

Omiwade, Oluwatoke., Efficacy of Alcohol-Impregnated Port Protectors on Central Line-Associated Blood Stream Infections in Intensive Care Units. Master of Science (Clinical Research Management), May, 2014, 52pp, 8 tables and 23 references. This research project focused on assessing the effectiveness of alcohol-impregnated port protectors (A-IPP) in reducing infection rate among the patients having central venous catheters in selected intensive care units. Infection rate data was obtained from the department of Infection Control at Baylor All Saints Hospital at Fort Worth. A comparison was made between the infection rates before and after the use of A-IPP. Overall, the risk of infection is extremely low (<1%). The newly implemented alcohol impregnated protectors do not significantly affect observed infection rates in the units investigated.

EFFICACY OF ALCOHOL-IMPREGNATED PORT PROTECTORS  
ON CENTRAL LINE- ASSOCIATED BLOODSTREAM INFECTIONS  
IN INTENSIVE CARE UNITS

Oluwatoke Omiwade, B.S, MPH

APPROVED

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Major Professor

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Committee Member

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Committee Member

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Committee Member

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Chair, Department of Biomedical Sciences

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Dean, Graduate School of Biomedical Sciences

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DISSERTATION

Presented to the Graduate Council of the University of North Texas Health Science Center at  
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Oluwatoke Omiwade, B.S, MPH

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## **INTRODUCTION**

The purpose of this project was to examine whether central line-associated bloodstream infections (CLABSIs) was reduced with the use of alcohol-impregnated port protectors (A-IPP). The current recommendation for disinfecting hubs includes the use of 70% isopropyl alcohol, chlorhexidine, or a combination of the two (4). CLABSIs during the intervention period with A-IPP were compared to CLABSIs in those units prior to the use of the A-IPP. The results of this study also compared whether there is a difference in bloodstream infection rates between two critical care units: a cardiovascular intensive care unit (CVICU) and a medical/surgical ICU. The nursing staff continued to adhere to current facility policies regarding central line management and care, and to follow current Centers for Disease Control and Prevention (CDC) guidelines, in addition to implementing the A-IPP, which contain disinfectants listed in the guideline.

## **BACKGROUND AND LITERATURE REVIEW**

It has been estimated that 250,000 episodes of central venous catheter-related infection occur annually in U.S. hospitals (12). This practicum project examined whether the use of A-IPP was associated with a reduction in central line-associated bloodstream infections.

Central line-associated bloodstream infections (CLABSIs) significantly contribute to morbidity and mortality among hospitalized patients. Central line days are obtained by counting the number of patients with central lines as near to the same time everyday as possible. At the end of the month, the number of central line days are summed (3). There are an estimated 12 million central line days in the United States each year, with an annual occurrence of 41,000 or 0.34% CLABSIs hospital wide (13). Despite this relatively low infection rates per total central line usage the infection rates for the ICU are much higher. In 2009, CLABSIs accounted for 23,000 infections in inpatient units and 18,000 infections in patients in ICUs (4). Studies have shown that the mortality from CLABSIs ranged from 12% to 25% among critically ill patients (4). In addition, CLABSIs are associated with increased length of hospital stay and costs as high as \$29,000 per episode (11). The additional cost spent on treating one infection in hospitals could be avoided if hospitals were to effectively implement measures to prevent CLABSIs and, more importantly, would reduce the pain experienced by the patients because of the infections.



## **Risk Factor for Bloodstream Infections.**

### **Hospital Environment and Hand Hygiene practices:**

Research has shown that organisms from the hospital environment can contribute to an increased risk of bloodstream infections (21). Coagulate-negative staphylococci are more likely to be isolated from cultures of blood specimens from patients in intensive care units (21). Poor hand hygiene practices may also play a role in the increase of nosocomial infections (14). Effective hand washing requires a time commitment; nurses who are too busy providing care for their patients, while working overtime, may not be able to adhere to hand-hygiene recommendations and other infection-control procedures during such demanding workloads and hours.

### **Needleless Connectors:**

There is evidence that the widely used commercial needleless valve connectors are vulnerable to nosocomial contamination, leading to an increased incidence of nosocomial bloodstream infections in many U.S. hospitals (12). The findings from one study showed that conventional disinfection with 70 % alcohol does not reliably prevent entry of organisms when the membranous septum of a needleless connector is heavily contaminated. In contrast, the antiseptic barrier cap provides a high level of protection, even in the presence of very heavy contamination (12).

## **Use of Catheters**

A central venous catheter is a vascular access device inserted into a centrally located vein with the tip residing in the vena cava. The catheter permits intermittent or continuous infusion and/or access into the venous system (1). CVCs have been shown to be a major risk factor for health-care associated bloodstream infection (HA- BSIs) (8). Improper CVC hub care can lead to CLABSIs as well as to contaminated blood cultures (CBCs). Frequent handling of and access through catheter hubs, needleless connectors and injection ports put patients at risk of acquiring a CVC-associated primary BSI (12). Most hospitals in the United States disinfect the catheter hubs, needleless connectors and injection ports by swabbing the membranous septum with 70% isopropyl alcohol (16). A study by Sweet et al (19) switched the traditional catheter-hub care using alcohol wipes to care using 70% isopropyl A-IPP (Curo; Ivera Medical, San Diego CA) and needleless pressure connectors. The results of this study showed a statistically significant reduction in CLABSIs and CBCs (19). To reduce CVC- associated BSIs and CBCs, the current guideline for preventing CLABSIs are well-documented in the hospital policy obtained from the literature, was followed (13). In addition to these guidelines, the A-IPP, CUROS were used to reduce CLABSIs.

Other independent risk factors for CLABSI include: prolonged hospitalization before catheterization, prolonged duration of catheterization, internal jugular catheterization, neutropenia, total parenteral nutrition and substandard care of catheterization or reduced nurse-to-patient ratio (22).

## **SPECIFIC AIMS**

The aim of this quality improvement project was to continue to provide the current, evidence-based standard of care to patients in the ICU who have a central line, while providing additional protection from infection with the application of A-IPP for the exposed catheter hub.

1. Obtain bloodstream infection rate data for all patients with central lines in two intensive critical care units -- medical/surgical ICU and CVICU before and after the implementation of the A-IPP
2. Categorize the essential data on these patients from their medical records, which include age, sex, length of stay(LOS), All Patient refined diagnosis- related- group (APRDRG), a system used to classify hospital cases, body mass index (neutropenia), and others.
3. Compare the rate or incidence of CLABSI before and after the use of the A-IPP

## **SIGNIFICANCE**

ICUs account for a relatively small proportion of all hospitalized patients, but infections acquired in these units account for greater than 20% of all Hospital Acquired Infections (HAIs) (18).

Prevention strategies are needed to reduce the colonization of microbes at the insertion site and catheter hub used in intensive care units. Microbes that colonize the central venous catheter (CVC) hub and the skin surrounding the insertion site are a source of many catheter-related bloodstream infections (CRBSIs) (17). Reducing this microbial population would help protect patients from HAIs and reduce additional cost spent on these infections.

## **METHODS**

**Settings and Subjects:** A prospective and retrospective chart review of 1,000 patient records was performed at Baylor All Saints Medical Center, a 474-bed acute-care hospital. Charts obtained from the Med/Surg ICU and CVICU were evaluated. This study included all patients in two adult critical care units with a central line between January 2013 – October 2013. Seven hundred eighty-seven patient admissions were accounted for in the final analysis. Any patient without a central line was excluded from the study, such as patients with peripheral lines and midline catheters.

The Central Line Bloodstream Infections (CLABSIs) was evaluated before and after the use of the A-IPP. The intervention period was July 21, 2013 to October 21, 2013. The retrospective comparison period was from January 2013 to June 2013, before the implementation of the A-IPP

The central venous lines were cared for and managed by registered nurses using evidence-based standard practices. A central venous line management and care policy is currently in place at the hospital (2,7,9,15). In addition to following the standardized procedures, the nurses used the Ivera Medical Cooperation CuroS A-IPP. Day and night shift nurses were trained on how to use the A-IPP. Also, notices were placed in the intensive care unit on the utilization of the caps, with signs such as “Green Means Clean” posted in the units, to educate the nurses. The A-IPPs were visible and easy to use. The seal of the cap is peeled off and the CuroS A-IPP is twisted over the top of a luer-activated IV access port. The cap contains 70% isopropyl alcohol (IPA) saturated

sponge-like foam. Once secured, the Curoc A-IPP provides consistent and passive disinfection of the port.

Baseline information was obtained in order to ensure groups being compared were similar.

Patient demographics obtained included: age, sex, BMI, underlying disease, severity of illness score, risk of mortality score, whether or not the patient had a central line, LOS, type of catheterization (location and type), and number of CVC device days and neutropenia (white blood cell count). Patients were identified as neutropenic, if their absolute neutrophil count (ANC) was below 500 cells per mm<sup>3</sup> while a central line was in place.

These risk factors were considered because the risk factors for BSIs vary with underlying disease and include age greater than 65, pre-existing comorbid illness (or illness severity), immunosuppression, being admitted to an ICU, a surgical operation, a complicated surgery, receiving antimicrobial therapy, a decreased nurse/patient ratio, and male gender (23). Therefore, patients presenting these risk factors are more likely to have a bloodstream infection.

**Catheter types Used in the study include:**

1. **Nontunneled Central Venous Catheter (CVC):** It is inserted through the skin into the central vein (subclavian, internal jugular, or femoral). It accounts for majority of CRBSI (13).
2. **Tunneled central venous catheters (Permcath):** This is implanted into the subclavian, internal jugular or femoral veins. It has lower rate of infection than the nontunneled CVC (13).
3. **Peripherally inserted central venous catheters (PICC):** This type of catheter is inserted into basilic, cephalic or brachial veins in the arm and enters the superior vena cava. It has a lower rate of infection than nontunneled CVCs (13).
4. **Totally implantable (Port):** Subcutaneous port accessed with a needle, it is implanted in the subclavian or internal jugular vein. It has the lowest risk of infection for CRBSI (13).
5. **Pulmonary artery catheters (PA catheter):** It is inserted through a Teflon introducer (a type of solid material used in surgery) into the central vein (subclavian, internal jugular or femoral). It has a similar rate of infection as CVCs; the subclavian site is the preferred site to reduce infection risk (13).
6. **Multiple catheters:** For this study, this is defined as more than one central line was in place during the patient's visit.

## **National Healthcare Safety Network Surveillance and Definitions**

Active surveillance for CLABSIs was conducted by the infection control preventionist at the study hospital. CRBSIs are currently defined using Centers for Disease Control and Prevention (CDC) and National Healthcare Safety Network (NHSN) system. The BSI rate in patients with central lines is calculated using the following formula:

$(\text{Number of BSIs in patients with central lines} / \text{Number of central lines}) \times 1,000.$

For example, if an ICU has 2 infections in a month and 237 line days in that same month, the infection rate will be  $2/237 \times 1,000 = 8.44$  infections per 1,000 line days. The rates or incidences of BSIs or CLABSIs will be compared before and after the implementation of the A-IPP

The purpose of using the CDC/NHSN infection criteria is to identify and consistently categorize infections that are healthcare-associated into major and specific infection sites or types (3).

Using CDC/ NHSN definitions, a CLABSI is a laboratory-confirmed bloodstream infection (LCBI) in which a central line (CL) or umbilical catheter (UC) is in place for greater than 2 calendar days. The day of device placement is considered to be day 1 (3). For instance, an LCBI criterion includes: 1) patient with a recognized pathogen cultured from one or more blood cultures; 2) the organism cultured from the blood is not related to an infection at another site.

The elements for these LCBI criteria must be found present together (3).

### **Central line Days**

To calculate the central line days, the number of patients with central lines is counted as near to the same time everyday as possible (suggested between 12am and 3am). At the end of the month, the numbers of days were summed. Central lines do not include peripheral IVs, arterial lines, or midline catheters. A line day is counted for each month a patient has at least one central line. Only one line day is calculated per patient day, even if the patient had multiple central lines in place on the same day.

### **STATISTICAL ANALYSIS**

Categorical variables were compared using the Chi-square test. Comparisons between the means of two groups for continuous variables such as length of stay and BMI, age before the intervention period and after the intervention period were performed using an independent sample t test to compare means. Multiple logistic regression analysis was used to identify whether an association between the use of the A-IPP and infection risk was present using SPSS. All tests were 2-tailed. A *P* value < 0.05 was considered statistically significant.



## RESULTS

### Demographic characteristics

A retrospective and prospective review of patient charts was performed. Of the 787 patients with a central line, five of these patients developed a CLABSI that met NHSN surveillance criteria.

There were 538 patients (retrospective data) who did not use the A-IPP compared to 249 patients (prospective data) in the intervention period. 0.7% or 4 infections occurred before the implementation period compared to one infection or 0.4% during the intervention. Mean patient ages were 60.34 (range, 19-97 years) and 58.94 (range, 23-95 years), before and after the use of A-IPP respectively (see table 1). A summary of the patient demographics is shown in Table 2 which categorizes age, gender and BMI before and after A-IPP use.

**Table 1:** Descriptive statistics on age, length of stay (LOS) and body mass index (BMI) before and after A-IPP use

	Used A-IPP	Total	Mean	Standard deviation	Min - Max	P value
<b>Age (years)</b>	No	538	60.34	15.267	19-97	*0.228
	Yes	249	58.94	15.166	23-95	
<b>LOS (days)</b>	No	534	13.69	11.029	1-67	*0.206
	Yes	245	12.64	10.085	1-59	
<b>BMI</b>	No	536	28.86	8.78	13.9 -81.6	*0.133
	Yes	249	29.24	9.86	13.6 -71.6	

\*All p- values statistically non-significant.

As there were no significant differences between the two groups in age, LOS and BMI we concluded that the patient groups were similar.

**Table 2:** Comparison of age, sex, BMI before and after A-IPP use

	Pre-Intervention % (n)	Intervention % (n)
<b>Gender</b>		
Male	54.3 (292)	47.8 (119)
Female	45.7 (246)	51.8 (129)
Missing Data	0	0.4 (1)
<b>Age (years)</b>		
≤ 65	61.7 (332)	66.7 (166)
≥ 65	38.3 (206)	33.3 ( 83)
<b>BMI</b>		
Underweight ( 18.5 )	4.5 (24)	6.0 (15)
Normal ( 18.5 – 24.9)	31.8 ( 171)	33.3 (83)
Overweight ( 25-29.9)	28.8 (155)	24.9 (62)
Obese ( ≥ 30)	34.6 (186)	35.7 (89)
Missing	0.3 (2)	0

#### **Association between infection risk and BMI, age and gender**

Results from other studies have shown that being age 65 and above and male gender increases the likelihood for an infection (23). A chi-square test was performed to determine if age, BMI and gender were major predictors for infection. The current study did not show an age related difference in infection risk ( $p = 0.605$ ). Neither was a statistical significant association observed between male gender and infection risk ( $p = 0.939$ ). The finding of this study also show that BMI is not a strong predictor for infection risk ( $p = 0.323$ ).

The most common location for the central line in the current study is the arm (42.6% and 35.3%) pre and post intervention of the A-IPP respectively. However, a statistically significant association between central line location and infection risk was not found in this study ( $p=0.169$ ).

**Table 3:** Comparison of central line location before and after A-IPP use.

	Pre-intervention % (n)	Intervention % (n)
<b>Central line location</b>		
Arm	42.6 (229)	35.3 (88)
Internal Jugular vein	25.3 (136)	26.5 (66)
Multiple	7.6 (41)	20.9 (52)
Femoral vein	7.2 (39)	4.4 (11)
Subclavian	12.5 (67)	6.0 (15)
Chest	1.9 (10)	6.8 (17)
Missing Data	2.9 (16)	0 (0)
Total	100 (538)	100 (249)

### Severity of illness

The severity of illness and risk of mortality, another predictor for infection risk were studied (23). Patients were classified using the All Patient Refined Diagnostic Related Groups (APR-DRG), a coding system done by the hospital. The categories of severity of illness include: 1- minor; 2-moderate; 3- major and 4- extreme. The majority of diagnostic outcomes are shown in Table 5. These diagnostic categories were examined before and after the intervention period and were of similar frequencies in both comparison groups.

**Table 4:** Comparison of severity of illness categories before and after A-IPP use

Severity of illness	Pre- intervention % (n)	Intervention % (n)
Minor	2.2 (12)	0.4 (1)
Moderate	8.7 (47)	11.2 (28)
Major	30.5 (164)	33.3 (83)
Extreme	57.2 (308)	53.0 (132)
Missing Data	1.4 (7)	2.1 (5)
Total	100 (538)	100 (249)

**Association between infection risk and severity of illness and neutropenia**

Using a Chi- square test to determine the association between the severity of illness and infection risk. The results of this study did not find a statistically significant association between the severity of illness and risk of infection ( $p = 0.410$ ). In addition, patients were identified as neutropenic if their absolute neutrophil count (ANC) was below 500 cells per  $\text{mm}^3$  while a central line was in place. Neutropenia is not associated with infection risk ( $p = 0.717$ ) for this study.

### Diagnostic categories

The majority of diagnostic outcomes for the patients who had a central line at Baylor All Saints were septic illness and cardiovascular disease, see Table 5.

**Table 5:** Comparison of diagnostic categories before and after A-IPP use

Illness	Pre-intervention % (n)	Intervention % (n)
Septic	34.6 (186)	30.1 (75)
Cardiovascular	13.4 (72)	15.3 (38)
Renal	7.8 (42)	8.8 (22)
Gastrointestinal	7.4 (40)	8.8 (22)
Hepatic	5.0 (27)	6.8 (17)
Respiratory	7.4 (40)	6.4 (16)
Malignancy	9.7 (52)	5.2 (13)
Nervous system disorder	2.4 (13)	3.2 (8)
Endocrine disorder	4.6 (25)	3.2 (8)
Other	4.8 (26)	6.0 (15)
Missing information	2.9 (15)	6.2(15)
Total	100 (538)	100 (249)

### **A-IPP and Infection rate data**

An independent sample t-test was used to compare means of the monthly infection rates.

The mean monthly infection rates were 1.59 and 1.32 per 1,000 line days before and after the use of the A-IPP, respectively.

As shown in Table 4, while a reduction in the mean monthly infection rate was observed in the ICU, This reduction is not statistically significant ( $p=0.266$ ).

Similarly, the mean monthly infection rate in the CVICU before and after the use of the A-IPP was 1.23 and 0 per 1,000 line days respectively. However, the reduction in infection rate in the CVICU was found to be non-statistically significant ( $p=0.081$ ).

**Table 6:** Mean Monthly infection rate in the units between January to October 2013

Unit	A-IPP use	Mean Monthly infection rate per 1,000 line days	Standard deviation	P value
ICU	Before	1.59	2.68	*0.266
	After	1.32	1.53	
CVICU	Before	1.23	3.00	*0.081
	After	0	0	

\*All p- values statistically non-significant.

### Central line type and Infection Risk.

A majority of patients admitted into the CVICU and ICU had a PICC and CVC in place (Table 7).

**Table 7:** A comparison between central line type before and after A-IPP use

Central line type	Pre-intervention % (n)	Intervention % (n)
PICC	43.5 (234)	35.3 (88)
CVC	35.3 (190)	40.6 (101)
Multiple	13 (70)	17.3 (43)
Port	6.1(33)	6.8 (17)
Missing Data	2.1 (11)	0 (0)
Total	100 (538)	100 (249)

PICC- peripherally inserted central venous catheter, CVC- Central venous catheter, multiple catheters, Port -Implanted port.

Of the patients with the central line in place, 2.7% of the infections that occurred resulted from patients with multiple central lines in place during their hospital stay (Table 8). A statistically significant association between infection risk and type of central line used was found. ( $p = 0.046$ ).

**Table 8:** Association between infection risk and central line type

Central line type	No Infection n (%)	Infection n (%)	Total
CVC	290 (99.7)	1 (0.3)	291
PICC	322 (100)	0 (0)	322
Port	49 (98)	1 (2)	50
Permcath	2 (100)	0	2
PA catheter	9 (100)	0	9
Multiple	110 (97.3)	3 (2.7)	113
Total	782 (99.4)	5 (0.6)	787

CVC- central venous catheter, PICC- peripherally inserted central venous catheter,  
Port- Implanted Port, PA – pulmonary artery catheter and multiple Catheters

Multiple logistic regression analysis was used to detect if there was a significant relationship between the use of the A-IPP and infection risk. After adjusting for central line type, and other risk factors mentioned, the results from our study shows that there is no significant difference in the risk of infection following A-IPP use. ( $p = 0.450$ ).

## DISCUSSION

The primary goal of this project was to investigate whether there was a decrease in infection rate following the use of A-IPP for all patients with a central line admitted into selected units during a 3 month time frame. The CVICU and ICU are units in which patients with high severity of illness are admitted. For this study, majority of the patients were found to have septic illness,



cardiovascular and renal disorders in both comparison groups (pre-implementation and implementation).

The use of A-IPP was not statistically associated with the reduction of CLABSI (p =0.450). Perhaps, the initial low infection rate before the use of the A-IPP did not allow for a true effect to be observed. For instance, during the 6-month pre-intervention, the mean monthly infection rate was 1.59 per 1,000 line days compared to 1.32 per 1,000 line days in the 3 month intervention period.

Although large sample size (n =787) was used, the risk of infections before and after the implementation of the A-IPP was less than 1 % i.e., 0.7% and 0.4 % of infections occurred before and after the use of the A-IPP, respectively.

The current study has observed a statistically significant association between central line type and risk of infection (p =0.046). Perhaps, focus should be spent on ensuring proper standard of care to all catheters used in the ICU and CVICU. This study shows that age, sex, BMI, LOS, neutropenia, Severity of illness, and the location of the central line were not associated with an increase in infection risk. Strengths identifiable from this study are the compatibility of the pre-intervention period to the intervention period, in terms of demographic characteristics.

Since comparison months were not similar, that is, 6 months prior to A-IPP use compared to three months after intervention period, this may have affected the findings of our study, leading to a non-statistical association between major risk factors studied and infection risk.

Recommendations for future studies is a longer time frame, possibly, a year after the pre-implementation period to capture an effect of the A-IPP, if any, and the use of multiple hospitals with various units.

## **DESCRIPTION OF INTERNSHIP SITE**

Baylor Research institute (BRI) is a research center with the goal of finding and preventing therapies and treatment for diseases and illnesses. Research at BRI is centered towards patients. BRI has a network of physicians, research investigators knowledgeable about drug, device and vaccine studies. BRI offers patients the opportunity to participate in various clinical trials.

## **INTERNSHIP EXPERIENCE:**

- Participation in site initiation and site closures for clinical trials.
- Attend grand rounds to gain more understanding of various health and research topics.
- Attend research nurse meetings for innovative research.
- Observe monitor visits and recommendations given by the monitor for study revision.
- Meeting with institutional review board and gain an understanding of the IRB process.
- Collaboration with research coordinators to understand the day-to-day activities of clinical trials.
- Obtain data for internship project with the infection control preventionists.
- Attend infection control meetings relevant to the intervention study.

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## **Appendix**

### **DAILY JOURNAL**

#### **Monday, 3 June 2013**

- Signed the confidentiality agreement form
- Took the following online training courses:
  - CITI Health Information Privacy and Security (HIPS) for Clinicians
  - GCP Course for Clinical Trials Involving Investigational Drugs
  - GCP Course for Clinical Trials Involving Investigational Medical Devices

#### **Tuesday, 4 June 2013**

- Observed Cathy, research coordinator conduct interviews on 5 patients
- Case Report form tutorial by Cathy
- Began brainstorming ideas for project – Diabetes and women's health research
- Protocol for diabetes sent to me via – email – read the protocol.

#### **Wednesday, 5 June 2013**

- Clinic with Theresa and went over the study on Endometriosis – A randomized, Double blind, placebo – controlled study.
- Observed Theresa consent a patient, perform an EKG and also provide a questionnaire on prior health history.
- Went with Trista to the Diabetes and Thyroid center clinic.

- Trista followed up with a Type II Diabetic patient, received study diaries from the patient.
- Observed Trista Obtain investigational product (Insulin pens) from the patient and ensured that they were accounted for
- Met with Dr. Tan to review project idea

#### **Thursday, 6 June 2013**

- Read articles on social values and research
- Researched online American Diabetes Association for potential research questions.

#### **Friday, 7 June 2013**

- Met up with Dr. Aryal from school of public health to discuss possible data analysis
- Reviewed literature on nosocomial infections

#### **Monday, 10 June 2013**

- Met with the nurses from transplant to discuss potential nosocomial infection project
- E-mailed Director of quality control about potential of using retrospective data for research
- Read Epidural study protocol for potential research topic
- Meeting with committee members: Theresa Chena, RN added to committee
- Consensus from committee meeting: nosocomial infections research topic.



**Tuesday, 11 June 2013**

- set up a meeting with Stephanie Kreiling, the manager of infection control and prevention
- Began literature review on nosocomial infections. I read articles, to get me started on my background and literature review.

**Wednesday, 12 June 2013**

- Research nurse meeting: new knowledge and innovation research – Several research topics that were mentioned include: incidence of trafficking victims in the Emergency rooms, difference between researches, evidence based practice and quality improvement, investigation of infection rates in post transplant unit, patient compliance to medications.
- Continued to review literature for my project. Looking at articles related to nosocomial infections. I looked at retrospectives studies and chart reviews for intensive care units.
- Meeting with Stephanie Kreiling, the manager of Infection control: showed me databases used for infection control data.

**Thursday, 13 June 2013**

- Read the literature nosocomial infections- Specifically blood stream infections
- Read about the alcohol impregnated port protectors (curos product)that would be possibly used for the research project

**Friday, 14 June 2013**

- Clinic visit with research nurse, Jessica.
- Observed Jessica follow up with patient for a research study
- Meeting with Stephanie- involved explanation on how infection rate is calculated in the ICU.

**Monday, 17 June 2013**

- Reviewed the literature on Blood stream infections
- Met with Dr. Aryal to go over statistics for my project involving the use of port protectors.
- Read the transmittal form for port protectors
- Read about the central venous line management and care.
- Looked at the forms for central line collection.
- Read the APIC- BRSI elimination guide

**Tuesday, 18 June 2013**

- Site initiation visit for an Interstitial Cystitis study. The study protocol was explained to the study coordinators, the PI and sub PI
- Visit to insight diagnostics, where patients would get their diagnostic work done for 4 – week double blind, placebo controlled randomized multicenter study.

- The sponsor representatives went over the objectives of the study, inclusion and exclusion criteria, adverse event reporting, regulatory binder, designation of authority log, Statement of agreement, side effects from the drug, as well as product accountability.

### **Wednesday, 19 June 2013**

- Meeting with Stephanie Kreiling.
- I was Introduced to April, nurse manager for the ICU. Projected date of Cap implementation: July 21, 2013.
- Meeting with a TCU student who would be working on educating the nurses about the use of the port protectors

### **Thursday, 20 June 2013**

- Read the article “Reduction in Central line- associated bloodstream infection by implementation of a post insertion bundle.
- Familiarized myself with the Baylor All saints policy for IV therapy

### **Friday, 21 June 2013**

- Began Proposal writing – Worked on the summary and hypothesis portion of the proposal project
- Went to the transplant clinic nurse – Erin Fassett to observe how the needless connectors are used

**Saturday, 22 June 2013**

- Volunteered for 4 hrs at the Women's Health Fair at Baylor All Saints Hospital.
- Explained clinical research trials at Baylor to patients. Provided information (pamphlets and flyers) about the ongoing research– which include oncology, women's health and diabetes research.

**Monday, 24 June 2013**

- Proposal writing and research – Did a thorough literature review.
- Reviewed the policy on bloodstream infections at Baylor All Saints hospital
- Read the 2007 guidelines for isolation precautions: preventing transmission of infectious agents in health care hospitals.
- Read the article on the impact of alcohol impregnated port protectors from American Journal of infection control
- Obtained access to Baylor Learning Network (Took a class on IRB approval)

**Tuesday, 25 June 2013**

- Went to Baylor Dallas, where I had a class on Essential document: Drug and Device and PI- initiated trials.
- Met with Todd Almarez and other interns for the clinical research management project.

- Learned about important source documents for research: regulatory binder, informed consent, financial disclosure, delegation of authority, the roles of the sponsors, investigators and the monitor and other researchers in a clinical trial.

### **Wednesday 25 June 2013**

- Began reading on Catheter hub care and guidelines
- Worked on the Method section of the proposal, detailing how the Curoc product works (based on current literature and how data would be collected)

### **Thursday, 26 June 2013**

- Continued to work on first draft for proposal
- Read the following articles: Successful disinfection of needless access ports

### **Friday, 26 June 2013**

- Obtained resource from Stephanie regarding surveillance definitions and specifications
- Read the 2013 NHSN modules for CLASBI from CDC – Modules contained: surveillance definitions for identifying and reporting central line associated bloodstream infections.

### **Monday, 1 July 2013**

- Continued to work on draft for proposal
- Compiled bibliography for proposal.

**Tuesday, 2 July 2013**

- Read literature on microorganisms as risk factors for Hospital acquired infections
- Finished first draft for proposal and submitted to committee members

**Wednesday, 3 July 2013**

- Met with Patricia Crummel with Infection control
- Discussed with me about Curot study and scrub the hub procedures
- Ms. Crummel explained to me in detail job responsibilities of an infection control preventionist.

**Thursday, 4 July 2013****Independence Day****Friday, 5 July 2013**

- Met with Stephanie to discuss data necessary for Curot project.
- Took the Baylor Learning network courses.
- Received comments from First draft of proposal from Dr. Shi and Dr. Raven

**Monday, 8 July 2013**

- Finished up the Baylor Learning network courses
- Made corrections to Draft of proposal from Dr. Shi and Dr. Raven

**Tuesday, 9 July 2013**

- Accompanied Deborah to the Fort worth Heart Institute to obtain Doctor Signatures for her study
- Continued to work on IRB submission for proposal

**Wednesday, 10 July 2013**

- Clinic with Cathy
- Observed Cathy enroll patients into the endometrial study
- Sanitary towels and other study tools were provided to the patient for follow up.

**Thursday, 11 July 2013**

- Attended Baylor Dallas IRB blue board meeting
- Learned how studies are approved during the IRB meeting

**Friday, 12 July 2013**

- Clinic with Cathy – observed Cathy enroll patient into the endometrial study – lengthy informed consent, but the patient was eager to participate
- Patient qualified for the research study
- Assisted Cathy with providing patient with products needed for the study ( sanitary pads, tampons, etc)

**Monday, 15 July 2013**

- Read Central line monitoring tool: showing criteria for classifying bloodstream infection
- Met with Dr. Aryal regarding sample size and statistics to use for project

**Tuesday, 16 July 2013**

- Continued working on proposal corrections
- Continued working on IRB submission to Baylor

**Wednesday, 17 July 2013**

- Met with Stephanie, obtained estimates for number of patients needed for the CUROS study
- ICU staff meeting – met with curos representatives
- Introduced myself to nursing staff about curos project – had meeting with both day and night shift nurses.
- Nurses educated about port protectors and how to use the product – Nurses are enthusiastic about this new addition to preventing Central line associated bloodstream infections
- Obtained relevant resources for curos project from company representatives and samples of port protectors – green and bright and easy to use.



**Thursday, 18 July 2013**

- Critical care quality meeting with Stephanie- Environmental services described how cleaning is done in the units.
- Observed reporting of infection rate data

**Friday, 19 July 2013**

- Began working on IRB submission for Baylor All Saints Fort worth
- Contacted IRB specialist for the checklist for IRB submission

**Monday, 22 July 2013**

- Received Revisions from proposal from Dr. Gwartz
- Made corrections to proposal

**Tuesday, 23 July 2013**

- Cathy showed me the process for submitting informed consents to the IRB
- Learned how to change informed consent format from pharmaceutical companies to Baylor All Saints Informed consent

**Wednesday, 24 July 2013**

- Read the pattern action plan for blood isolates sent to me from Stephanie
- looked at Blood root cause form sent from Stephanie
- looked at Central line monitoring tool: showing criteria for classifying bloodstream infection

**Thursday, 25 July 2013**

- Followed Trista to the endocrinology clinic
- Collected patient diary for the diabetic study
- Observed Trista obtain blood samples for the study – Trista centrifuged the blood and prepared to transport samples to where they would be analyzed

**Friday, 26 July 2013**

- Worked on IRB submissions for Baylor
- Made corrections to proposal
- Attended town hall meeting with the president of Baylor All saints – A highlighted issue in the town hall meeting was the infection rate in the hospital, and the goal is to reduce infection rates to zero.

**Monday, 29 July 2013**

- Dr. Gwartz made final edits to proposal
- I made final edits to proposal and sent to Theresa for corrections

**Tuesday, 30 July 2013**

- Curo Caps Roll out in the ICU
- Met with Sales representative at Curo to discuss compliance tools for the Curo caps
- Stephanie and I made rounds in the CVICU to ensure proper compliance of caps in units.

**Wednesday, 31 July 2013**

- Cathy explained how to view two groups of charts on the epidural study  
Using patient registration, tracking number, subject ID on chart

**Thursday, 1 August 2013**

- Worked on UNTHSC IRB application form
- Worked on UNTHSC IRB submission protocol
- Submitted protocol to the office of research compliance at UNTHSC

**Friday, 2 August 2013**

- Sent request for statement of authorization to Stephanie Kreiling to view Baylor's medical record
- UNT CITI basic training course taken for IRB submission

**Monday, 5 August 2013**

- Obtained authorization request to review all associated records and data related to curos research at Baylor All Saints Medical Center from the director of critical services
- Authorization request sent to UNTHSC IRB
- Proposal submitted to GSBS and approved by all committee members.

**Tuesday, 6 August 2013**

- American Heart Association Campaign Kickoff - dunk booth with the president and other employees at Baylor All Saints
- Baylor IRB sent protocol to me, to make corrections.

**Wednesday, 7 August 2013**

- Meeting with Infection Control team at Baylor University Medical Center at Dallas.
- Products review at the meeting, update on curos port protectors – implemented on other Baylor campuses

**Thursday, 8 August 2013**

- Environmental services meeting to discuss blood spills and microorganism cleaning
- Discussed cleaning of C.diff rooms with bleach, controlling airborne contaminants and blood borne pathogen control plan
- Stephanie E-mailed me CHG bath poster, used to clean all ICU patients at BASMC before Curos Cap were in use.

**Friday, 9 August 2013**

- Worked on IRB corrections for Baylor IRB

**Monday, 12 August 2013**

- Cathy showed me how to merge informed consents from the sponsor of an ablation study with that of the BASMC
- Proof read the consent for Cathy

**Tuesday, 13 August 2013**

- Med mined access for thesis project approved
- Obtained suggestion for correction from Office of Research Compliance at UNTHSC for IRB submission

**Wednesday, 13 August 2013**

- Made corrections for UNTHSC IRB submission
- Obtained Signatures from Major Professor, Dr. Shi
- Submitted corrected IRB forms to UNTHSC

**Thursday, 14 August 2013**

- Obtained signatures for declaration to graduate from school advisors
- Continued to work on IRB corrections for Baylor All Saints Medical Center

**Friday, 15 August 2013**

- Worked on other supplemental documents and protocol for Baylor IRB
- Worked on data analysis sheet template to be used for IRB submission containing study variables

**Monday, 19 August 2013**

- IRB approval obtained from UNTHSC
- Obtained signatures from Dr. Alan Johns for Baylor IRB protocol
- Helped Theresa unpack and organize study items that were shipped for the endometrial study

**Tuesday, 20 August 2013**

- Celebration lunch for Cathy Completing study trial for epidural study
- Worked on Financial form and conflict of interest form for IRB submission

**Wednesday, 21 August 2013**

- Revisions for IRB submission sent to Baylor

**Thursday, 22 August 2013**

- Patient Visit 3 with Trista at the endocrinology clinic
- Trista obtained blood draws, vitals, diary from patient
- Questionnaire filled out with patient
- Helped Trista Organize study drug at the clinic

**Friday, 23 August 2013**

- Worked Financial paper work for IRB and conflict of interest form

**Monday, 26 August 2013**

- IRB pending financial paper work sent to Heather Whitacre

**Tuesday, 27 August 2013**

- IRB approval at Baylor
- Unable to begin chart reviews no access into Eclypsis
- Helped around the office to organize study folders and dispose of used shipping boxes.

**Wednesday, 28 August 2013**

- Helped Theresa organize study folders for source documents.
- Patti ( infection preventionist) showed me how she does surveillance using Med Mined
- 

**Friday, August 29 2013**

- Stephanie gave me access to a year's worth of data (paper forms) of patients with central lines that came into the clinic

**Monday, September 2 2013 – Tuesday, September 10, 2013**

No work Labor Day weekend, took permission from Claudia Mattil supervisor to study for scheduled MCAT exam.

**Wednesday, September 11 2013**

- Took scheduled MCAT exam

**Thursday, 12 September 2013**

- Still no access to eclipses to begin data collection
- Made copies of this data collection form received from Stephanie and began organizing folder
- Helped Theresa with protocol board for studies – showing study name, study number and research coordinator for each trial

**Friday, September 13 2013**

- Met with Stephanie Kreiling to begin chart reviews
- Learned how to look up patients, central lines, catheter use and other patient demographics

**Monday, September 16 2013**

- Helped Cathy with Uterine Cavity ablation project by editing form

**Tuesday, September 17 2013**

- Went to Baylor Dallas – meeting with Todd Almarez for continuing nursing education
- Topic involved drugs and biologics and phases of clinical trials

**Wednesday, September 18 2013**

- Contact with IT at Baylor unable to obtain access into Eclypsis to begin data collection for Thesis.
- Obtained certificate of completion for Continuing nurse education



**Thursday, September 19 2013**

- Obtained access to Eclipses
- Conference with Stephanie to learn to use charts on Eclipsis
- Slow process but a learning process, as 1000 patients charts are to be reviewed
- Individually accessed patient charts for study variables

**Friday, September 20 2013**

- Met with Stephanie Kreiling to learn how to identify neutropenia patients on charts
- Learned how to find patient diagnosis and labs on charts

**Monday, September 23 2013**

- Theresa gave me an informed consent to work, edited the consent for AEGEA Inc, for an ablation study and changed to Baylor format IRB consent

**Tuesday, September 24, 2013**

- Continued to work on Consent form for AEGEA Inc.
- Met with Patti Crummel and Mac Jones, Vice president for CUROS
- Gave the representatives updates on curos projects.
- Obtained resources regarding curos project
- Room reserved for Thesis presentation

**Wednesday, September 25 2013**

- Made labels for different studies to be placed in study rooms
- Continued chart review for the month of July 2012 for ICU patients
- Met with Dr. Shi and Dr. Raven to discuss progress on curos project

**Thursday, September 26 2013**

- Read the literature on various types of central lines for my project, which made data collection for central line type easier to collect. I am finding that majority of the patients present with the following central line types:
  - Non-tunneled central line
  - Peripherally inserted central line
  - Tunneled catheter
  - Implanted ports
  - Pulmonary artery catheter

**Friday, September 27 2013**

- Met with Stephanie Kreiling to assist with chart reviews,
- Finished up chart reviews for July 2012 CVICU patients.

**Tuesday, October 1 2013**

- Changed plans to collect data. Time consuming to collect a 1 year worth of data, decided to review data only 6 months prior to intervention date.
- Decision approved by committee
- Began collecting central line charts for January 2013 for CVICU

**Wednesday, October 2 2013**

- Finished collecting data for January ICU patients
- Data process time consuming since data has to be abstracted manually for each patient record, still collecting charts for January 2013 CVICU patients.

**Thursday, October 3 2013**

- Collected data for February CVICU patients.
- Learning how to use database for data collection

**Friday, October 4 2013**

- Began collecting data for March ICU patients
- Learning how different diagnosis on eclipses are coded
- Some missing information not present on eclipses, such as BMI, this delayed some data collection, began calculating manually to find BMI for each individual patient

**Monday, October 7 2013**

- Began collecting infection rate baseline data for March CVICU Patients.
- Begin to see some inconsistencies with data in paper form and data on Eclipses
- Stephanie Kreiling clarified reason for inconsistencies with central line data

**Tuesday, October 8 2013**

- Finished March CVICU data collection
- Unable to collect data for Transplant A8 transplant records – since medical record numbers are unavailable
- Contacted Stephanie about this issue, Stephanie sent a census report for the month of March for A8 transplant

**Wednesday, October 9 2013**

- Began collecting data for A8 patients
- Realizing that data collection for A8 will be very slow since medical record unavailable and would need to search for patients individually from census

**Thursday, October 10 2013**

- Continued collecting A8 transplant patient information
- Learning how to find out patient location and patient visit on Eclipses

**Friday, October 11 2013**

- Finished up Data collection for transplant unit for March and April
- Stephanie informed me that there might be a possibility of running a query to collect data more effectively.
- Query unavailable, manual data collection continued.

**Monday, October 14 2013**

- Realized that I may not go over 1000 patient charts and stepped back from further collection of transplant data.
- Collected patient data for May CVICU
- Learning quicker ways to view data – for instance, I learned to find quick ways on how patients are neutropenic, by viewing graphs on patient, learned more about patient diagnosis and the type of central lines the patient had while in the clinic

**Tuesday, October 15 2013**

- Continued collecting data for May CVICU
- Confirmed with Dr. Shi that I may no longer continue to obtain data for A8 transplant patients, because of time concerns and possibility of going over the set amount of sample size

**Wednesday, October 16 2013**

- Finished up May CVICU data collection.
- Began collecting data for May ICU patients.

**Thursday, October 17 2013**

- Finished up collecting data for May ICU patients
- Began Collecting data for June ICU Patients
- Obtained Pre-intervention infection rate data from Stephanie
- Obtained line days for pre-intervention from Stephanie as well, as is reported to NHSN

**Friday, October 18 2013**

- Met with Stephanie Kreiling who showed me how standardized infection rate data Is collected and reported
- Stephanie Kreiling also showed me how nosocomial infections are confirmed, using defined NHSB+N criteria
- Obtained post intervention infection rate data from Stephanie
- Received the unfortunate news from Stephanie that there has been 1 infection in the ICU since the post intervention of the port protector.
- Stephanie Kreiling and I began to investigate this case, in order to confirm that it is indeed a central line associated bloodstream infection.
- Infection met NHSN criteria.

**Monday October 21, 2013 – Wednesday 23 October 2013**

- Received Permission from Claudia Mattil and Theresa Cheyne to take time off from data collection

**Thursday, October 24 2013**

- Continued data collection and began collecting data for June ICU and CVICU
- Data collection for June ICU and CVICU completed
- Began collecting data for July ICU and CVICU
- No longer collecting data for device days
- Nurses have reported device days data in paper form
- Data collection for ICU and CVICU collected

**Friday, October 25 2013**

- Began collecting data for August CVICU patients
- Finished August CVICU and ICU data collection

**Monday, October 28 2013**

- Began collecting data for September ICU patients
- Obtained patient census for September ICU patients for easier data collection

**Tuesday, October 29 2013**

- Began collecting data for October ICU patients
- Obtained positive blood culture information from Stephanie

**Wednesday, October 30 2013**

- Began collecting data for October CVICU patients

**Thursday, October 31 2013**

- Finished data collection for October CVICU patients

**Friday, November 1 2013**

- Finished up collecting any missing data for previous months – such as February ICU and CVICU data

**Monday, November 4 2013**

- All data collection completed. Shown to Dr. Shi for Data Analysis
- Created dummy variables

**Tuesday, November 5 2013**

- Theresa helped to code dummy variables for SAS out put
- Sent spread sheet to Dr. Shi to assist with SAS Analysis

**Wednesday, November 6, 2013**

- Statistical analysis performed on data
- Did not find an association between port protector use and infection risk

**Thursday, November 7 2013**

- Began to fill in missing information that may have affected validity of data by reviewing more patient charts

**Friday, November 8, 2013**

- Officially finished all data collection, began thesis writing.



**Monday, November 11 2013**

- Began working on results section for paper

**Tuesday, November 12 2013**

- Finished working on results and methods

**Wednesday, November 13, 2013**

- Submitted rough draft of internship to Dr. Shi and Dr. Raven

**Thursday, November 14 2013**

- Infection control meeting at Baylor Dallas – Met with Stephanie Kreiling and MPH student working on PACC line project
- Discussed Curo Cap project results and other infection control topics

**Friday, November 15 2013**

- Received edit for Thesis draft from Dr. Shi and Dr. Raven
- Made corrections to Thesis draft
- Began working on power point presentation for Thesis report.

**Monday, November 18 2013**

- Practiced Mock thesis defense with Dr. Shi in Center for Biohealth classroom
- Obtained advice from Dr. Shi on power point, made necessary corrections
- Continued working on Thesis draft

Tuesday, November 19 2013

- Mock presentation with Dr. Shi.
- Submitted final thesis draft to committee.