or the ICU Intensivist. The physician champion is charged with advancing the project, bridging any communication gaps, and securing the buy-in of other physicians to participate in the CUSP project (AHRQ, 2012).

The recommended executive champion for each unit-based ICU team is the hospital Chief Nursing Officer (CNO) due to the organizational reporting structure of the ICU and the essential connection of quality initiatives and outcomes to the role and responsibility of the CNO in each hospital. The executive champion is the senior leader who partners with the CUSP team and takes an active role in the CUSP initiative (AHRQ, 2012). The direct link of this senior executive with other hospital executives helps

guarantee the initiative is taken seriously hospital-wide and the project remains an organizational priority (AHRQ, 2012). Guidelines to assist CUSP team leaders and members in key messaging for executive sponsorship are presented in Appendix B.

Engaging staff RNs from each shift will provide the frontline expertise and patient care knowledge to help sustain the effects and success of the CUSP initiative (AHRQ, 2012). Additional members who would be helpful to involve in the unit-based team composition include IPs, RTs, pharmacists, quality and safety specialists, and nutritionists. The unit-based focus of the CUSP provides a manageable approach when initiating cultural change in an organization (Pronovost et al., 2005).

Scope of the Project

The scope of this project will include the education, training, and implementation of the CUSP as a catalyst in the reduction or elimination of CLABSIs in the adult ICUs throughout our healthcare system. The CUSP teams will be developed within the adult ICUs of the participating hospitals. Use of the CUSP will not be applied in any other clinical department or QI initiative during the course of this project. All CVCs used for intravenous fluid, medication, dialysis, or administration of TPN to adult ICU patients will be included. The CLABSI definition and standard outcome measure of surveillance, as delineated by the CDC, will be utilized for the identification and evaluation of CLABSIs throughout the project.

Effects on the Healthcare System

The success of this project will demonstrate that the implementation of the CUSP resulted in the project goal of reducing or eliminating CLABSIs in the ICUs within our healthcare system. The national *On the CUSP: Stop BSI* program integrated methods to

translate evidence into practice with safety culture improvement methods and a system for measurement of infection data (Sawyer et al., 2010). This approach illustrates that implementation of interventions must be tailored to the local hospital setting where patient care is delivered to recognize and resolve potential patient safety hazards or untoward outcomes (Sawyer et al., 2010).

CLABSIs, and associated care complications, lead to increases in morbidity and mortality, LOS, and healthcare costs (DePalo et al., 2010). The estimated costs associated with CLABSIs are approximately $45,000 per infection (Lissauer et al., 2012). The literature review revealed multiple studies that have resulted in the significant reduction of CLABSIs after the implementation of evidence-based strategies inclusive of the CUSP. The RI ICU collaborative study was able to demonstrate the prevention of 42 CLABSIs reduced ICU LOS by 608 days with cumulative savings of approximately $2M (DePalo et al., 2010). This project will offer a strategy to improve clinical outcomes, decrease lengths of stay, and reduce costs of care associated with CLABSIs across our healthcare system.

The need for evidence-based interventions that ultimately improve patient outcomes is essential in complex healthcare environments. The success of the CUSP will validate the future use and replication of a systematic approach to undertake other QI initiatives throughout our healthcare system.

Mission, Goals, and Objectives Statements

Mission

The mission of this project is to utilize a nationally recognized program, with proven results in reducing CLABSIs, to engage bedside care providers in improving

safety processes, communication, and teamwork, with senior leadership support. Further, introducing and educating teams to the CUSP will advance the sustainability of the outcome metrics through our quality and safety improvement initiatives.

Goals

The ultimate goal of this project will be to reduce or eliminate CLABSIs across our healthcare system. Additional goals of this project will be to:

1. Determine the causal effects of the CUSP on the reduction of CLABSIs within the participating ICUs
2. Determine the association of the CUSP team member webinar attendance to the reduction in CLASBIs

Objectives

The objectives for this project will be presented and categorized as outcome and process objectives. The outcome objective of this project will be to:

1. Achieve a 30% reduction in CLABSIs across the healthcare system by the 4th quarter of 2013

The process objectives for this project will be to:

1. Educate participating ICU teams on the culture of safety and the CUSP
2. Implement the CUSP in all participating ICUs
3. Measure and report the number and rate of CLABSIs for each participating ICU and system-wide
4. Enforce the utilization compliance of the bundled evidence-based blood stream infection prevention practices in conjunction with the CUSP education

CHAPTER III – THEORETICAL UNDERPINNINGS OF THE PROJECT

Theoretical Framework

The use of theoretical frameworks progresses our knowledge of organizational factors that are central to successful implementation and sustainment of innovations (Jones, Skinner, High, & Reiter-Palmon, 2013). The theoretical framework used for this project is Rogers' Diffusion of Innovations (Rogers, 2003). According to Rogers (2003), diffusion is the process in which an innovation is communicated through certain channels over time among the members of a social system. Innovation refers to an idea, practice, or object that is perceived as new by an individual or other unit of adoption (Rogers, 2003). Newness in an innovation does not just involve new knowledge, but may also be expressed in terms of persuasion or a decision to adopt (Rogers, 2003).

The evidence-based central line insertion bundle was not new knowledge for our healthcare teams, however, the attitudes toward the bundle and the decisions to adopt its use into practice on a consistent basis define it as an innovation. The implementation of the CUSP framework as a means to further reduce or eliminate CLABSIs is a new idea or innovation for the assembled teams within our healthcare system.

Five perceived attributes of innovation diffusion that influence the rate at which an innovation is adopted include relative advantage, compatibility, observability, complexity, and trialability, and (Rogers, 2003). The attributes of relative advantage and compatibility are especially important in explaining the rate of adoption and diffusion of an innovation (Rogers, 2003). Relative advantage is the degree to which an innovation is perceived as being advantageous and compatibility is the degree to which an innovation is perceived as being consistent with the values and norms of potential adopters (Rogers,

2003). An innovation that is perceived as advantageous and compatible will be more rapidly adopted and diffused. The relative advantage and compatibility of the CUSP program was provided through the team education sessions and was an important part of the message content about this innovation to assist in the diffusion process. Observability is the degree to which the results are visible to others (Rogers, 2003). The extent to which potential adopters can observe the adoption of an innovation by others can determine its success for diffusion (Rogers, 2003). The observability of the CUSP was accomplished through peer testimonials and national success examples provided by the program participants during the education sessions. Complexity is the degree to which an innovation is perceived as difficult to understand and use (Rogers, 2003). It was essential to equip the CUSP team members with a thorough understanding of the CUSP to facilitate the adoption of the innovation. Trialability is the degree to which an innovation can be used prior to adoption (Rogers, 2003). The CUSP team members were provided opportunities to use the skills and tools acquired throughout the education sessions.

Individuals and groups do not all adopt an innovation at the same time (Rogers, 2003). The adoption within individuals and groups typically follows a normal distribution which can be described with five adopter categories that assist to explain variation in adoption: innovators, early adopters, early majority, late majority, and laggards (Rogers, 2003). These adopter categories are the classifications of individuals and groups on the basis of their innovativeness, the degree to which an individual or other unit of adoption is relatively earlier in adopting new ideas than other members of a group or system (Rogers, 2003). It was important for the project leader and the CUSP team

leaders to recognize that the assembled teams are composed of an array of individuals who may differ in their progression and patterns of innovation adoption.

The decision to adopt or reject an innovation is conceptualized in several stages that occur over time. The Diffusion of Innovations theory proposes that knowledge, persuasion, decision, implementation, and confirmation are the five stages in the innovation-decision process (Rogers, 2003). This process is one that individuals and other decision makers go through as they move from gaining initial knowledge about an innovation, form their attitude about the innovation, make a decision to adopt or reject the innovation, implement the new idea, and confirm their decision (Rogers, 2003). The innovation-decision process explains the individual psychological processes involved with the change experience and the adoption of an innovation (Rogers, 2003). The model of five stages in the innovation-decision process is presented in Figure 5 in the Appendices. The theoretical generalizations of the innovation-decision process integrate well with the CUSP framework. Partnership with senior hospital leaders and the ICU teams will help ensure all stakeholders are involved in the change process. Teams were mentored and educated on methods to facilitate change at the unit level, inclusive of identifying common barriers, using theoretical and evidence-based strategies.

Diffusion of an innovation is an uncertainty reduction process (Rogers, 2003). As individuals and other decision makers pass through the innovation-decision process, they seek information to decrease the amount of uncertainty they may have about an innovation (Rogers, 2003). Introduction and overview of this initiative, with the specific objectives and interventions, assisted in providing knowledge and diminished the uncertainty that may have surrounded this innovation. As uncertainty decreases, the

decision to adopt an innovation increases (Rogers, 2003). The role of this author was as facilitator for the assembled CUSP teams and for the innovation diffusion process.

Rogers' Diffusion of Innovations theory provided the change management theoretical framework to facilitate the diffusion and adoption of the CUSP in the participating ICUs within our healthcare system. The linkage of the perceived innovation attributes and the innovation-decision process stages of the Diffusion of Innovations to the CUSP five sequential steps are presented in Table 3 in the Appendices.

Program Framework

The CUSP is a safety culture program that is designed to educate and improve awareness about patient safety and quality of care, empower staff to take charge and improve safety in their local workplace units, create partnerships between senior executive hospital leaders and units to improve organizational culture and provide resources for unit improvement efforts, and provide tools to investigate and learn from defects (AHRQ, 2011). The program integrates teamwork, communication, and leadership to create and support a culture of patient safety. The program employs a collaborative model in which the key participants are interdisciplinary teams of healthcare professionals from units or departments within a hospital (Pronovost et al., 2011). The CUSP is implemented and managed at the unit level and involves frontline patient care providers who recognize and attempt to prevent patient safety hazards (AHRQ, 2011). The CUSP is comprised of five steps and is designed to integrate an evidence-based patient safety structured process into a unit or department (AHRQ, 2011).

The five steps of the CUSP are (AHRQ, 2011):

- Step 1: Educate on the science of safety
    - This education emphasizes the basic principles of safe design, the understanding that safety is part of the work system, and that teams make prudent decisions with diverse and independent input.
- Step 2: Identify defects/patient safety hazards
    - The CUSP teams were directed to identify, prioritize, and eliminate patient safety hazards in their ICUs. The CUSP teams were asked how the next patient will be harmed in their units and how the harm could be prevented. The CUSP team members were empowered with the ability to stop procedures if patient safety is compromised.
- Step 3: Partner senior executive with unit
    - The senior executive partner reviews the identified patient safety hazards and ensures the CUSP teams have the resources and support to implement safety risk reductions and assigns accountability to the teams to mitigate the hazards.
- Step 4: Learn from defects
    - The CUSP teams were requested to use a tool to learn from one defect per month that prompts users to answer what happened, why did it happen, what was done to reduce risk, and whether the intervention reduced the risk.

- Step 5: Implement teamwork and communication tools
    - The CUSP teams were provided several tools which are mechanisms of change that can be utilized to improve communication and teamwork deficits within their ICUs. Examples of the communication and teamwork tools include the morning briefing, daily goals checklist, and shadowing.

These five sequential steps outline the progression in which the ICUs can assess, improve, and evaluate their cultures of safety in efforts to reduce or eliminate CLABSIs. The CUSP is the program framework upon which this project was based.

CHAPTER IV – PROJECT AND EVALUATION PLAN

Project Plan

CUSP Project Overview

Our healthcare system entered into a partnership agreement with the Center for Patient Safety for the provision of the CUSP training, education, and support for the ICUs participating in this project within our healthcare system. The CUSP is a structured strategic framework for safety improvement that integrates communication, teamwork, and leadership to create and support a culture of patient safety that can prevent harms (AHRQ, 2011). The program features evidence-based safety practices, staff training tools, standards for consistently measuring infection rates, engagement of leadership, and tools to improve teamwork among physician, nurses, and other direct care providers in the ICUs (AHRQ, 2011).

The program is a six-month course, offered through a series of six consecutive monthly webinars and teleconferences, designed to assist hospitals in implementing the CUSP to ICU teams for success in the reduction of CLABSIs. The course guides participants through the process of creating a unit or department-based CUSP team, evaluating the patient safety culture, educating staff on the science of safety, and identifying and solving defects. Each step of the CUSP builds on the previous work to systematically provide frontline patient care providers with the tools, metrics, and framework to undertake the challenge of QI. The content description and objectives for each of the six monthly sessions are outlined in Appendix C.

Setting

The project will occur in adult ICUs within our healthcare system. This healthcare system is one of the largest investor-owned healthcare delivery systems in the nation. The healthcare system is comprised of 49 acute care hospitals and over 100 outpatient centers spanning 10 states, employing 57,000 people inclusive of 17,000 Registered Nurses (RNs). The acute care division of this healthcare system includes hospitals that are critical access, community-based, academic teaching, and large urban medical centers. All hospitals within the healthcare system were invited to participate in this initiative. Forty-one hospitals assembled ICU teams to participate in the education, training, and implementation of the CUSP. The hospitals not participating in this project have previously implemented the CUSP or are involved in state level Hospital Engagement Networks (HENs) that address efforts to reduce CLABSIs.

Population of Interest

The population of interest identified in this project includes registered nurses (RNs), physicians, and other healthcare team members who provide direct care to adult ICU patients with CVCs. The other healthcare team members identified who provide direct care to adult ICU patients include NPs, PAs, RTs, and NTs. Additional healthcare team members included in the population of interest who participate in the care of adult ICU patients are pharmacists, IPs, nutritionists, and quality and safety specialists. The patient population identified in this project includes all adult patients with a CVC in the ICU.

The corporate clinical operations executives of our healthcare system elected to exclude patients admitted to a Pediatric Intensive Care Unit (PICU), Neonatal Intensive

Care Unit (NICU), or any other clinical department outside of the adult ICUs to mitigate confounding from multiple settings. This decision was also in congruence with the model established for the numerous collaborative cohort studies conducted to reduce CLABSIs.

Measures, Instruments, and Activities

Checklists are cognitive tools that standardize process elements to facilitate care delivery, reduce variability, and improve the translation of information among varying team members (Winters et al., 2009). One strategy adopted by the ICUs within our healthcare system was the use of a central line insertion care team checklist to ensure adherence to evidence-based bloodstream infection prevention practices during CVC insertion (Appendix D). This checklist utilizes the static sequential with verification format which involves a challenge and response (Winters et al., 2009). A designated person reads the items on the checklist and each responsible party verifies the completion of their specific task (Winters et al., 2009). This type of checklist helps to reduce complexity, create independent redundancies, and ensure the entire team and patients are certain about expected behaviors (Sawyer et al., 2010). Major components of the central line insertion care team checklist include four of the five evidence-based bloodstream infection prevention practices of handwashing, using full barrier precautions, cleaning the skin with chlorhexidine, and avoiding the femoral site when feasible (Pronovost et al., 2010). The fifth practice of removing unnecessary catheters is not incorporated into the checklist for central line insertion as it focuses on optimizing CVC maintenance. The four evidence-based bloodstream infection prevention practices in the checklist have been validated by a detailed practice guideline issued by the CDC and categorized on the basis

of existing scientific data, theoretical rationale, and applicability (O'Grady et al., 2011). These components were also validated in the 2006 seminal Keystone ICU project collaborative cohort study where use resulted in a 66% decrease in CLABSI rates (Pronovost et al., 2006).

Surveillance standardization is essential within and across all of the participating adult ICUs to measure the magnitude or impact of prevention strategies on CLABSI rates (Worth et al., 2009). Standardization should incorporate the data collection technique, the application of an accepted and valid case definition, and the method of analyzing and reporting CLABSI rates (Worth & McLaws, 2012). The most prevalent data collection technique is in accordance with the National Healthcare Safety Network (NHSN) methodology (Dudeck et al., 2011). The validity and reproducibility of the NHSN surveillance methodology has been evaluated and is extensively applied within and outside the United States (Dudeck et al., 2011).

Timeline and Project Tasks

The timeline for this project will extend from January 2013 through March 2014. A detailed timeline with associated tasks for the entire project is presented in Table 4 of the Appendices.

Risks and Threats

The identified risks and threats for this project were minimal. The first identified risk of this project was team member attendance and participation in the six monthly CUSP webinars and teleconferences. The six-month webinar schedule with dates, times, and access information was distributed to all identified team members prior to the initiation of the webinars. In addition, each webinar was recorded and stored in an

accessible electronic folder for subsequent replay in the event a team member missed a scheduled session.

The second identified risk of this project was team communication and collaboration. Frontline staff, especially RNs, are apprehensive about identifying potentially hazardous situations for fear of repercussion or other barriers (Southworth, Henman, Kinder, & Sell, 2012). One advantage of the CUSP is its empowerment of frontline staff to assume responsibility for patient safety by generating issues, prioritizing them, and implementing them based upon the ICU identified needs (Pronovost et al., 2005). Enhanced autonomy and communication by RNs alters role expectations of both nurses and physicians (Southworth et al., 2012). This risk was mitigated through the provision of the science of safety education which provides a conceptual framework and a common safety vocabulary that allows frontline staff to recognize, surface, and address defects at the unit level (Southworth et al., 2012).

Evaluation Plan

The impact of the CUSP on the reduction or elimination of CLABSIs was evaluated using a pre-and post-implementation comparison of hospital CLABSI rates. This outcome measure was selected because the CDC provides a standardized definition of CLABSIs and all of the hospitals within our healthcare system currently collect and report this data. This standard outcome measure for surveillance is defined as the number of CLABSIs per 1,000 central line catheter days, where the numerator is the number of CLABSIs and the denominator is the number of catheter days (O'Grady et al., 2011). Data for the numerator and denominator was collected by the IPs at each participating hospital, independent of the established ICU CUSP teams. Evaluation of the project

through data collection of CLABSI rates offers accountability to the stakeholders, demonstrates improvement in quality and outcomes, and provides rationality to the initiative (Zaccagnini & White, 2011).

Baseline performance was measured using the September 2012 through January 2013 CLABSI rate data for our healthcare system. Baseline performance must be measured to understand the improvement opportunity and the magnitude of improvement after implementation of the CUSP (Pronovost, Berenholtz, & Needham, 2008). Throughout the project, the CUSP teams received monthly feedback on the number of CLABSIs in the ICUs and quarterly feedback on the CLASBI rates. Frequent monitoring of outcomes and feedback to the CUSP teams can have a significant impact on the confirmation stage of the innovation-decision process. During the confirmation stage, individuals seek to reinforce the innovation adoption decision previously made through the validation of its impact (Rogers, 2003). The CUSP team training and education was completed at the end of July 2013. Analysis of the CLABSI rates for August 2013 through December 2013, with comparison to the baseline period of September 2012 through January 2013, will be used to evaluate the effect and success of the project. Evaluation of the CUSP implementation success through the reduction or elimination of CLABSIs will provide an opportunity to determine future use and replication in other clinical units and QI initiatives.

Financial Plan

The costs and professional fees for the delivery of the CUSP training, education, and support from the Center for Patient Safety will be managed through the funding provision of the healthcare system corporate offices. Materials for the training sessions

and webinars will be maintained electronically on the healthcare system intranet share point site with access for all participating hospitals. Additional expenses for the participating hospitals in the project will not be incurred. No funding will be necessary for program evaluation completion.

Institutional Review Board (IRB)

This project includes an education and training program designed for the RNs, physicians, and other previously identified healthcare team members within our healthcare system ICUs. This project is a QI initiative without the use of human subjects. Data used will be de-identified and reported in the aggregate. Because of this project design, IRB approval is not required. The Biomedical IRB Notice of Excluded Activity from the University of Nevada, Las Vegas (UNLV) Office of Research Integrity-Human Subjects is presented in Appendix E.

Maintaining/Sustaining the Change

Sustained reduction or elimination of CLABSIs will require continued efforts. The seminal Keystone ICU Project demonstrated that the reduction of CLABSIs can be sustained with ongoing focus and monitoring efforts (Pronovost et al., 2006). The durability of this effect suggests that not only can behaviors be changed, but education, engagement, monitoring, and feedback can sustain these gains beyond the intervention stage (AHRQ, 2013). Increased understanding of the root causes of CLABSIs that do occur will provide valuable insights that will sustain improvements long term (Clancy, 2012).

To sustain our efforts, the hospitals within our healthcare system will be requested to formally integrate and incorporate the CUSP into their QI plans and efforts. This will

include ongoing measurement and feedback of performance, encouragement of the teams to continue the work, and incorporating the CUSP education into staff orientation. In addition, plans will be formulated to integrate the CUSP into other clinical areas outside of the ICUs where CVCs are also inserted.

CHAPTER V – SUMMARY OF IMPLEMENTATION AND RESULTS

Initiation of the Project

The project was initiated in January 2013 under the direction of the DNP student and author of this document. All hospitals within our healthcare system with ICUs for adults were invited to participate in this project. Correspondence was sent to all Chief Executive Officers (CEOs), CNOs, Quality Directors (QDs), IPs, and Risk Managers (RMs) with an overview of the CLABSI CUSP project organization, project objectives, and the dates and times for each of the six consecutive monthly webinars. Hospital CUSP team membership guidelines were distributed to the CNOs for assignment, completion, and return. A share point site was created on the healthcare system intranet as the repository for all CUSP education and training materials. Access to this share point site was provided for all participating hospitals and CUSP team members. Communication, coordination, and completion of these items were essential to ensure a smooth transition into the educational intervention.

Education of the identified hospital CUSP team members was accomplished through a series of six consecutive monthly webinars and teleconferences beginning on February 26, 2013 and culminating on July 23, 2013. The webinars were approximately one hour in duration and focused on an introductory overview of the entire program and each of the five steps of the CUSP. The format of the webinars included a power point presentation on one specific component or step of the CUSP program followed by a question-and-answer period with the teams. Technical support and clinical guidance were offered through each of the webinars and teleconferences. In addition to the didactic content of each webinar, hospital CUSP team members were encouraged to

participate by sharing their successes and challenges to expand their knowledge as they evolved with implementation of the program. The webinars were designed to prepare the teams to implement the CUSP and develop a social network of hospitals and colleagues that learn together during implementation (Della et al., 2012). The creation of this social community enabled the CUSP team members across all hospitals to mutually reinforce beliefs about the importance of preventing CLABSIs and fostered synergistic improvements to reduce these infections (Pronovost et al., 2011).

Providing resources, tools, and support for the CUSP teams to ensure innovation adoption throughout the course of the project was imperative to effective program implementation and achieving project objectives. Additional resources and support were provided for the CUSP team leaders that included team ground rules, team meeting agendas inclusive of content items for the meeting and facilitation guidance instructions for the team leaders, staff safety assessment form, attendance sheet for staff safety training and assessment completion, and the learn from defects tool worksheet. These documents are provided in the Appendices labeled Appendix F through Appendix O.

Threats and Barriers to the Project

Common barriers to implementation of best practices to reduce or eliminate CLABSIs include lack of leadership support, lack of a safety culture, and inadequate education (Kusek, 2012). Leadership support was not an identified barrier in this project. Education of the CUSP teams was also not an identified barrier because of the designed instructional intervention that addressed the overview of CUSP and the five sequential steps of the program. The CUSP is designed to improve the safety culture of a unit

through increasing awareness of quality care problems and encouraging communication and teamwork (Lin et al., 2012).

Although these common barriers were not identified in this project, several hospitals experienced early challenges with the CUSP implementation and the spread of change throughout the units and to the clinicians. Engaging frontline physicians was an early identified barrier in the project. This challenge did not significantly delay the project progress and was addressed individually by the CUSP team physician and executive champions. Nursing empowerment, a documented advantage of the CUSP, was also an identified early challenge. Nursing staff reluctance to question or challenge physicians and other healthcare team members when they observed noncompliant patient care delivery posed a potential obstacle to achieving the desired outcomes associated with the CUSP. This risk was mitigated through consistent, supportive leadership involvement and reinforced by physician, nurse, and executive champions that assisted in eliminating any dissent and contributed to program success. Teams discovered that safe dialogue was essential to foster trust, transparency, and program commitment (Lin et al., 2012).

These identified cultural barriers must be considered and addressed when attempting to improve the quality and reliability of patient care. An effective methodology that was employed to assist the teams to address local barriers and impact change was a "four Es" approach: (1) *engage* staff in the need to address the problem and why the interventions are important; (2) *educate* staff on the evidence supporting the interventions; (3) *execute* the intervention activities and practices targeted at the barriers and challenges; and (4) *evaluate* the process and outcomes regularly (Pronovost,

Berenholtz, & Needham, 2008). This approach recognizes the importance of culture change, contextual factors, engaging staff in the project, and identifying local barriers. As such, this approach complimented and aligned with the overall framework of the CUSP and provided structural guidance for the teams to assist in addressing and overcoming associated project barriers.

Monitoring of the Project

Monitoring of the project implementation and ongoing efforts to measure progress against the goals and objectives, mission statement, evaluation plan, and timeline was an important task. Maintaining the momentum of this large-scope project was an essential element in achieving the desired goals and outcomes. The project required that all of the team members and stakeholders collaborate, understand the basis of the work and the sequential progression of the project, and complete the required program tasks. Because of the sequential nature of the webinars and associated project assignments, it was imperative to ensure that the CUSP teams progressed collectively and completed the required actions in the established time frames. Checklists were developed and provided to each CUSP team leader that outlined the specific actions required of the team for each of the six webinars and the associated resources to assist in the completion of each action item. The six checklists are provided as tables in the Appendices labeled Table 5 through Table10. The actions listed on each checklist were required to be completed by each CUSP team prior to the next scheduled webinar.

Variation in adoption and completion of the actions required of the CUSP team members following each consecutive webinar can be associated with the Diffusion of Innovations framework that describes the five adopter categories of innovators, early

adopters, early majority, late majority, and laggards (Rogers, 2003). Individual guidance, support, assistance, and consultation was provided throughout the project for the hospital CUSP teams, as requested by the CUSP team leader or observed by the project leader, to facilitate movement through the organizational stages of innovation and complete the associated program requirements in accordance with the project scope and timeline.

Data Collection

Throughout the project, data on the number of CLABSIs was collected monthly by the hospital–based IP in accordance with the NHSN methodology and definition of CLABSIs (Dudeck et al., 2011). Hospital CUSP teams received monthly feedback on the number of infections and quarterly feedback on the rate of infections per 1,000 catheter days. The feedback of data to teams is critical in generating peer pressure for change and compliance and to ensure that continual modification and evaluation of processes have achieved the desired result (McMullan et al, 2013). One attribute of the Diffusion of Innovations theory is relative advantage, the degree to which an innovation is perceived as being advantageous (Rogers, 2003). Timely and frequent feedback on the number and rate of infections to the team members was a method to demonstrate relative advantage to assist in the adoption and diffusion of this innovation.

CUSP team member attendance for each of the webinars was tracked by the team leaders on a webinar attendance form (Appendix P) and submitted to the project leader at the end of the final webinar in July 2013. Attendance records were utilized to determine the association between the CUSP webinar attendance and reduced CLABSI rates. Although the webinars were recorded for playback at a later time, attendance was

determined based upon documented presence at the webinar on the CUSP team webinar attendance form, due to the interactive nature and design of the presentations.

Data Analysis

Data was analyzed using the Statistical Analysis Software (SAS) version 9.20 and Medcalc version 13.0.4.0. Data comparing the months of September 2012 to January 2013 (baseline pre-CUSP implementation) to data from August 2013 to December 2013 (post-CUSP implementation) was analyzed. These time periods were selected to allow for assessment of the largest sample and to correlate with the pre-and post-CUSP implementation periods.

Inferential statistical analysis was used in the examination of the data. The CLABSI rates per hospital were calculated as the average of the CLABSI rates from the ICUs in the hospital which gives each ICU the same weight and provides information regarding CLABSI rate reduction for an average ICU in the project. A Poisson distribution was used to examine the relationship between time since the CUSP implementation and CLABSI rates. The Poisson analysis was also used to generate an incidence rate ratio (IRR) to compare pre-and post-CUSP implementation CLABSI rates, as had been done in previous studies (O'Grady et al., 2011; Pronovost et al., 2006). Analysis of infection statistics often employs Poisson distribution on the assumption that infections occur independently and at random in populations. The Pearson product-moment correlation coefficient I and the coefficient of determination (r^2) were used to explore the association between the pre-and post-CUSP implementation CLABSI rates and the relationship of CLASBI rate reduction and webinar attendance. All reported P values of 0.05 or less were considered to indicate statistical significance.

Giving Meaning to the Data

Results

Data are reported for 65 ICUs, representing 41 hospitals and 113,288 catheter days across the baseline pre- and post-CUSP implementation time periods. The total number of CLABSIs reported for the baseline pre-CUSP implementation time period of September 2012 to January 2013 was 71, with an infection rate of 1.10 per 1,000 catheter days. The data for the post-CUSP implementation time period of August 2013 to December 2013 revealed a decrease in the total number of CLABSIs to 42, and a resultant decrease in the infection rate to 0.73 per 1,000 catheter days. This decrease represented a 32.8% reduction in CLASBIs post-CUSP implementation. As shown in Table 1, Poisson 95% confidence intervals were calculated to determine the statistical significance between the pre-and post-implementation CLABSI rates. The P value of 0.0398 demonstrates a statistical significance was observed between the pre-and post-CUSP implementation CLABSI rates.

Pre-CUSP Incidence Rate	1.1005
95% Confidence Interval	0.8595 to 1.3882
Post-CUSP Incidence Rate	0.7394
95% Confidence Interval	0.5329 to 0.9995
Incidence Rate Difference	0.3611
95% Confidence Interval	0.0169 to 0.7053
P-value	P = 0.0398
Incidence Rate Ratio	1.4883
95% Confidence Interval	1.0023 to 2.2347

Table 1. *CLABSI Rate Comparison Pre-and Post-CUSP Implementation*

Poisson 95% confidence intervals were also calculated for differences between the pre-CUSP and post-CUSP implementation CLABSI rates for each participating hospital. Table 11 demonstrates the results of this analysis which is located in the Appendices.

The Pearson product-moment correlation coefficient I and the coefficient of determination (r^2) was calculated to compare each hospital's rates with their own rates to determine if an association existed between the pre-and post-CUSP implementation CLABSI rates. The Pearson $r = 0.131$ and $r^2 = 0.0174$ demonstrated a weak positive linear relationship between these two rates (Figure 1). Only 1.74% of total variation in post-CUSP implementation CLABSI rates can be explained or accounted for by variation in the pre-CUSP implementation CLABSI rates. The P value was 0.414 which indicates there was not a statistical significance in the correlation of these rates.

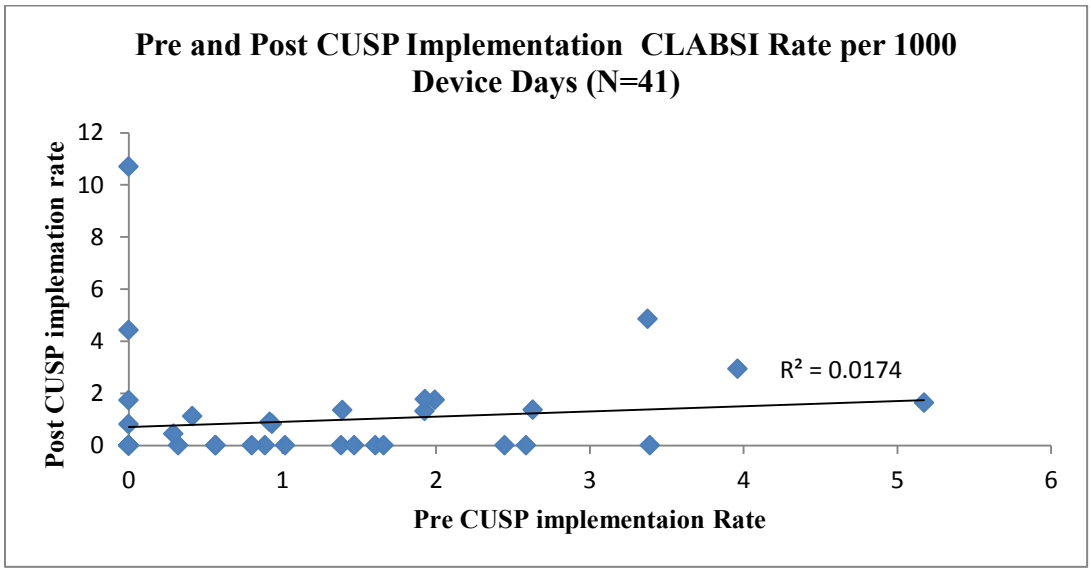

Figure 1. Individual Hospital CLABSI Rate Comparison Pre-and Post-CUSP Implementation

The control chart in Figure 2 displays the trend in CLABSI rates from the 1st Quarter in 2012 through the 4th Quarter in 2013. Prior to the 1st Quarter in 2013, an upward trend in CLABSI rates was observed that had prompted the need for this project. A significant decline in CLABSI rates was observed in the 1st Quarter of 2013 coincident with the initiation of the CUSP project. A slight increase in CLABSI rates was observed in the 2nd Quarter of 2013 which was not validated with any particular findings. Subsequent decreases in CLABSI rates were observed in the last two quarters of 2013 post-CUSP implementation.

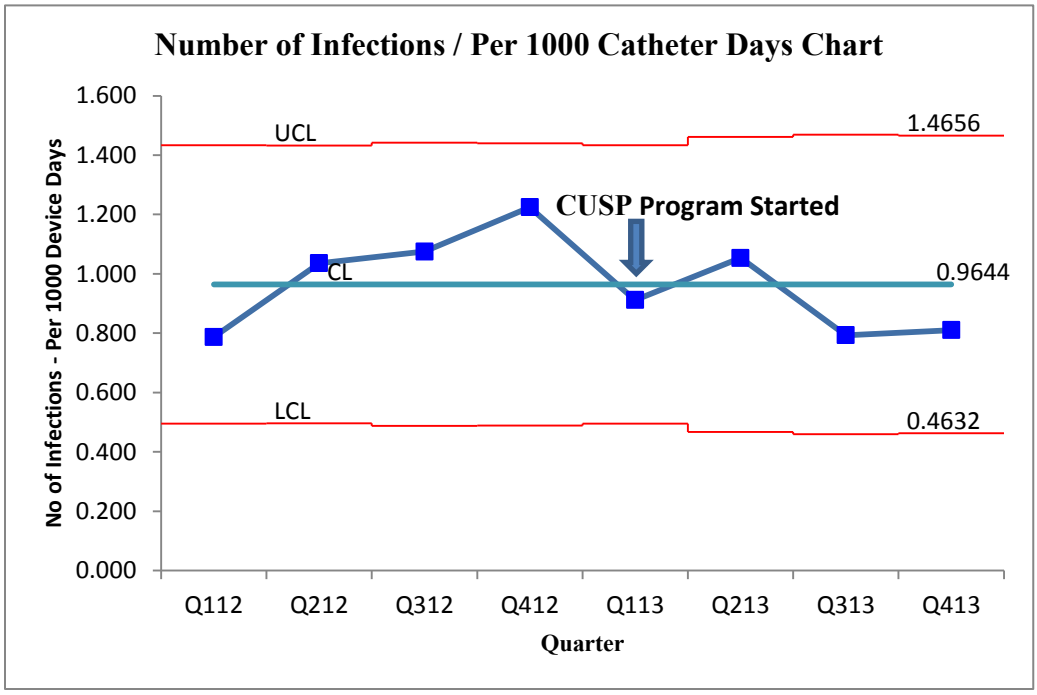

Figure 2. CLABSI Rates Trended Comparison 1st Q 2012 – 4th Q 2013

The Pearson product-moment correlation coefficient I and the coefficient of determination (r^2) was calculated for each hospital, based on CUSP team webinar attendance forms, to determine the strength of the association between overall webinar attendance and post-CUSP implementation CLABSI rates. Attendance for each webinar was calculated based on required attendees and actual attendees. The Pearson $r = 0.06$ and $r^2 = 0.0041$ demonstrated a weak positive linear relationship between these two rates (Figure 3). The P value of 0.701 indicated there was not a statistical significance that was demonstrated in this statistical analysis associated with webinar attendance and CLABSI rate reduction.

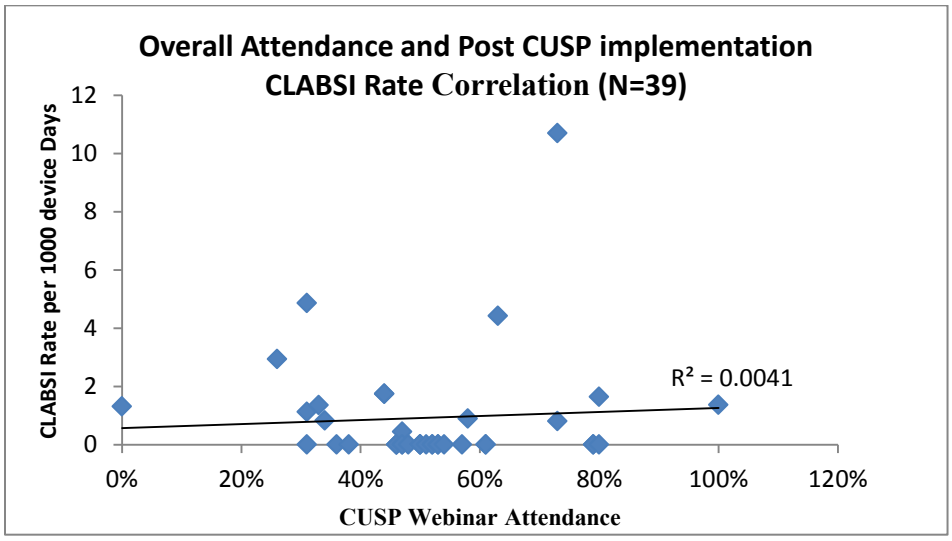

Figure 3. Overall Webinar Attendance and Post-CUSP Implementation CLABSI Rates

Given the results of the above webinar attendance analysis, a second analysis was conducted to determine if there was an association between the degree of webinar attendance and the reduction of CLABSI rates. The webinar attendance forms were further divided into three categories of good, fair, or poor based on percentile of team member attendance. Good attendance was defined as ≥ the 75th percentile, fair

attendance was defined as the 25th-75th percentile, and poor attendance was defined as ≤ the 25th percentile (Figure 4).

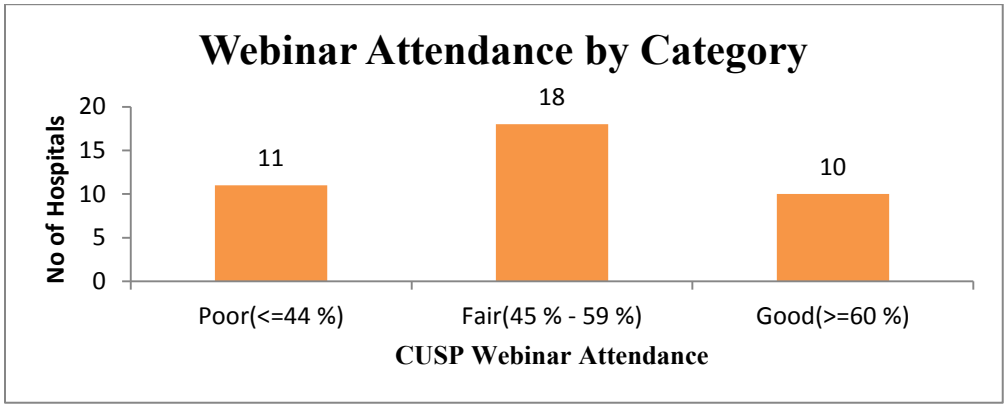

Figure 4. Webinar Attendance by Category

The CLABSI rates between attendance categories were compared to evaluate if being a part of one of these categories correlated with infection rate reductions. Pre-and post-CUSP implementation CLABSI rates were compared based upon the three determined attendance categories. The data displayed in Table 2 demonstrated significant reductions in CLABSI rates post-CUSP implementation for webinar attendance in the fair and good categories.

Attendance Category	Pre-CUSP Implementation Period CLABSI Rate per 1000 Catheter Days	Post-CUSP Implementation Period CLABSI Rate per 1000 Catheter Days	P Value	% Reduction
Poor	1.543 (27/17491)	1.520 (24/15783)	0.957	1.4%
Fair	0.479 (15/31300)	0.154 (4/25879)	0.034	67.7%
Good	1.896 (22/11603)	0.890 (10/11232)	0.042	53.0%

Table 2. *Comparison of Pre-and Post-CUSP Implementation Rates by Attendance Category*

This CLABSI rate reduction was statistically significant in both the fair and good webinar attendance categories with P values at 0.034 and 0.042 respectively. There was no significant CLABSI rate reduction observed in the hospitals categorized with poor attendance and the percent reduction was low. Poisson 95% confidence levels were also calculated to determine the differences in the webinar attendance and pre-and post-CUSP CLABSI rate reductions and to determine statistical significance between the two rates. These results also revealed statistical significance for webinar attendance and CLABSI rate reduction in the fair and good attendance categories and no significant CLABSI rate reduction in the poor attendance category. The detailed results of this analysis are located in Table 12 in the Appendices.

Discussion

CLABSIs are a significant cause of preventable harm that lead to increases in morbidity and mortality, length of stay, and healthcare costs (Hong, et al., 2013). At the onset, our healthcare system sought to evaluate whether an improvement in culture, through the implementation of the CUSP, could result in achieving the established goal of a 30% reduction in CLABSIs across the participating hospitals in the system. Comparison of pre-and post-CUSP implementation CLABSI rates revealed a 32.8% reduction that exceeded the overall project goal, demonstrated a causal association of the CUSP implementation and the reduced CLABSI rates, and confirmed that a large-scale project focused on reducing CLABSIs is feasible. There were a total of 25 out of the 41 hospitals (61%) that achieved a CLABSI rate of zero in the post-CUSP implementation period. However, 12 of the 41 hospitals (29%) had an established CLABSI rate of zero pre-CUSP implementation. Nonetheless, 13 additional hospitals reported CLABSI rates

of zero post-CUSP implementation which resulted in doubling the number of hospitals reporting zero infections by the end of the project. This study demonstrates that CLABSIs are preventable in ICUs and supports recent studies which suggest that up to 90% of CLABSIs may be preventable (Pronovost et al., 2010).

The interactive design of the webinars that allowed the CUSP team members across our healthcare system to share successes and challenges established collaboration, trust, and enhanced teamwork. Two attributes of the Diffusion of Innovations theory are observability, the ability to observe the adoption of an innovation by others, and trialability, the ability to experiment (Rogers, 2003). The CUSP teams established a network where those who had successes were able to share their experiences on what worked for them, how they achieved the success, and how they adapted the framework to work within their culture and hospital. Implementation of the CUSP relies on local accountability and ownership to adopt and adapt this innovation into daily work practices (Marsteller et al., 2012). As predicted by the Diffusion of Innovations theory, this interpersonal network assisted in overcoming any barriers in the process of the CUSP implementation and enhanced the adoption and diffusion of the innovation.

Study Limitations

This study had several limitations. First, we did not separate the efforts intended to directly improve culture, through the implementation of the CUSP, and the other prevention strategies and technologies to reduce CLABSIs such as increased compliance with the central line insertion bundles, physician insertion technique changes, post-insertion maintenance care practice changes, or the use of impregnated dressings or catheters and chlorhexidine baths. Nevertheless, the CUSP was the main intervention

used by the teams and improvements in unit culture and clinical outcomes intersected. Second, organizational and staffing challenges, such as changes in team leadership or executive sponsors, were not considered in the continued CUSP implementation of the individual impacted hospitals. These changes are common, often unanticipated, and have the potential to slow the rate of diffusion with the other team members and the hospital. The adoption of an innovation by individuals in an organization is more likely if key individuals are present and willing to support the innovation (Rogers, 2003). Committed team leadership and visible executive leadership have been demonstrated as key contributing factors in the success of the CUSP (Koll et al., 2008). Third, participation in the CUSP to reduce CLASBIs was not a mandated directive from the executives in our healthcare system. Although we had an 84% hospital participation rate in the project, a mandatory directive would have provided the CUSP education for the other non-participating hospitals which could have been utilized in the spread of this methodology to other QI initiatives within their organizations. The CUSP has been demonstrated for application to reduce other types of preventable harm (Pronovost et al., 2011). Fourth, we did not measure or have a mechanism to determine if team members unable to attend the live educational webinars went back and reviewed the recorded sessions at a later time frame. Although not interactive, the translation of knowledge from the webinar could have been disseminated to these team members. A methodology to gather this information for future similar initiatives and projects may prove to be beneficial in determining the impact of education and overall attendance rates. Fifth, hospital size, complexity of services, patient acuities, and comorbidities were not analyzed as potential contributing factors impacting the amount and rate of CLABSI reductions associated with

the CUSP implementation. Understanding patients who are more at risk for CLABSIs may allow targeted efforts at prevention and early diagnosis in the highest risk groups (Lissauer et al., 2012). Finally, we did not collect data for ICU mortality, length of stay, and costs of care, which limits the ability to determine whether the resulting improvements in CLABSI rate reductions led to reductions in these outcomes as well.

Conclusion

Although multifaceted interventions to reduce the incidence of CLABSIs have been demonstrated to be successful, CLABSIs continue to be identified (Lissauer et al., 2012). The pioneering work of Pronovost and colleagues at Johns Hopkins Hospital and the consortium of Michigan hospitals, as well as other efforts across the United States, have confirmed that the effective application of evidence-based practices can have a profound effect on the incidence of CLABSIs (AHRQ, 2012). This project demonstrated that an uncomplicated, inexpensive, evidence-based educational intervention, the CUSP, resulted in a 32.8% reduction in CLABSI rates. Evidence-based educational programmatic interventions have proven effective in reducing CLASBI rates (Parra et al., 2010). The progress achieved with this project challenges the difficulty of changing the culture and practice of medical and nursing staff, which takes time and perseverance. Programs to improve quality of care must address culture (Pronovost et al., 2011). In this program implementation, addressing culture occurred at three levels: (1) recognition that each hospital and ICU are microsystems within which an intervention is implemented; (2) enlistment of senior leaders to ensure support of the efforts to reduce CLABSIs; and (3) the creation of a social community within our healthcare system which has helped to create innovative standards regarding CLABSIs.

A leading item on the research agenda for QI initiatives is identifying methods that sustain a successful project (Pronovost et al., 2010). Sustainability is making an innovation routine, is often ambiguous, and may not always be legitimately separated from the initial implementation and evaluation of the project (Greenlaugh, Robert, MacFarlane, Bate, & Kyriakidou, 2004). However, sustainability should be examined separately from implementation. Continued success in this endeavor will require ongoing attention, commitment, support, monitoring, and collaboration. The progress achieved in this project with the reduction in CLABSI rates highlights the preventability of these infections and provides the framework that can be successfully applied to other QI initiatives.

Dissemination and Utilization of Results

The initial findings from this project were presented to our healthcare system corporate QI Council on February 18, 2014. In addition, each hospital was provided with their individual findings and results from participation in the project. As a result of the demonstrated success and initial results from this project, our healthcare system has decided to launch the CUSP program initiative again with an emphasis on catheter-associated urinary tract infections (CAUTIs). The complete findings and results from this project will be provided in webinar presentations for the healthcare system in the second quarter of this year. The DNP student and author of this document will plan on pursuing publishing the project later this year in a peer-reviewed journal.

Appendix A
CUSP Team Membership Guidelines

- Members of a CUSP team will vary by unit and by focus of the CUSP initiative

- A general rule is to have representation from all types of staff members who provide direct patient care on a unit.

- At a minimum, the following staff should be on your CUSP team:
  1. Team Leader
     - Ideally should be a CNS (advanced practice), Unit Nurse Manager/Director, Unit-based Quality Nurse, or Nurse Educator
     - Should have leadership skills, including project management and communication abilities
     - Anticipated Time Commitment: 4-5 hours per month (1 hour of coaching calls, 2 hours of planning, 1-2 hours of team meetings)
  2. Physician Champion
     - Anticipated Time Commitment: 3-4 hours per month (1 hour of coaching calls, 1 hour of planning with Team Leader, 1-2 hours of team meetings)
  3. Executive Champion
     - Anticipated Time Commitment: 1-2 hours per month (1-2 hours of team meetings)
     - See Appendix B – Key Messages for Senior Leaders – for messages to assist in the recruitment an executive champion
  4. Staff Nurse **(from each shift)**
     - Anticipated Time Commitment: 1.5-2.5 hours per month (1-2 hours of team meetings, 0.5 hours for education when implementing evidence-based interventions)

- Other potential team members for consideration regarding their involvement in care on the CUSP unit: Anticipated Time Commitment for each participant is 1-2 hours per month (1-2 hours of team meetings)
  1. Nutritionist, Pharmacist, or Respiratory Therapist
  2. Infection Preventionist (recommended for hospitals working on HAI-related improvement)
  3. Quality Manager (recommended)
  4. Nurse Manager (if not the Team Leader)
  5. Any other staff who is involved in the direct care of patients on the CUSP unit

Appendix B

Guidelines for Key Messages – Senior Leader Sponsorship

This document can be used to help CUSP team leaders and members communicate with

Senior Leaders about their CUSP team activities

Messages for Senior Leaders from Project Leaders/Nurse Managers/Middle Managers

- My unit/department is engaging in the Basics of CUSP – a comprehensive unit-based safety program that engages frontline staff with supervisors, managers, and senior leaders to solve patient safety problems identified on their own unit.
- CUSP helps us identify and take ownership of safety improvement.
- CUSP was developed by Dr. Peter Pronovost of Johns Hopkins University. In 2005, over 100 ICUs in the state of Michigan nearly eliminated central line associated blood stream infections (CLABSIs), and have held a mean rate of zero CLABSIs for over 5 years.
- The CUSP model is proven to be effective, and can be implemented in any unit to identify and resolve all types of defects while improving patient safety culture on the unit.
- CUSP has five simple steps. We are working through these steps in six monthly training sessions with Tenet and the Center for Patient Safety. Here are the steps of CUSP:
    1. Form a unit CUSP team with executive sponsorship
    2. Educate staff on the Science of Safety
    3. Identify defects using the Staff Safety Assessment ("How will the next patient be harmed? What can be done to prevent that harm from happening?"); prioritize defects
    4. Learn from one defect per quarter
    5. Implement team/communication tools
- We need your help! CUSP was designed to have an "executive sponsor" – someone like you who will be part of our team, work with us, and help us if we run into problems that need executive support. For example, if we find that _<falls>__could be eliminated or significantly decreased by changing the type of _<enter supply/equipment here>___ then someone like you could help us with that; Or, if we identify that the next patient will be harmed on our unit due to pharmacy or lab issues, you can help us navigate how to get the right people involved to help us fix the problem.
- Staff members on our unit want you to visit us– to round and let our co-workers and patients know that you are supporting our work to make our unit as safe as possible. It is a significant morale booster, a personal touch for our patients, and can help us get the changes we need put in to place.

Messages for Senior Leaders from Bedside Staff – 'How you can help me to my job better"

- I love being a <*nurse, RT, etc…*> and taking care of my patients.
- Sometimes it's hard for me to do that because of <*insert one small issue here: missing equipment; lost lab tests; late food trays; etc… >*
- Our unit is learning about a safety program called CUSP and it is teaching us how to identify problems on our unit and fix them (by asking ourselves, "How will the next patient be harmed?") – But some problems can only be fixed outside of our unit.
- Our manager does what he/she can to help with these problems, but sometimes he/she cannot remove the barriers to fully solve the problem.
- I want our patients to be safe, to get them well and sent home as soon as possible. I want to know my family or I will be safe being cared for here. Will you help us make that happen?

Appendix C
CUSP Course Content and Objectives

Session 1: Overview of CUSP

Content Description:

Review the components of the CUSP: science of safety education, measure safety culture, staff safety assessment, learn from defects, and teamwork and communication tools.

Objectives:

At the end of this session the learner will be able to:

1. Discuss the five components of the CUSP
2. Define how to form a CUSP team
3. Discuss three strategies to engage the executive

Session 2: Science of Safety and Staff Safety Assessment

Content Description:

Review the science of safety, including how errors happen and the role of the healthcare provider.

Objectives:

At the end of this session the learner will be able to:

1. Discuss 3 reasons medical errors happen
2. Discuss an example of process redesign to decrease medical errors

Sessions 3 and 4: Learning from Defects (LFDs)

Content Description:

Review the process for learning from defects and define the strategy to identify defects.

Objectives:

At the end of this session the learner will be able to:

1. Discuss the components of the LFDs process
2. Understand how to identify and prioritize defects
3. Select a defect to apply the LFDs process

Session 5: Understanding the Results of the Hospital Survey on Patient Safety

Content Description:

Review the AHRQ survey components. Discuss what the results mean and develop action plans to improve in areas where score is less than 60% positive.

Objectives:

At the end of the session the learner will be able to:

1. Define the different components of the AHRQ survey
2. Understand the results from the AHRQ survey
3. Define 1-2 strategies to address areas on the AHRQ survey that are less than 60% positive

Session 6: Introduction to CUSP Teamwork and Communication Tools

Content Description:

Review different strategies to improve teamwork and communication tools.

Objectives:

At the end of the session the learner will be able to:

1. Share three communication and teamwork tool strategies
2. Discuss strategies to implement at least one of the tools

Appendix D

Central Line Insertion Care Team Checklist

New line ☐
Rewire ☐

Pt Name_____ MR# _____Unit _____Date/Time _____

The purpose of this checklist is to check the procedure and environment before, during and after the procedure. If there is a deviation in any of the critical steps, immediately notify the operator and stop the procedure until corrected. If a correction is required, make a check in the 'Yes with reminder' column and note what correction was made in the comment space, if applicable. Uncorrected deviation and complications of line placement are to be reported in hospital-specific incident report. Contact the Attending/ICU Medical Director if any item on the checklist is not adhered to or with any concerns. **PLEASE RETURN COMPLETED FORM TO THE DESIGNATED PERSON IN YOUR AREA.**
Please note that in the absence of contraindications, a chest site is preferred over the femoral due to a lower incidence of mechanical and infectious complications.

TYPE OF LINE PLACED: _____ LOCATION OF LINE: _____
 # OF LUMENS _____

Critical Steps	Yes ✓	Yes With Reminder	Procedure Deviation? (complete incident report)	Comments:
Before the procedure, did the operator (person inserting line):				
Explain the procedure to the patient and provide educational materials as appropriate. After the patient has been given an opportunity to ask questions to the individual performing the procedure, ensure informed consent is provided by the physician.			**STOP**	
Obtain consent for the procedure (signed and witnessed)			**STOP**	
Perform a time-out and document on hospital form			**STOP**	
Confirm hand washing/sanitizing immediately prior			**STOP**	
Operators(s): wear cap, mask, sterile gown/gloves, and eye protection?			**STOP**	
Assistant: wear cap, mask, isolation gown and gloves, eye protection (if at risk for entering sterile field, use sterile gown and gloves)				
Properly position patient to prevent air embolism For Chest/EJ: Trendelenburg (HOB <0 degrees) For Femoral or patients where trendelenburg is contraindicated: supine			**STOP**	
Prep procedure site (chlorhexidine) for 30 seconds, allow to air dry an additional 30 seconds. (groin prep: scrub for 2 minutes and allow to dry for 1 minute)			**STOP**	
Allow site to dry				
Use sterile technique to drape from head to toe			**STOP**	
Utilize local anesthetic and/or sedation				N/A ☐
During the procedure, did the operator:				
Maintain a sterile field			**STOP**	
Monitor that lumens were not cut			**STOP**	N/A ☐
Clamp any ports not used during insertion (to avoid air embolism, clamp all but distal port)			**STOP**	N/A ☐
Obtain qualified second operator after 3 unsuccessful sticks (except if emergent)			**STOP**	N/A ☐
Aspirate blood from each lumen (to avoid air embolism and ensure intravascular placement)			**STOP**	
Transduce CVP or estimate CVP by fluid column (to avoid arterial placement)?			**STOP**	N/A for fluoroscopy procedures ☐
After the procedure, did the operator:				
Clean blood from site using antiseptic agent (chlorhexidine), apply sterile dressing and apply sterile caps on all hubs			**STOP**	
Verify placement by x-ray (time in SVC/RA junction) (N/A if placed under fluoroscopy or in the femoral vein)			**STOP**	N/A for fluoroscopy procedures ☐

Operator: _____ Assistant: _____

Appendix E
Biomedical IRB Notice of Excluded Activity

Biomedical IRB
Notice of Excluded Activity

DATE: March 22, 2013

TO: Mr. Michael Basinger, Nursing

FROM: Office of Research Integrity – Human Subjects

RE: Notification of IRB Action

Protocol Title: **The Reduction of Central Line-Associated Bloodstream Infections (CLABSIs) in Intensive Care Units (ICUs) Through the Implementation of the Comprehensive Unit-Based Safety Program (CUSP)**
Protocol# 1303-4410M

This memorandum is notification that the project referenced above has been reviewed as indicated in Federal regulatory statutes 45CFR46.

The protocol has been reviewed and deemed excluded from IRB review. It is not in need of further review or approval by the IRB.

Any changes to the excluded activity may cause this project to require a different level of IRB review. Should any changes need to be made, please submit a Modification Form.

If you have questions or require any assistance, please contact the Office of Research Integrity – Human Subjects at IRB@unlv.edu or call 895-2794.

Office of Research Integrity – Human Subjects
4505 Maryland Parkway • Box 451047 • Las Vegas, Nevada 89154-1047
(702) 895-2794 • FAX: (702) 895-0805

Appendix F
Team Ground Rules Sample

- Members commit to active and regular participation in meetings and activities.
  - All members agree to attend all meetings. When someone cannot attend that person will contact the team leader 24 hours in advance of meeting, if possible
- Members come to all meetings with assignments completed, prepared to productively contribute to discussions and decisions
- Meetings will be started on time if at least 80% of team is present
- We will discuss best decision making model for each situation. We will support decisions made by the group
- We will use data whenever possible as the 'ultimate authority'
- Honest disagreements are welcome as long as people treat each other with respect.
- All members will be given an opportunity to contribute to discussion and decision.
- Members will listen to others, respect their opinions and not interrupt
- Members monitor minutes for key decisions and promptly communicate to the staff/unit they represent

Appendix G
CUSP Team Meeting #1 Agenda Sample

This document is a Sample Agenda for the CUSP team leader to customize for the first CUSP Team Meeting at their organization

Team Meeting 1

Sample Agenda

1. Overview of CUSP (NOTE TO LEADER – please use the slides from Coaching Call 1 held on February 26, 2013)

2. Physician Engagement module (NOTE TO LEADER – the URL to the audio file link and slides are provided on team leader checklist)

3. Science of Safety Video – (NOTE TO LEADER – the URL for the audio file and slides are on the team leader checklist)

4. Plan to educate all unit staff on the Science of Safety using the URL link to the video or the DVD. (NOTE TO LEADER – the URL for the video and slides are on the team leader checklist)

   Consider providing the CUSP education as follows:

   - During regularly scheduled staff meetings
   - Set up a computer in a designated location with a shortcut on the Desktop of the computer to CUSP materials
   - During shift huddles (consider dividing the video content into small segments to view at different huddle sessions)

5. Documentation of who attends the CUSP training?

   - Work with your education department to meet facility requirements

6. How will you educate future unit staff members on the Science of Safety?
   Consider the following –
   - New employee unit orientation
   - Assigning a preceptor for new staff to share components of CUSP
   - Include in annual competencies

7. Adjourn

Appendix H
CUSP Team Meeting #1 or #2 Agenda Sample

This document is a Sample Agenda for the CUSP team leader to customize for the first or second CUSP Team Meeting at their organization

Team Meeting 1 or 2

Sample Agenda

Recommended Documents for Team Meeting:

From Coaching Call 1, 02/26/2013 (if this is your first team meeting):

- The Basics of CUSP Session 1 PowerPoint Presentation (to provide an overview of CUSP to team)

From Coaching Call 2, 03/26/2013:

- **Document -** The Basics of CUSP Session 2 PowerPoint Presentation (to provide an overview of the Staff Safety Assessment and HSOPS)
- **Document** – Team Ground Rules Sample
- **Document** – Staff Safety Assessment
- **Document 6** – Science of Safety Training Sample 1
- **Document 7** – Science of Safety Training Sample 2

1. Overview of CUSP (can use slides from Coaching Call 1 on 02/26/2013)

2. Discuss and set Team Ground Rules (see Document 2 for sample rules)

3. Listen to the Physician Engagement module (audio file link and slides on team leader checklist from Coaching Call 1, 02/26/2013) – can do this together during team meeting or individually

4. View the Science of Safety video (audio file link and slides on team leader checklist from Coaching Call 1, 02/26/2013) – can do this together during team meeting or individually

5. Develop plan for educating all unit staff on the Science of Safety and administering the Staff Safety Assessment

6. Plan to educate all unit staff on the Science of Safety using the URL link to the video or the DVD. (NOTE TO LEADER – the URL for the video and slides are on the team leader checklist from Coaching Call 1 on 02/26/2013)

Consider providing the CUSP education as follows:

During regularly scheduled staff meetings
Set up a computer in a designated location with a shortcut on the Desktop of the computer to CUSP materials
During shift huddles (consider dividing the video content into small segments to view at different huddle sessions)

a. Choose a method to do the Staff Safety Assessment

i. Can be done immediately following staff education on the Science of Safety (recommended)
ii. How will the staff assessment forms be collected?
    1. Box on the unit that staff puts the survey into
    2. Other method?
iii. Who on the CUSP team will collect and collate the results?

b. How will you educate future unit staff members on the Science of Safety? Consider the following –

- New employee unit orientation
- Assigning a preceptor for new staff to share components of CUSP
- Include in annual competencies

7. Overview of Hospital Survey on Patient Safety – unit culture survey
    a. Develop plan to reach the goal of a 60% response rate
        i. Getting the word out
        ii. Rewards/recognition (this is a good area for your executive champion to assist)
    b. Review HSOPS Timeline

8. Review action items/assign tasks and deadlines

9. Adjourn

Appendix I
CUSP Team Meeting #2 or #3 Agenda Sample

This document is a Sample Agenda for the CUSP team leader to customize for the second or third CUSP Team Meeting at their organization

Team Meeting 2 or 3
Sample Agenda

Recommended Documents for Team Meeting:

From Coaching Call 2:

- **Document** – The Basics of CUSP Session 2 PowerPoint Presentation (to provide an overview of the Staff Safety Assessment and HSOPS)
- **Document** – Team Ground Rules Sample
- **Document** – Staff Safety Assessment

From Coaching Call 3:

- **Document** – The Basics of CUSP Session 3 PowerPoint Presentation (to provide an overview of the Revised HSOPS Timeline and the Learning from Defects Tool)
- **Document** – Learning From Defects Tools
- **Document** – Article on Learning from Defects

1. Discuss and set Team Ground Rules (see Document from Coaching Call 2)

2. Collate and prioritize results of the Staff Safety Assessment (Document from Coaching Call 3 – slides 12-18)

3. Select one defect to take through the Learning from a Defect Tool. Begin the Learning from a Defect Process (Document from Coaching Call 3 – slides 19-43; Documents from Coaching Call 3 – Learning from Defects Tools)

4. Homework for all team members – read Document from Coaching Call 3 – Article on Learning from Defects

5. Review action items/assign tasks and deadlines

6. Adjourn

Appendix J
CUSP Team Meeting #3 or #4 Agenda Sample

This document is a Sample Agenda for the CUSP team leader to customize for the third or fourth CUSP Team Meeting at their organization

Team Meeting 3 or 4
Sample Agenda

Recommended Documents for Team Meeting:

From Coaching Call 3, 04/23/2013

- **Document** – The Basics of CUSP Session 3 PowerPoint Presentation (to provide an overview of HSOPS and the Learning from Defects Tool)
- **Document** – Learning From Defects Tool
- **Document** – Article on Learning from Defects

From Coaching Call 4, 05/28/2013

- **Document** – Learning From Defects Tool
- **Document** – Case Summary Learning Tool

1. Collate and prioritize results of the Staff Safety Assessment (Document from Coaching Call 3 – slides 8-10)

2. Select one defect to take through the Learning from a Defect Tool. Begin the Learning from a Defect Process (Document from Coaching Call 3 – slides 11-27; Document from Coaching Calls 3& 4 – Learning from Defects Tool)

3. Complete the Case Summary Learning Tool (Document from Coaching Call 4)

4. Review action items/assign tasks and deadlines

5. Adjourn

Appendix K
CUSP Team Meeting #4 or #5 Agenda Sample

This document is a Sample Agenda for the CUSP team leader to customize for the fourth or fifth CUSP Team Meeting at their organization

Team Meeting 4 or 5
Sample Agenda

Recommended Documents for Team Meeting:

From Coaching Call 3,

- **Document** – The Basics of CUSP Session 3 PowerPoint Presentation (to provide an overview of the Learning from Defects Tool)

From Coaching Call 4,

- **Document** – Learning From Defects Tool
- **Document** – Case Summary Learning Tool

From Coaching Call 5,

- **Document** – The Basics of CUSP Session 5 PowerPoint Presentation (to provide the method for patient safety action planning)

1. Select one defect to take through the Learning from a Defect Tool. Begin the Learning from a Defect Process (Document from Coaching Call 3 – slides 11-27; Document from Coaching Call 3 – Learning from Defects Tool)

2. Complete the Case Summary Learning Tool (Document from Coaching Call 4)

3. Review HSOPS/patient safety survey results; begin action planning

4. Review action items/assign tasks and deadlines

5. Adjourn

Appendix L
CUSP Team Meeting #5 or #6 Agenda Sample

This document is a Sample Agenda for the CUSP team leader to customize for the fifth or sixth CUSP Team Meeting at their organization

Team Meeting 5 or 6
Sample Agenda

Recommended Documents for Team Meeting:

From Coaching Call 4,
- **Document** – Learning From Defects Tool
- **Document** – Case Summary Learning Tool

From Coaching Call 5,
- **Document** – The Basics of CUSP Session 5 PowerPoint Presentation (to provide the method for patient safety action planning)

From Coaching Call 6,
- **Document** – The Basics of CUSP Session 6 PowerPoint Presentation (for an overview of communication/teamwork tools)

1. Complete the Case Summary Learning Tool (Document from Coaching Call 4)
2. Review HSOPS/patient safety survey results; begin action planning
3. Review communication/teamwork tools; plan to implement at least one.
4. Establish a process to Learn from One Defect monthly.
5. Review action items/assign tasks and deadlines
6. Adjourn

Appendix M
Staff Safety Assessment – CUSP

Purpose of this form: The purpose of this form is to tap into your knowledge and experiences at the frontlines of patient care to find out what risks are present on your unit that have or could jeopardize patient safety.

Who should complete this form: All health care providers within the ICU

How to complete this form: Provide as much detail as possible when answering the 2 questions. Drop off your completed safety assessment form in the location designated by the CUSP improvement team with your job category, date, and unit **(name is optional)**.

When to complete this form: Assessing safety should be considered an iterative process with no defined end (like a moving bicycle wheel). Thus, it can be filled out by any health care provider in the ICU at any time. At the very least, all health care providers should complete this form semiannually.

Name (optional): _____
Job Category: _____
Date: _____
Unit: _____

Please describe how you think the next patient in your unit/clinical area will be harmed.

Please describe what you think can be done to prevent or minimize this harm.

Thank you for helping improve safety in your workplace!

Appendix N
Attendance Sheet – Science of Safety/Safety Assessment

Unit Name: _____

Name	**Date of Training**	**Science of Safety**	**Staff Safety Assess**
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
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_____	_____	_____	_____
_____	_____	_____	_____

Appendix O
Learn From Defects Tool Worksheet

Date:

Attendees:

<table>
<tr><td colspan="2">What happened? (brief description)</td></tr>
<tr><td colspan="2">Why did it happen? (what factors contributed)</td></tr>
<tr><td>+
<u>What prevented it from being worse?</u></td><td>-
<u>What happened to cause the defect?</u></td></tr>
<tr><td colspan="2">What can we do to reduce the risk of it happening with a different person?</td></tr>
<tr><td colspan="2">How will we know the risk is reduced?</td></tr>
<tr><td colspan="2">With whom shall we share our learning?</td></tr>
</table>

Appendix P
CUSP Webinar Team Attendance List

February – July 2013

Hospital _____

Unit_____

Team Member	Webinar #1 2/26/13	Webinar #2 3/26/13	Webinar #3 4/23/13	Webinar #4 5/28/13	Webinar #5 6/25/13	Webinar #6 7/23/13
TL -						
MD -						

Notes:

Appendix Q
Permission

S I M O N & S C H U S T E R

1230 Avenue of the Americas
10th Floor
New York, NY 10020

(212) 698-7283 (fax)
agnes.fisher@simonandschuster.com

Agnes Fisher
Director
Permissions Department

April 30, 2013

Michael A. Basinger
665 Ravel Ct.
Las Vegas, NV 89145
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Dear Michael Basinger:

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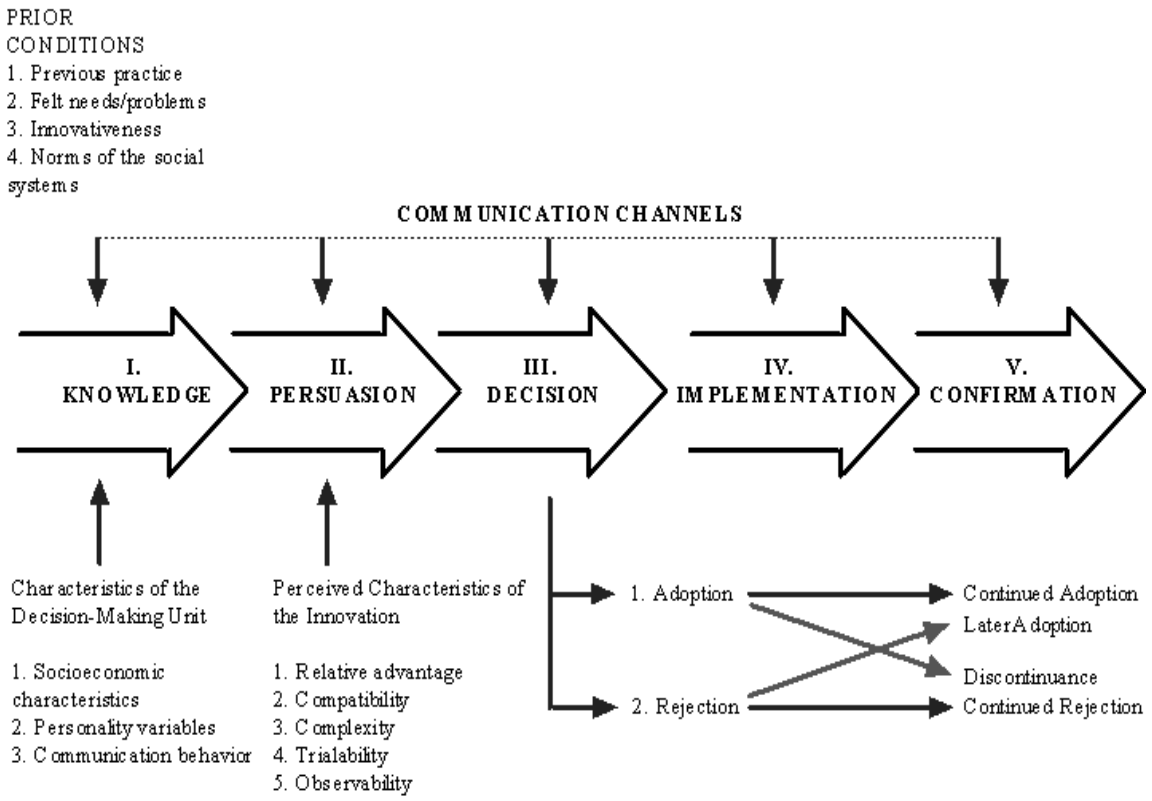
Best wishes.

Appendix R
Figures and Tables

Figure 5. Model of Five Stages in the Innovation-Decision Process



Note. The *innovation-decision process* is the process through which an individual (or other decision-making unit) passes from first knowledge of an innovation, to forming an attitude toward the innovation, to a decision to adopt or reject, to implementation of the new idea, and to confirmation of this decision. Adapted from "Diffusion of Innovations (5th Ed.)" by Everett M. Rogers, 2003, p.170. Copyright 2003 by Free Press, A Division of Simon & Schuster, Inc. Reprinted with permission.

Table 3

Diffusion of Innovations Linkage to CUSP Steps

CUSP	DIFFUSION OF INNOVATIONS	DIFFUSION OF INNOVATIONS
CUSP Steps	**Innovation Attributes**	**Innovation-Decision Process Stages**
Step 1: Educate on the science of safety	Relative Advantage Compatibility	Knowledge
Step 2: Identify defects/ patient safety hazards	Relative Advantage Compatibility	Knowledge Persuasion
Step 3: Partner senior executive with unit	Relative Advantage Compatibility Observability	Persuasion Decision
Step 4: Learn from defects	Relative Advantage Observability Complexity Trialability	Knowledge Persuasion Decision Implementation
Step 5: Implement teamwork and communication tools	Complexity Trialability	Decision Implementation

Innovation Attributes:

Relative Advantage - *The degree to which an innovation is perceived as being advantageous*

Compatibility - *The degree to which an innovation is perceived as being consistent with values and norms of the potential adopters*

Observability - *The degree to which the results of an innovation are visible to others*

Complexity - *The degree to which an innovation is perceived as difficult to understand and use*

Trialability - *The degree to which an innovation can be experimented with on a limited basis*

Innovation-Decision Process Stages:

Knowledge - *Awareness of an innovation and understanding how it functions*

Persuasion - *Formation of favorable or unfavorable attitudes toward the innovation*

Decision - *Activities that lead to adoption or rejection of an innovation*

Implementation - *Putting the innovation into use*

Note. Innovation attributes and stages of the innovation-decision process impact the rate of adoption. Linkage of the innovation attributes and innovation-decision stages to the CUSP steps. Adapted from Rogers, E. M. (2003). *Diffusion of Innovations* (5th Ed.). New York, NY: Free Press.

Table 4

Detailed Timeline

Time Period	Activities
January 2013	• Review, finalize, and sign the Center for Patient Safety proposal for training and services to implement the CUSP • Draft process steps for each education webinar session and assign accountability • Determine technology to be used for the education webinar series • Determine dates and times for preplanning and post evaluation calls for each education webinar • Send memo/correspondence to all Chief Nursing Officers (CNOs), Quality Directors (QDs), IPs, & Risk Managers (RMs) regarding the CLABSI/CUSP initiative • Obtain final September 2012 – January 2013 CLABSI rates as baseline data
February 2013	• Send memo/correspondence to all Chief Executive Officers (CEOs) regarding the CLABSI/CUSP initiative • Send team membership form and request to all CNOs for assignment, completion, and return • Complete process requirements to offer continuing education units (CEUs) to participants for attendance at education webinars • Create share point site on the healthcare system intranet to locate all CUSP education and training materials • Send share point site link to all CNOs, QDs, IPs, RMs, and other CUSP team members

Time Period	Activities
February 2013 (continued)	• Collect and log all hospital CUSP team membership forms • Review and finalize draft materials for webinar #1 • Post all materials for webinar #1 on the share point site one week prior to call • Conduct pre-and post-webinar calls on 2/11/13 and 2/26/13 • Conduct webinar #1 on 2/26/13 • Assign "homework" to CUSP teams
March 2013	• Review and finalize draft materials for webinar #2 • Post all materials for webinar #2 on the share point site one week prior to call • Conduct pre-and post-webinar calls on 3/18/13 and 3/26/13 • Conduct webinar #2 on 3/26/13 • Assign "homework" to CUSP teams • Obtain IRB Exclusion from the UNLV Office of Research Integrity-Human Subjects
April 2013	• Review and finalize draft materials for webinar #3 • Post all materials for webinar #3 on the share point site one week prior to call • Conduct pre-and post-webinar calls on 4/15/13 and 4/23/13 • Conduct webinar #3 on 4/23/13 • Assign "homework" to CUSP teams • Defend DNP Project Proposal at UNLV on 4/11/13
May 2013	• Review and finalize draft materials for webinar #4 • Post all materials for webinar #4 on the share point site one week prior to call • Conduct pre-and post-webinar calls on 5/13/13 and 5/28/13 • Conduct webinar #4 on 5/28/13 • Assign "homework" to CUSP teams

Time Period	Activities
June 2013	• Review and finalize draft materials for webinar #5 • Post all materials for webinar #5 on the share point site one week prior to call • Conduct pre-and post-webinar calls on 6/10/13 and 6/25/13 • Conduct webinar #5 on 6/25/13 • Assign "homework" to CUSP teams
July 2013	• Review and finalize draft materials for webinar #6 • Post all materials for webinar #6 on the share point site one week prior to call • Conduct pre-and post-webinar calls on 7/8/13 and 7/23/13 • Conduct webinar #6 on 7/23/13
August 2013	• Conduct follow-up session with all CUSP teams • Develop process with participating hospital IPs to provide the number of CLABSIs in the ICUs to the CUSP teams each month
September 2013	• Develop plans to incorporate the CUSP into new employee orientation • Review 3rd Quarter 2013 CLABSI rates as a preliminary measure of progress and success • Review monthly CLABSI rate numbers from all participating hospital ICUs
October 2013	• Conduct follow-up session with all CUSP teams • Review monthly CLABSI rate numbers from all participating hospital ICUs
November – December 2013	• Develop plans to incorporate the CUSP framework into the corporate and hospital QI plans for use in other quality initiatives • Review monthly CLABSI rate numbers from all participating hospital ICUs

Time Period	Activities
January 2014	• Conduct follow-up session with all CUSP teams • Review monthly CLABSI rate numbers from all participating hospital ICUs • Obtain and review August - December 2013 CLABSI rates • Begin data analysis process by comparing pre-and post-implementation CLABSI rate data
February 2014	• Complete data analysis and interpretation of pre- and post-implementation of CLABSI rates • Begin evaluation process with identification of findings • Present findings to corporate leadership and hospitals system wide
March 2014	• Complete final DNP Project writing and submit to Project Chair and Committee Members • Defend final DNP Project at UNLV on March 24, 2014 • Submit approved final DNP Project to the Graduate College of UNLV

Table 5

Team Leader Checklist – Webinar #1

ACTIONS	RESOURCES
✓ Choose a unit in your hospital to implement CUSP	▪ The unit may be designated by your organization for participation in the Basics of CUSP project. ▪ If not, consider units that have strong leadership, passion and commitment to improve the culture for safety and teamwork on their unit. Also consider units that have a need to improve aspects of clinical safety.
✓ Recruit a unit-based CUSP team	▪ **Document -** Recommendations for Unit-based CUSP Teams
✓ Recruit an executive sponsor	▪ **Document** – Key Messages for Executives
✓ Schedule CUSP team meetings – once or twice per month	▪ Schedule team meetings for at least 6 months for the Basics of CUSP series.
✓ Listen/view the "Physician Engagement" module	▪ Link to Audio File: http://www.ahrq.gov/cusptoolkit/videos/02e_phys_engagement/index.html ▪ Link to Slides: http://www.ahrq.gov/cusptoolkit/2assembleteam/assembleteamnotes.htm#slide15
✓ Consider listening/viewing one of the "Science of Safety" videos	▪ Science of Safety Videos: http://www.ahrq.gov/cusptoolkit/videos/04a_scisafety/index.html http://dukepatientsafetycenter.com/video.asp
✓ Facilitate first team meeting (for teams that are established this month)	▪ CUSP Team meeting to be held prior to the Basics of CUSP Session #2 ▪ **Document** – Sample Agenda for your CUSP Team Meeting 1
✓ Team members listen/view the Physician Engagement module and the Science of Safety video	▪ See links to audio files/slides above ▪ If your first team meeting is happening this month, can view as a group ▪ If first team meeting will be next month, consider asking team members to view individually

*In order to stay on track during this 6-month course, actions listed on the Team Leader Checklist should be considered homework," to be completed prior to next month's coaching call.

Table 6

Team Leader Checklist – Webinar #2

ACTIONS	RESOURCES
✓ Complete any action items that you did not complete on the Team Leader Monthly Checklist for Coaching Call 1	
✓ Facilitate team meeting 1 or 2 (depending on whether you had your first team meeting last month)	▪ **Document** – Team Ground Rules Sample ▪ **Document** – Staff Safety Assessment ▪ **Document** – Sample Agenda for CUSP Team Meeting 1 or 2 ▪ **Document** – Science of Safety Training Sample 1 ▪ **Document** – Science of Safety Training Sample 2
✓ Roll out Science of Safety Training and the Staff Safety Assessment to Unit Staff	▪ **Document** – Attendance Sheet for Science of Safety Training
✓ Collate results of the Staff Safety Assessment	▪ You will be instructed on what to do with your collated results during Coaching Call 3

*In order to stay on track during this 6-month course, actions listed on the Team Leader Checklist should be considered "homework," to be completed prior to next month's coaching call.

Table 7

Team Leader Checklist – Webinar #3

ACTIONS	RESOURCES
✓ Complete any action items that you did not complete on the Team Leader Monthly Checklist for Coaching Call 2	
✓ Facilitate team meeting 2 or 3 (depending on whether you had your first team meeting)	▪ **Document** – Sample Agenda for CUSP Team Meeting 2 or 3 ▪ **Document** – Learning From Defects Tools ▪ **Document** – Article on Learning from Defects
✓ Prioritize results of the Staff Safety Assessment; choose a defect to take through the Learning from a Defect Tool	▪ **Document** – Coaching Call 3 Presentation (slides 12-18) ▪ **Document** – Sample Agenda for CUSP Team Meeting 2 or 3
✓ Begin working through the Learning from a Defect Tool (we will cover this step in Coaching Call 4 as well)	▪ **Document** – Coaching Call 3 Presentation (slides 19-43) ➢ Note: "Summarize and Share Findings" (slide 40) will be covered during Coaching Call 4 (do not do this month) ▪ **Document** – Sample Agenda for CUSP Team Meeting 2 or 3 ▪ **Document** – Learning From Defects Tool

*In order to stay on track during this 6-month course, actions listed on the Team Leader Checklist should be considered "homework," to be completed prior to next month's coaching call.

Table 8

Team Leader Checklist – Webinar #4

ACTIONS	RESOURCES
✓ Complete any action items that you did not complete on the Team Leader Monthly Checklist for Coaching Call 3	
✓ Facilitate team meeting 3 or 4 (depending on whether you had your first team meeting)	▪ **Document** – Sample Agenda for CUSP Team Meeting 3 or 4 ▪ **Document** – Learning From Defects Tool ▪ **Document** – Case Summary Learning Tool
✓ Finish prioritizing results of the Staff Safety Assessment; choose a defect to take through the Learning from a Defect Tool	▪ **Document** – Sample Agenda for CUSP Team Meeting 3 or 4
✓ Work through the Learning from a Defect Tool	▪ **Document** – Learning From Defects Tool ▪ **Document** – Case Summary Learning Tool
✓ Complete the Post-Coaching Call 4 survey	▪ This will be emailed to you by Wednesday, May 29th ▪ Please complete survey by Friday, June 7th

*In order to stay on track during this 6-month course, actions listed on the Team Leader Checklist should be considered "homework," to be completed prior to next month's coaching call.

Table 9

Team Leader Checklist – Webinar #5

ACTIONS	RESOURCES
✓ Complete any action items that you did not complete on the Team Leader Monthly Checklist for Coaching Call 4	
✓ Facilitate team meeting 4 or 5 (depending on when you had your first team meeting)	▪ **Document** – Coaching Call 5 Presentation ▪ **Document** – Sample Agenda for CUSP Team Meeting 4 or 5 ▪ **Document** – Learning From Defects Tool (from call 4) ▪ **Document** – Case Summary Learning Tool (from call 4)
✓ Work through the Learning from a Defect Tool	▪ **Document** – Learning From Defects Tool (from call 4) ▪ **Document** – Case Summary Learning Tool (from call 4)
✓ Begin patient safety survey results action planning	▪ **Document** – Coaching Call 5 Presentation ▪ Your HSOPS or other patient safety culture survey results
✓ Complete the Post-Coaching Call 5 survey	▪ This will be emailed to you on Wednesday, June 26th ▪ Please complete the survey by July 5th

*In order to stay on track during this 6-month course, actions listed on the Team Leader Checklist should be considered "homework," to be completed prior to next month's coaching call.

Table 10

Team Leader Checklist – Webinar #6

ACTIONS	RESOURCES
✓ Complete any action items that you did not complete on the Team Leader Monthly Checklist for Coaching Call 5	
✓ Facilitate team meeting 5 or 6 (depending on whether you had your first team meeting)	▪ **Document** – Presentation for Coaching Call 6 ▪ **Document** – Sample Agenda for CUSP Team Meeting 5 or 6
✓ Work through the Learning from a Defect Tool	▪ Coaching Call 3 and 4 Resources
✓ Begin patient safety survey results action planning	▪ **Document** – Coaching Call 5 Presentation ▪ Your HSOPS or other patient safety culture survey results
✓ Plan to implement at least one team and communications tool	▪ **Document** – Coaching Call 5 Presentation
✓ Commit to Learning from One Defect per Month	▪ Coaching Call 3 and 4 Resources
✓ Keep your CUSP team meetings going!	

*In order to stay on track during this 6-month course, actions listed on the Team Leader Checklist should be considered "homework," to be completed prior to next month's coaching call

Table 11

Poisson 95 % Confidence Intervals by Hospital

Hospital Code	Pre-CUSP Implementation Rate	Post-CUSP Implementation Rate	Difference in Rates	Lower Limit 95 % CI	Upper Limit 95% CI
BAR	0.801	0.000	0.801	-0.769	2.372
CCA	0.000	0.000	0.000	0.000	0.000
CGH	0.000	4.418	-4.418	-9.418	0.581
CYF	1.381	0.000	1.381	-1.326	4.088
DES	1.391	1.357	0.034	-2.166	2.234
DHF	0.000	0.000	0.000	0.000	0.000
DHW	0.000	1.733	-1.733	-5.130	1.664
ECH	0.000	0.000	0.000	0.000	0.000
FLO	1.658	0.000	1.658	-1.592	4.909
FRH	2.584	0.000	2.584	-2.481	7.649
FRM	0.566	0.000	0.566	-0.544	1.676
FVR	1.468	0.000	1.468	-0.193	3.129
GBH	1.605	0.000	1.605	0.416	2.794
GSM	1.926	1.313	0.612	-2.227	3.451
HAH	2.628	1.361	1.268	-3.247	5.782
HIA	1.992	1.749	0.243	-2.757	3.243
HNM	5.174	1.637	3.537	-0.037	7.112
IND	0.000	0.000	0.000	0.000	0.000
LAK	0.000	0.000	0.000	0.000	0.000
LOM	0.000	0.000	0.000	0.000	0.000
LPX	0.000	0.000	0.000	0.000	0.000
MAN	3.390	0.000	3.390	-3.254	10.034
MOD	0.932	0.826	0.107	-1.200	1.414
NFR	0.886	0.000	0.886	-0.850	2.622
NMC	0.000	0.000	0.000	0.000	0.000
NOS	3.962	2.941	1.021	-2.595	4.638
PBG	0.564	0.000	0.564	-0.218	1.346
PGH	0.414	1.119	-0.705	-2.456	1.046
PLA	0.000	10.695	-10.695	-25.518	4.128
PMC	0.000	0.810	-0.810	-2.397	0.777
PPH	0.322	0.000	0.322	-0.124	0.769
PRV	1.018	0.000	1.018	-0.393	2.428
PSH	3.376	4.854	-1.479	-7.273	4.316
SES	0.000	0.000	0.000	0.000	0.000
SFH	0.918	0.897	0.021	-1.432	1.474
SIE	0.000	0.000	0.000	0.000	0.000
SMH	0.291	0.445	-0.154	-1.197	0.889
SRE	1.927	1.767	0.160	-2.402	2.722
SYL	0.000	0.000	0.000	0.000	0.000
TWI	2.445	0.000	2.445	-2.347	7.237
WBO	0.000	0.000	0.000	0.000	0.000
System	**1.101**	**0.739**	**0.361**	**0.021**	**0.701**

Table 12

CLABSI Rates and Webinar Attendance

Category-Poor Attendance:

Pre-CUSP Incidence Rate	1.5437
95% Confidence Interval	1.0173 to 2.2459
Post-CUSP Incidence Rate	1.5206
95% Confidence Interval	0.9743 to 2.2626
Incidence Rate Difference	0.02303
95% Confidence Interval	-0.8194 to 0.86545
P-value	P = 0.9573
Incidence Rate Ratio	1.0151
95% Confidence Interval	0.5639 to 1.8379

Category- Fair Attendance:

Pre-CUSP Incidence Rate	0.4792
95% Confidence Interval	0.2682 to 0.7904
Post-CUSP Incidence Rate	0.1546
95% Confidence Interval	0.0421 to 0.3957
Incidence Rate Difference	0.3247
95% Confidence Interval	0.0245 to 0.6248
P-value	P = 0.0340
Incidence Rate Ratio	3.1005
95% Confidence Interval	0.9877 to 12.8339

Category- Good Attendance:

Pre-CUSP Incidence Rate	1.8961
95% Confidence Interval	1.1883 to 2.8707
Post-CUSP Incidence Rate	0.8903
95% Confidence Interval	0.4269 to 1.6373
Incidence Rate Difference	1.0057
95% Confidence Interval	0.0345 to 1.9769
P-value	P = 0.0424
Incidence Rate Ratio	2.1297
95% Confidence Interval	0.9677 to 5.0377

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Date: May 2014

Vita

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Education

University of Pennsylvania, Wharton School of Business, Philadelphia, PA
Wharton Fellow in Management for Nurse Executives, May 2010

Tulane University, New Orleans, LA
MBA, May 1988

Pennsylvania State University, University Park, PA
BSN, May 1982

Uniontown Hospital School of Nursing, Uniontown, PA
Diploma, Nursing, May 1976

Professional Experience

Tenet Healthcare Corporation, Dallas, TX
Regional Chief Nurse Executive, 2011 – Present

St. Joseph Hospital and Medical Center, Burbank, CA
Chief Nursing Officer, 2009 – 2011

Renown Regional Medical Center, Reno, NV
Chief Nursing Officer, 2007 – 2009

Sunrise Hospital and Medical Center, Las Vegas, NV
Chief Nursing Officer, 2003 – 2007

Memorial Medical Center, New Orleans, LA
Chief Nursing Officer, 2001 – 2003

Life Care Hospital, New Orleans, LA
Chief Nursing Officer, 2000 – 2001

Cardinal Healthcare, McGaw Park, IL
Project Manager/Consultant, 1998 – 2000

Tulane University Hospital and Clinics, New Orleans, LA
Associate Vice President/Director of Nursing, 1993 - 1998

Positions Held in Clinical Nursing and Nursing Management, 1976 - 1993

Professional Certifications

Board Certification as a Nurse Executive (NE-BC), 1991 – Present
Board Certification in Critical Care Nursing (CCRN), 1985 – Present

Professional Affiliations

American Organization of Nurse Executives
American College of Healthcare Executives
American Nurses Association
American Association of Critical Care Nurses

Professional Honors and Achievements

Sigma Theta Tau International Honor Society of Nursing, 2013 - Present
Nevada Nurse Administrator of the Year, 2005
Great 100 Nurses, New Orleans, LA, 1992
Who's Who in the South and Southwest, 1988 – Present
Outstanding Young Men of America, 1985
Who's Who in American Nursing, 1984 – Present
BSN with Distinction, 1982