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Reducing Central Line-Associated Bloodstream Infections

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This is to certify that the doctoral study by

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has been found to be complete and satisfactory in all respects,
and that any and all revisions required by
the review committee have been made.

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2019

Abstract

Reducing Central Line-Associated Bloodstream Infections

by

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MS, Walden University, 2014

BS, Bethune-Cookman University, 1989

Project Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Nursing Practice

Walden University

August 2019

Absract

Central line-associated bloodstream infection (CLABSI) at the local healthcare setting exceeded the benchmark of 0 CLABSI. The Infection Prevention and Control (IPC) department determined that a role as CLABSI nurse champion would address the problem; however, no comprehensive education on CLABSI prevention and maintenance was available at the site. The purpose of this project was to develop a CLABSI prevention and maintenance education module using Knowles's adult learning theory and the chain of infection model. The practice-focused question asked whether a CLABSI educational module would provide the necessary information to educate nurse champions on CLABSI prevention and maintenance. The education module was presented to 9 local experts, composed of the Infection Prevention and Control (IPC) director, doctor of medicine, microbiologist, biomedical technologists, IPC nurses, and 2 staff nurses, who evaluated the CLABSI education module. An 11-question Likert-scale questionnaire that included an option for recommendations for improvement was used by the expert panel to evaluate the module. Of the 11 questions, only 3 were scored as strongly agree or agree, indicating a need to modify the module to raise the education level of the content and to include the clinical standards, objectives, and dressing-change procedures. After modifications, the education module was scored again, and 100% met the criteria and the recommendations of the expert panel. The project has the potential to promote positive social change by increasing the knowledge of the CLABSI nurse champions and by reducing the risk of CLABSI at the site.

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Dedication

This DNP project is dedicated to the many healthcare workers that took care of patients who accidentally suffered from adverse-events. The science that guides our profession has been proven to produce better patient outcomes. Therefore, the leaders in our profession must relentlessly continue to educate themselves and others on the latest evidence-based research to improve humanity.

Acknowledgments

Thank you, Lord, for your grace and mercy which allowed me to accomplish my life dream, a Doctor of Nursing Practice degree. Without you, I could do nothing. I will forever praise you! I would like to thank my entire family and friends for being forgiving during the times I was absent from family events and special occasions.

I would like to thank my mother Brenda Whitfield for all your financial support, prayers and unconditional love. I would like to thank my ninety-five-year-old grand-mother who is the matriarch of my family for all your unconditional love and who has instilled in me the phrase “I can do all things through Christ who strengthens me”. A special thank you to my aunt and uncle Gail and Willie Watson for your continuous prayers, encouragement, and belief in me to succeed. I would like to thank my aunt Alena Lawson, uncle Cecil King, and uncle and aunt Gail and Lewis King for your support.

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Finally, I would like to extend special appreciation and gratitude for my DNP committee guiding me through the DNP process. I would like to thank Scott Brown, infection control director (preceptor) and staff for allowing me to be part of the Infection Prevention and Control family.

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Section 1: Introduction

Introduction

Central line-associated bloodstream infections (CLABSI) are a nationwide healthcare concern, and if not prevented cause patient morbidity and mortality, increase healthcare cost and prolong hospital stays (National Healthcare Safety Network, 2018). Hospitals continue to strive for the Centers for Medicare and Medicaid (2018), the Centers for Disease Control and Prevention (CDC, 2018) and the National Healthcare Safety Network (2018) compliance for preventing hospital-acquired infections to near zero. The local hospital falls within the group that has reduced their CLABSI rate but continues to see evidence of CLABSIs, therefore the hospital continues to seek system-wide efforts to prevent the infections, as required by the regulatory agencies.

According to the Association for Professionals in Infection Control and Epidemiology (2015), the evidence-based CLABSI prevention strategies must occur either at the time of central venous line (CVL) catheter insertion or during catheter maintenance. The CLABSI insertion site infections occur within four days of being inserted; after four days, the infection is attributed to CVL maintenance (Infection Prevention and Control Director, personal communication, August 12, 2018). At the local hospital, the dashboard data from January 2018 to August 2018 showed a total of 40 CLABSI occurrences which exceeds the clinical expectation of zero (IPC Director,

August 12, 2018). Based on the Infection Prevention and Control department (IPC) drill-downs to determine the causes of CLABSIs only two (5%) were identified as insertion site infections which indicates 95% of the infection were related to CVL maintenance. CVL maintenance is the nurse's responsibility, at this hospital. After reviewing evidence-based practice initiatives for CLABSI prevention related to CVL maintenance, the IPC recommended an education program for a new role as CLABSI champion. Currently, no program exists for training nurse champions.

The purpose of this doctor of nursing project was to develop an instructional CVL maintenance education module for the CLABSI champion staff nurses in one hospital which is a contribution to a positive social change. Potentially, improving the nurse's practice skills for CVL maintenance will prevent CLABSI and decrease the hospital stay, cost, morbidity and mortality that is associated with CLABSI. Section 1 of this project includes a definition of the practice problem, project purpose, significance and nature of the project.

Problem Statement

The problem identified for this doctor of nursing practice (DNP) project was that the IPC dashboard showed forty CLABSIs occurred that were related to the nurses CVL maintenance practice skills which exceeded the clinical expectation of zero (IPC Director, August 12, 2018). The IPC stated the local hospital number of CLABSI

occurrences from January 2018 to August 2018, an eight-month time-frame, showed increases each month above (0) for Jan (5) Feb (4), March (8), April (2), May (6), June (3), July (5) and August (7), the number of occurrences totaled forty.

The CDC National Healthcare Safety Network (NHSN, 2018) is a national surveillance database that monitors CLABSI and hospital-acquired infections. The CDC; NHSN (2018) predicted the local hospital number of CLABSI occurrences from January 2018-August 2018 as 60.934, but the actual hospital number of occurrences reported to the NHSN was 40. The NSHN uses a formula to determine if the hospital complies with the national set standard of 1.0. The NHSN Standard Infection Ratio Formula compares the hospital actual number of CLABSI occurrences to the NHSN predicted number and the NHSN standard population, also adjusting for the hospital risk factors. The hospital risk-adjusted factors are based on hospital unit types, facility bed size, and medical school affiliation. The CLABSI Standard Infection Ratio Formula (SIR) reads 40 observed (the local hospital number of CLABSI occurrences) / 60.934 (the NHSN predicted number of CLABSI occurrences) = 0.656 which remains below the 1.0 national standard.

According to the National Healthcare Safety Network (2018), if the SIR < 1.0, then fewer hospital-associated infections were observed than predicted, based on the 2015 national aggregate data. If the SIR >1.0, then more hospital-associated infections

were observed than predicted, based on the 2015 national aggregate data. Therefore, the hospital goal is to remain below the 1.0 national standard.

Although, the local hospital SIR is 0.656 below the national standard of 1.0, still, the local hospital leaders called an emergency management meeting to improve the nurse's clinical practice skills for CVL maintenance (IPC Director, August 12, 2018). Additionally, the local management concerns were directed towards preventing further escalation of the number of CLABSI occurrences. According to the administration of this hospital, the number of CLABSI occurrences showed a need for improvement. Figure 1 illustrates the CLABSI rate over an 8 month period from January to August, 2018.

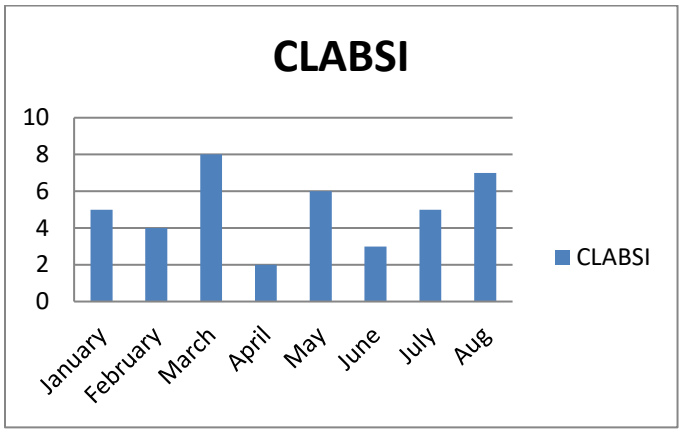

Figure 1. The local hospital CLABSIs for 8 months.

Local Relevance

As a result of the IPC drill-downs to determine the causes of CLABSIs only two (5%) were identified as insertion site infections which indicates 95% of the infection are

related to CVL maintenance (IPC Director, August 12, 2018). CVL maintenance is the nurse's responsibility, at this hospital. After reviewing evidence-based practice initiatives for CLABSI prevention related to CVL maintenance, the IPC recommended an education program for a new role as CLABSI champion. Currently, no program exists for training CLABSI champion nurses. The CLABSI champion role is being initiated to raise the staff nurses awareness, improve knowledge and guide the staff nurses to use the appropriate practice skills to prevent CLABSI. The IPC plan is to place a CLABSI champion on each floor in the hospital after they have completed the education module.

To address the IPC concerns, the practice problem identified for this DNP project was the lack of a comprehensive instructional CVL maintenance education module and the need for staff nurses with the expertise to assist other nurses in improving practice skills. This DNP education module did not include a formal written test to evaluate the CLABSI champion nurses knowledge for improvement on CVL maintenance and uses Bloom’s taxonomy learning strategies to achieve objectives (Wilson, 2019). Using Bloom’s taxonomy helped develop the CLABSI champion nurses critical thinking and cognitive ability to direct psychomotor skills that would complete the CVL maintenance practice skills. Also, based on the expert recommendation from the Joint Commission CLABSI Toolkit and Monograph (2018), the Society for Healthcare Epidemiology of America (2014), the Healthcare Infection Control Practices Advisory Committee (2011)

and Health Research Education and Trust (2017) educating the CLABSI champion nurses on CVL maintenance should improve knowledge and practice skills after watching the newly developed evidence-based education module.

The CVL maintenance instructional, education module addressed the CLABSI nurses affective, cognitive, and psychomotor learning domains using derivatives of Bloom's taxonomy (Wilson, 2019). All three learning domains do not necessarily need to be addressed to create an effective education module. But the instructional CVL education module addresses all three of the learning domains which provided a more holistic and well-rounded learning experience for the CLABSI nurses.

Bloom's taxonomy has six learning levels that are based on the hierarchy of intellectual abilities and skills (Wilson, 2019). The learning levels start from the lowest level of learning to the highest, as the learner moves up each level more skills and abilities are being applied to the accomplish the preset cognitive objective. The affective or feeling domain has six levels of learning: *receiving, responding, valuing, organization, and characterization*. The cognitive domain has six levels of learning: *remember, understand, apply, analyze, evaluate, and create*. The psychomotor domain has six levels of learning: *imitation, manipulation, precision, articulation, and naturalization*. The education module was an instructional presentation directing the nurse's psychomotor skills in sequence to accomplish the evidence-based practice skills for CVL maintenance.

First, the module addressed the CLABSI nurse's affective learning domain by presenting the impact of CLABSI occurrences which increases patients morbidity and mortality rates, increase costs and prolong hospital stays. Other presented content included the fact that CLABSIs are preventable using evidence-based CVL maintenance practice skills. The statistics were given to influence the nurse's feelings, emotions and motivation in an attempt to gain a willingness to receive the nurse's response and acceptance that CLABSIs are a problem, and changes were needed (Wilson, 2019).

Second, the instructional CVL maintenance module addressed the CLABSI nurse's cognitive learning domain by addressing the *remembering* and *understanding* level. Anderson and Krathwohl cited in Wilson (2019) defined the cognitive domain at the *remembering level* as recalling knowledge from memory and the cognitive domain, at the *understanding level* as obtaining meaning from an activity or graphic message. The instructional education module addresses the cognitive domain by asking questions and having the nurses write the answers for the skill.

For example, the power-point slides are arranged to have a slide to stimulate the nurse's understanding and recalling knowledge for answering the question. Then, the following slides provide the answers. Examples of the instructional CVL maintenance module questions are: describe keeping the CVL system close, explain the steps for sanitizing the the injection portal, identify how often the CVL dressing needs changing,

identify the reasons a CVL dressing must be changed immediately, identify how often the CVL administration set need changing, list the CVL administration sets that are used only once, list the devices used to keep the CVL system close, describe the steps for performing a patient chlorhexidine bath, and identify how often a chlorhexidine bath is given to the patient with a CVL device.

Conducting the short quizzes throughout the presentation invoked the CLABSI nurses to recall the practice skills content, similar to a teach-back method when the learner states the content learned in their words (Wilson, 2019). In addition, the education module addressed a higher level of learning in the cognitive domain, at the *analyze level*, by asking the nurse to explain why sanitizing the CVL device injection portal hub is necessary before each use? Another example, compare the difference between Curos caps and needless connectors and instruct the student to complete this sentence, CVL semipermeable transparent dressings are changed every (7 days is the answer), these question applies to knowledge application, a higher level of learning, than the cognitive domain at the *understanding and remembering level*.

Thirdly, the CVL instructional maintenance module addressed the CLABSI nurse's psychomotor learning domain by addressing the *manipulation level*. The CLABSI nurse's learning on the *manipulation level* required the nurse's to reproduce an activity by instruction or reproduce an activity by memory. During the instructional CVL

maintenance education module, the nurses were prompted to write the answers, after watching an instructional presentation on the CVL device dressing changes, CVL administration set changes, sanitizing the injection portal hub and chlorhexidine bathing, then the answers are provided. Similar, Dave and Simpson cited in Wilson (2019) reported findings that indicated the learner would use physical actions to achieve the cognitive learning objectives. Likewise, Kasilingam, Ramalingam, and Chinnavan (2014) agreed that the cognitive learning domain at the *understanding level* controls the learner physical motor actions to perform the tasks. Therefore, the CVL maintenance practice skills may effectively be observed through video presentation or picture of each step in the sequence as it occurs and affects the CLABSI nurse's performance of the practice skills. However, for the psychomotor skills to become precise, smooth, and automatic to the CLABSI nurses, the physical activity must be repeatedly performed or imitated after observing the skill, this occurs at the *naturalization level* of the psychomotor domain, Harrow cited in Wilson, 2019.

Furthermore, the instructional CVL maintenance module addressed the CLABSI nurse's cognitive learning domain: at the *understanding level*, *analyze level* and *evaluate level*; affective learning domain at the *characterization level*; and the psychomotor domain at the *manipulation level*. Examples of CLABSI champion nurses using different levels of learning show the CLABSI nurses recalling knowledge from memory regarding

the pathogenesis of CLABSI, applying and making a decision to use the evidence-based practice skills. Further, the CLABSI nurses understanding the causes of CLABSI influences the CLABSI nurse's decision making to use the evidence-based practice skill that will prevent the accumulation of the infectious microorganisms that colonize at the external surface of the CVL device and injection portal hub (TJC, 2018). Also, the CLABSI nurses understanding the causes of CLABSI influences the nurse's decision making to use the evidence-based practice skills that will prevent infectious microorganisms from transferring when inserting the intravenous administration set connector into the CVL device injection portal hub and during manipulation of the intravenous administration set.

Lastly, the DNP project encompasses all three of the learning taxonomies, affective, cognitive and psychomotor. The CLABSI nurses already possess the basic nursing skills to work in an acute care hospital and repeatedly uses the nursing practice skills, daily. However, the CVL maintenance instructional module demonstrates the correct sequence that the nurses must perform the practice skills for evidence-based CVL maintenance. The CLABSI nurses valuing the CVL maintenances skills enough to decide to use the skills for each patient with a CVL device shows the nurses learning at the highest level of Bloom's taxonomy.

Significance for the Field of Nursing Practice

The DNP education module holds significance for the nursing field as described by the American Association of Colleges of Nursing (2015); Essential 1 Scientific Underpinnings for Practice, due to the development of the instructional CVL maintenance education module. As a DNP student, I synthesized the latest evidence for CVL maintenance to adopt evidence-based practice skills to develop a CVL maintenance education module (American Association of Colleges of Nursing [AACN], 2015; Jones et al., 2014; Latif et al., 2015). The development of the CVL education module provided standardized CVL maintenance practice skills for the CLABSI champion nurses. Once the CVL education module was implemented, the CLABSI champion nurses could immediately incorporate the CVL maintenance practice skills into daily use to decrease CLABSI. Ultimately, the decrease in CLABSI conversely relates to a positive social change by decreasing the patient's morbidity and mortality, and cost and stay. The knowledge translation and integration to the CLABSI champion nurses were based on theories and concepts to determine the best delivery and appropriate education techniques.

Purpose Statement

Addressing the Gap in Practice

For this DNP project, I proposed to develop an instructional education module on

CVL maintenance for the staff nurses that the hospital has identified as CLABSI champions. The DNP instructional, educational module filled the gap in nursing practice for evidence-based CVL maintenance practice skills. Generally, the local hospital uses bundles to improve the staff nurse's knowledge and guide the nurse's practice skills (Association for Professional in Infection Control and Epidemiology [APIC], 2015; Joint Commission [TJC], 2018). Bundles are a group of the latest evidence-based practice skills put together by experts for one subject or population to provide patients with quality care and achieve quality outcomes.

- The staff education module for CVL maintenance was developed from evidence-based, proven strategies from CVL maintenance bundles.
- Each strategy from a CVL bundle is considered a standard of care that has the science to back the use as being a credible and reliable intervention for preventing and reducing CLABSI (APIC, 2015; Healthcare Infection Control Practices Advisory Committee [HICPAC], 2011; Institute for Healthcare Improvement [IHI], 2012; Society for Healthcare Epidemiology of America [SHEA], 2014; TJC, 2018).
- The CVL bundles were synthesized to develop practice skills that align with interventions for nursing.

- Used together the evidence-based CVL maintenance practice strategies have been proven more effective to achieve the desired patient outcomes for reducing and preventing CLABSI (APIC, 2015; HICPAC, 2011; IHI, 2012; SHEA, 2014; TJC, 2018).

Practice-Focused Question

The guiding practice-focused question: Will an instructional education module on CVL maintenance practice skills provide the CLABSI champion nurses with instruction on how to perform the latest CVL maintenance practice skills?

After the completion of the DNP education module, the CLABSI champions were expected to monitor, teach, demonstrate, and audit other staff nurses on the CVL maintenance practice skills as needed (American Journal of Nursing, 2014; Magnet Quality Director, personal communication, March, 15, 2019). Additional expectations included the CLABSI champions monitoring the CLABSI unit matrices, collaborating with IPC and attending the CLABSI workgroup meetings. Also, the CLABSI champion nurses were expected to collaborate with the unit clinical nurse leader and clinical nurse specialist about the CLABSI patients and staff concerns regarding CLABSI. The CLABSI champion nurse-leadership role at the local hospital is voluntary, as long as, the nurse has been practicing in the specific area more than five years, has a bachelor of science degree in nursing or higher and the unit manager has approved. Because the

CLABSI role is voluntary, the CLABSI champion nurses are viewed as motivated and willingly has accepted the leadership role to respond to the need of improving CVL maintenance practice skills (Wilson, 2019).

The hospital uses a shared governance management style. Therefore, CLABSI champions may develop their own rules that govern the roles and guidelines, as well as, change the roles anytime based on their unit needs (Magnet Quality Director, March, 15, 2019). In the shared governance model, the CLABSI champion nurses do not need permission to change their role or implement new practice skills but, need to keep the clinical leader and clinical nurse specialist informed of the decisions made. The local hospital does not support a defined CLABSI role with expected adherence for each unit throughout the hospital (Magnet Quality Director, March, 15, 2019).

The project learner objectives:

- Nurses will respond and accept that CLABSIs are a problem by accepting the CLABSI champion role
- Describe keeping the CVL system close
- Explain the steps for sanitizing the injection portal hub
- Identify how often the CVL dressing needs changing
- Identify the reasons a CVL dressing must be changed immediately
- Identify how often the CVL administration set need changing

- List the CVL administration sets that are used only once
- Describe the steps for performing a central line dressing change
- Identify how often a chlorhexidine bath is given to the patient with a CVL device
- Compare the difference between Curos caps and needless connectors

The project outcomes:

- Develop the CVL education module that has multiple practice skills.
- Review the content of the education module with the IPC experts.
- Provide the latest evidence on CVL maintenance practice skills for the CLABSI champion.

Nature of the Project

The first phase, a PICO analysis was applied to this DNP project. The PICO analysis reads:

P- the hospital staff nurses identified as CLABSI champions

I- develop an instructional education module on CVL maintenance with modifications based on the local IPC expert feedback and recommendations

C- latest evidence-based CVL maintenance practice skills

O- provide education on evidence-based CVL maintenance practice skills to the CLABSI champions after being approved by the IPC local experts

Sources of Evidence

The second phase was a collection of the sources of evidence. The Walden University Staff Education Manual (2018) was used as a guide for the DNP staff education module. In addition, a comprehensive literature review was conducted. A literature review was conducted to examine studies between the years 2010 to 2018. The designated search strategy took place at the Walden University Library. The Walden health science research section provided access to the Cumulative Index to Nursing and Allied Health Literature (CINAHL) and MEDLINE databases for a simultaneous search, also the Elton B. Steven Company database (EBSCO). The database search included key focus words for the project, such as CLABSI prevention, CVL maintenance bundles, CLABSI education, and CLABSI champion roles. The inclusion criteria consisted of peer-reviewed, full-text articles, published in the English language, within the past ten years.

The sources of evidence collected were used in the development of the evidence-based instructional CVL maintenance education module. I synthesized the Joint Commission Toolkit and Monograph (2018) CVL Maintenance Bundles for potential evidence-based CVL maintenance practice skills. I synthesized the sources of evidence from the expert recommendations for the pathogenesis of CLABSI, and expert recommendations or opinions for CLABSI prevention in an acute care hospital setting.

Additionally, I synthesized the expert resources to validate education as an evidence-based intervention to improve the CLABSI champion nurses CVL maintenance practice skills. Finally, I synthesized the literature for similar acute care hospitals interventions to improve the nurses CVL maintenance practice skills.

The expert resources used:

- The Health Research and Educational Trust (HRET), Preventing Harm from CLABSI (2017).
- The Healthcare Infection Control Practices Advisory Committee (HICPAC), Guidelines for the Prevention of Intravascular Catheter-related Infections (2011).
- The Association for Professional in Infection Control and Epidemiology (APIC), Guide to Preventing Central Line-Associated Bloodstream Infections (2015).
- The Infection Control and Hospital Epidemiology of America (SHEA), Strategies to Prevent Central Line-Associated Bloodstream Infections in Acute Care Hospitals (2014).
- The Toolkit and Monograph (2018) for CVL Maintenance Bundles and Expert Guidelines.

Project Team

The project team was the IPC Department staff members. The IPC monitors hospital infections daily, reports hospital infections to the National Healthcare Safety

Network database, provides infection matrices for the hospital and collaborates with nursing for prevention of infections (IPC Director, August 12, 2018). Recently, the hospital administration leaders called the IPC director to an emergency management meeting regarding the number of CLABSI occurrences. According to the hospital administration, the number of CLABSI occurrences shows a need for improvement.

The IPC director scheduled an inter-department meeting to develop strategies for preventing and decreasing CLABSIs (IPC Director, August 12, 2018). As a result of the IPC drill-downs to determine the causes of CLABSIs, only two (5%) were identified as insertion site infections which indicates 95% of the infections were related to CVL maintenance. CVL maintenance is the nurse's responsibility, at this hospital. After reviewing evidence-based practice initiatives for CLABSI prevention related to CVL maintenance, the IPC team recommended an education program for a new role as CLABSI champion. Currently, no program exists for training the CLABSI champion nurses.

As a DNP student in the IPC department, I collaborated with the IPC team on the identified need of an instructional CVL maintenance education module for the CLABSI champion nurses and plans for the development. The IPC team was favorable toward my plan, because evidence supports an instructional education module on CVL maintenance will improve the CLABSI champion nurse’s CVL maintenances practice skills, and

ultimately will improve the staff nurse's CVL maintenance practice skills which have been an on-going problem at the hospital (IPC Director, August 12, 2018).

Once the IPC team adopted my CVL maintenance instructional education plan, I participated in multiple interprofessional collaborations with unit representatives during the monthly IPC meetings, to gain buy-in and relay information of the roll-out date. The unit representatives were supportive of the new CLABSI champion nurse's role because potentially, the champions could influence or impact other nurses on the unit to use evidence-based CVL maintenance practice skills, which would eventually lower each unit CLABSI occurrences to near zero or zero (IPC Director, August 12, 2018). Additionally, each unit was asked to select a CLABSI champion nurse for the role. Because the CLABSI role is voluntary, the CLABSI champion nurses were viewed as motivated and willingly having accepted the leadership role to respond to the need of improving CVL maintenance practice skills (Wilson, 2019). After the IPC approval, I sent e-mails out with the expected go-live date.

My role in the DNP project was to develop the content for an instructional CVL maintenance education module. I collaborated with the IPC department and unit representatives on the development of the education module content. The instructional CVL maintenance education module was developed using evidence-based resources. The power-point presentation covered the objectives, background, pathogenesis, model and

theory for development and the newly developed practice skills. Working with the hospital leaders on the content needed in the module and coordination of the roll-out dates made the goal possible to develop a comprehensive instructional CVL maintenance education module for the CLABSI champion nurses.

My plan for researching the evidence required the use of techniques such as the scholarship of discovery, application, and integration. I used the application of discovery during my literature review search and while synthesizing the scientific underpinnings of CVL maintenance bundles. Once the evidence was collected, I applied the latest CVL maintenance knowledge and skills to my education module, then plan for knowledge integration among the CLABSI champion nurses. The education module was presented as a power-point presentation to the IPC for dissemination.

For the IPC experts to effectively evaluate the content in the education module, I created a 5 point Likert survey (Appendix A). The survey contained five choices to answer each question. The survey contained eleven questions regarding the education module content, also a space for recommendations on improvement. I used both formative and summative evaluations, to provide a descriptive analysis of the Likert survey results.

As part of the development process, the IPC team has agreed to take part in evaluating the instructional CVL maintenance education module. The method of

evaluation for the IPC experts was a 5-point Likert survey, with eleven questions. Each IPC expert was allowed two hours to review the educational program and provided feedback and recommendations on the educational program, after being placed in a quiet room. I used the data collected from the IPC experts to make changes to the educational module. In addition, I kept the data collected from the survey anonymous. I modified the education module based on the IPC staff recommendations and feedback, before presenting the final instructional education module to the IPC team. Next, I presented the education module to the IPC team and begin the plan for dissemination with the IPC for a later date.

The IPC team members decided to pilot the CLABSI Champion nurse's role, beginning with the critical care units first because those units were most likely, to have CVL devices in use. The pilot lasted one month before a re-evaluation of progress took place. The IPC continued the CLABSI champion nurses rollout every month until implementated throughout the hospital. The IPC team was able to benchmark data for results after the CLABSI champion nurse's role was implemented and gave the units real-time results to determine the project sustainability.

Also, the IPC team made future plans to transfer the education module to the central education division with the belief the module will be more accessible to employees at that location. Once uploaded in the central education system, all employees

may access the instructional CVL maintenance education module at any time. The instructional module may be used as a resource.

Approach To Organize and Analyze Evidence

The first phase, as a strategy to plan, implement and disseminate the DNP instructional education module to the targeted audience, I applied a PICO analysis to this DNP project. The PICO analysis read: P- the hospital staff nurses identified as CLABSI champions I- develop an instructional education module on CVL maintenance with modifications based on the local IPC expert feedback and recommendations C- latest evidence-based CVL maintenance practice skills and O- provide education on evidence-based CVL maintenance practice skills to the CLABSI champions after being approved by the IPC local experts.

The second phase, I collected evidence and developed the instructional education module, then had the IPC department panel of experts evaluated the content through an anonymous survey. Lastly, I collected the survey data from the expert panel and modified the education module as recommended by the expert committee. Then, I presented the education module to the IPC and begin the plan for dissemination with the IPC for a later date.

Therefore, I proposed to develop an instructional education module on CVL maintenance for the staff nurses that the hospital has identified as CLABSI champions.

The DNP instructional, educational module should fill the gap in nursing practice for evidence-based CVL maintenance practice skills, after the local IPC experts have validated and approved the education module. Working with the local IPC experts and unit representatives on the development allowed the instructional CVL maintenance educational module to have a successful implementation, integration, and dissemination at the local hospital.

Stakeholder Significance

The primary stakeholders for this DNP instructional education module were the patients, IPC, CLABSI champion nurses and eventually the staff nurses. Research indicates that CLABSI infections are preventable if evidenced-based CVL maintenance practice skills are followed. Therefore, stakeholders in this DNP project made efforts to address a gap in practice that indicated the need for a comprehensive instructional CVL maintenance education module to ensure the latest evidence reaches the frontline staff. The stakeholders recognized the frontline staff having the lastest CVL maintenance practice skills potentially could guide practice skills for preventing microorganisms from entering through a CVL device into the patient veins and could prevent CLABSI in the hospital.

Overall, the nurses improving the CVL maintenance practice skills would benefit the entire hospital. The nurses improving the CVL maintenance practice skills could

potentially impact the patients experiencing less harm and death, and pain and suffering. In addition, the nurses improving the CVL maintenance practice skills could potentially impact the hospital finances due to less hospital stays and costs, in addition to, an increase in the Centers for Medicare and Medicaid reimbursements for compliance of preventing CLABSI in the hospital. Also, the nurses improving CVL maintenance practice skills could potentially impact the IPC workload by having to develop less CVL maintenance interventions and less reportable infections to the National Healthcare Safety Network. Potentially, the IPC would have less CLABSIs matrices and benchmarks to be monitored and gain compliance with the Centers for Medicare and Medicaid Hospital Acquired Infections to near zero, if the nurses improve their CVL maintenance practice skills. Therefore, evidence validates an instructional CVL maintenance education program was needed.

Evidence-Based Significance of the Project

The DNP project outcome was to develop an instructional CVL maintenance education module for the CLABSI champion nurses. The instructional education module was developed using evidence-based resources for CVL maintenance practice skills. Based on the expert recommendation from the Joint Commission (2018), the Society for Healthcare Epidemiology of America (2014), the Healthcare Infection Control Practices Advisory Committee (2011) and Health Research Education and Trust (2017) educating

the CLABSI champion nurses on CVL maintenance should improve knowledge and practice skills after watching the newly developed evidence-based education module. Integrating and disseminating the CVL maintenance research into practice has the potential to improve the CLABSI champion nurses knowledge that guides practice skills to prevent microorganism from entering into the patient's veins through CVL devices, and ultimately would stop CLABSI in the hospital.

The Implication for Social Change

Developing an instructional CVL maintenance education module for the CLABSI champion nurses in one hospital was a contribution to a positive social change, due to standardizing CVL maintenance practice skills, potentially improving the nurse's practice skills and decreasing and preventing CLABSI. Based on the evidence, a positive social change should occur due to the voluntary CLABSI champion nurses willingness and acceptance of the leadership role aimed toward decreasing CLABSI. The CLABSI champion role required continuing education and awareness that lead to improved practice skills and expertise, to assist other staff nurses in improving CVL maintenance practice skills. Therefore, improving the CLABSI champion nurses CVL maintenance practice skills potentially could decrease hospital patients stays and costs, and morbidity and mortality associated with CLABSI.

Transferability

The DNP instructional education module for CVL maintenance is transferable to other medical institutions that have adult patients with a CVL device. Elements that will facilitate the transferability for the education module is adult patients with a CVL device, nursing staff, source for monitoring infections and product supply. Also, persons are needed for the translation of the evidence to the frontline staff nurses. The DNP project is not transferable to pediatrics' patients because the practice standards are different.

Summary

The purpose of the DNP project was to develop a CVL maintenance instructional education module for a select group of nurses who served as CLABSI champions. Next, the CLABSI champion nurses were expected to use their expertise in knowledge and skills to assist other nurses with the evidence-based CVL maintenance practice skills, which will reduce and prevent CLABSI in the hospital. The project guiding practice-focused question: Will an instructional education module on CVL maintenance practice skills provide the CLABSI champion nurses with instruction on how to perform the lastest CVL maintenance practice skills? To address the practice focus question, I conducted a comprehensive literature review and synthesized the latest sources of evidence. From the evidence, I developed the instructional CVL maintenance education module for the IPC team to review, afterward, the team provided recommendations and

feedback. I modified the education module based on the IPC team recommendations and feedback, then represented the final product to the IPC team, to disseminate at a later date. In Section 2, I will describe the concepts, models and theories, relevance to nursing practice, local background, as well as, context and the role of the DNP student. The evidence-based practice skills for CVL maintenance have been proven to decrease CLABSI.

Section 2: Background and Context

Introduction

The practice problem identified for this DNP project was the lack of a comprehensive instructional CVL maintenance education module and the need for staff nurses with the expertise to assist other nurses in improving practice skills. The guiding practice-focused question: Will an instructional education module on CVL maintenance practice skills provide the CLABSI champion nurses with instruction on how to perform the lastest CVL maintenance practice skills? For this DNP project, I proposed to develop an education module on CVL maintenance for the staff nurses that the hospital has identified as CLABSI champions. Potentially, the education module will improve the CLABSI champion nurses knowledge and guide evidence-based practice skills on CVL maintenance, that will ultimately prevent CLABSI. Additionally, the education module may be used as a resource for future training on CVL maintenance for staff nurses. In Section 2, I will discuss the theories that inform the doctoral education module, local background, and context for the lack of education at the practice site, my role and project team role, and relevant research that help develop the module.

Concepts, Models, and Theories

For this DNP project, I proposed to use the chain of infection model and the Knowles's adult learning theory to guide the development of the new instructional CVL

maintenance education module (APIC, 2015). Both are conceptual models, the chain of infection model describes the infection process and Knowles's adult learning theory describes the characteristics of the adult learner which helps the development of instructional CVL maintenance education module.

I chose the conceptual chain of infection model to inform this DNP project on the development of an education module because CLABSI occurs when infectious micro-organisms enter the patient bloodstream through a CVL device while in the hospital (APIC, 2015). The chain of infection model is most appropriate because the conceptual model explains how the CLABSI infection process occurs. Nurses that work with CVL catheter devices need to understand the process of the CLABSI infection. Understanding the steps in the chain of infection empowers the nurses and nurse leaders to create better opportunities to develop nursing practice skills that will break the chain of infection cycle and stop the CLABSI occurrences in the hospital (APIC, 2015; CDC, 2012).

Similarly, I chose the Knowles's adult learning theory to inform this DNP project on the development of an education module because the targeted audience for the instructional CVL maintenance education module is the adult CLABSI champion nurses. The Knowles's adult learning theory is a conceptual model that describes the adult learning characteristics which are based on the knowledge, skills, and experiences the nurses already possess. Therefore, I concluded the Knowles's theory was the most

appropriate because the concepts of the theory align well with an instructional education module on CVL maintenance for the adult nurses who are self-motivated and self-directed learners, according to the theory.

The CLABSI champion nurses and frontline staff nurses represent a large group that has different levels of nursing experiences and different levels of nursing education that impact the field of nursing. However, the IPC dashboard data shows 95% of the hospital CLABSI occurrences are related to CVL maintenance which indicates a challenge is presented for getting the latest evidence-based practice skills to the front line nurses, therefore, a new role was developed, as CLABSI champions. For this DNP project, it was important to bridge the gap of the latest CVL maintenance evidence to the CLABSI champion nurses and eventually, the front-line nursing staff to improve practice skills (AACN, 2015). Research indicates that CLABSI infections are preventable through applying evidence-based practice skills for CLABSI prevention (AIPC, 2015; HIPCAC, 2011; IHI, 2012; SHEA, 2014; TJC, 2018).

The Chain of Infection Model

The chain of Infection model has six links or sequence steps that include, infectious agent, reservoir, portal of exit, mode of transmission, portal of entry and susceptible host (APIC, 2015; CDC, 2012; McEwen & Willis, 2007;). Figure 2 illustrates the chain of infection model. The chain pathway travels in a complete circle. The chain

starts with the agent which is the bacteria or microorganism that has the ability to cause infection. The bacteria need a place to live grow and multiply this represents the hospital environment, known as the reservoir in the chain. As the circle pathway continues, the bacteria need a susceptible host to infect or cause infections, in this study, represents the hospital patient.

Additionally, two parts of the chain of infection model aid the bacteria with exiting the hospital environment, then entering the hospital patient bloodstream to cause infection (APIC, 2015; CDC, 2012). The two parts are the portal of exit and the portal of entry. For example, the portal of exit provides a way for the bacteria to leave the hospital environment (reservoir) and the portal of entry provides an opening to get inside the hospital patient (susceptible host). Of particular interest for this study, is the portal of entry that uses a CVL device. The central line device provides direct entry to the hospital patient bloodstream. Therefore, the portal of entry is a very likely place to cause an interruption in the chain of infection for this DNP education program.

Of most importance in the chain of infection is the method the infectious agent is carried from the hospital environment (reservoir) to the hospital patient (susceptible host), known as the mode of transmission (APIC, 2015; CDC, 2012). Many interventions have been designed to interrupt the circular pathway at the mode of transmission link or step, in the chain of infection process. For this DNP education program, the mode of

transmission is a very likely place to cause an interruption in the chain of infection, to prevent CLABSI.

As illustrated in the model, the mode of transmission for the bacteria may be direct or indirect transfer to the hospital patient (APIC, 2015; CDC, 2012). An example of direct transmission is skin to skin contact or droplet. The skin to skin contact may be done by touching the patient (susceptible host). The droplet may spread through talking, coughing or sneezing near the patient.

In contrast, an example of indirect transmissions is airborne, vehicle or vector (APIC, 2015; CDC, 2012). The airborne transmission occurs when dust or droplet nuclei is suspended in the air and blown to the patient. The vehicle transmission occurs when food, water or objects carry the bacteria to the patient (susceptible host).

Consequently, the chain of infection steps or links can be interrupted at any time during the sequence of steps (CDC, 2012). Based on the recommendations of the Joint Commission Toolkit and Monograph (2018) staff education on CVL maintenance is an effective tool for interrupting the chain of infection for preventing and reducing CLABSI occurrences. In the context of this DNP project, the evidence-based CVL maintenance practice skills in the instructional education module address each of the above methods of transmission for infection. Therefore, the staff nurses knowledge will potentially guide

the CVL maintenance practice skills to interrupt the chain of infection during patient care and prevent CLABSI (APIC, 2014; HICPAC, 2011; IHI, 2012; SHEA, 2015; TJC, 2018).

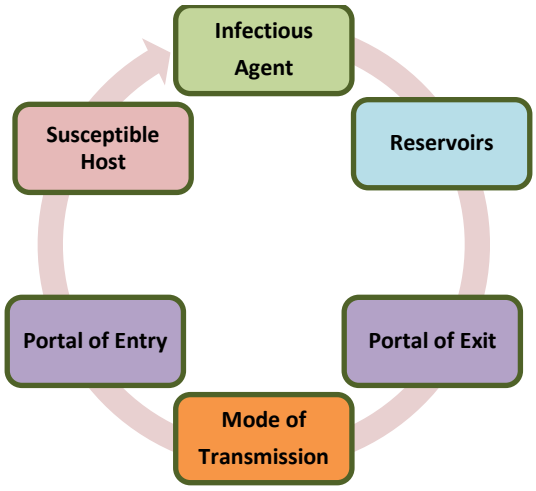

Figure 2. My application of the chain of infection model concepts.

Definition of Terms

Mode of transmission: The mode of transmission is the method the infectious agent is carried from the reservoir to the susceptible host (APIC, 2015; CDC, 2012)

Portal of entry: The portal of entry provides an opening for the infectious agent to enter through to get inside the susceptible host (APIC, 2015; CDC, 2012).

Portal of exit: The portal of exit provides a way out for the infectious agent to leave the reservoir (APIC, 2015; CDC, 2012).

Reservoir: A reservoir is a place that allows the agent to live, grow and multiply (APIC, 2015; CDC, 2012).

Staff nurses: These are nurses that work in the hospital delivering direct patient care.

Susceptible host: A susceptible host is a person or patient in the hospital (APIC, 2015; CDC, 2012).

Vehicle transmission: Occurs when food, water or objects carry the bacteria to the host (APIC, 2015; CDC, 2012).

The Knowles Adult Learning Theory

Concepts from the Knowles's adult learning theory will be used to develop an education module on CVL maintenance for the CLABSI champions nurses. Figure 3 illustrates the nurse's adult learner characteristics. The Knowles concepts will be applied to the CLABSI champion nurse's characteristics, as adult learners (McEwen & Willis, 2007; Smith, 2002). For this DNP project, I planned to apply the Knowles theory and principles to the instructional CVL maintenance education module for the CLABSI champion staff nurses to guide the steps in performing CVL maintenance practice skills. Accordingly, a more effective education program may be developed knowing the adult learner philosophy and characteristics of the CLABSI champion nurses.

The most beneficial aspect of Knowles's adult learning theory for the education program is the primary focus on adult learning (McEwen & Willis, 2007; Smith, 2002). To substantiate the primary focus Knowles acknowledges that the art and science of adult

learning is a process. Knowles goes on to name, the art and science process, andragogy. Andragogy stands for the study of adult learning or the methods and techniques for teaching adults. Knowles andragogy concepts consist of philosophy and a set of assumptions, as core principles for adult learning. Knowles andragogy concepts follow an individual transactional process for adult learning. As described by Knowles, the adult learner interacts through a sequence of learning transactions over time, and the end-results are arguable, the improvement of individuals and improvement in society.

Furthermore, Knowles humanistic views influence the belief that the adult learner has self-responsibility, in the learning process (Smith, 2002). Knowles believed the adult learner is autonomous and self-directed, as well as, the aims of the learner are driven by self-motivation and understanding that motivation is the responsibility of the adult learner. Further humanistic beliefs of Knowles encompasses that the adult learner behaviors, thought processes and emotions all influences and impacts the adult learning process, along with environmental factors. Other outside influences on the conceptual theory are the underlying precepts derived from the humanistic viewpoint in psychology that focuses on helping adults learn.

Further, Knowles believes helping the adult learn requires the teacher to assume the responsibility of facilitating a learning environment. For example, Knowles believes the teacher needs to provide a comfortable environment (McEwen & Willis, 2007). In

addition, Knowles believes the teacher and student relationship must develop to form mutual trust and respect, openness, as well as, acceptance of differences. Also, Knowles believes the teacher need to supply the learning resources for the learner.

Applying Knowles conceptual views to the CLABSI champion nurses and staff nurses describes their characteristics as showing a willingness to learn, being self-motivated and self-directed to learn the CVL maintenance practice skills and will need minimal support to perform the tasks (McEwen & Willis, 2007).

The Knowles's characteristics applied to the development of the education module is:

1. *Need to Know*. The adult learner needs to know why they need to learn something.
2. *Self-directed.* The adult learner self-concept moves from one being dependent toward one being self-directed.
3. *Prior Experience*. The adult learner accumulates a large amount of experience that may serve as a resource for learning.
4. *Readiness to learn*. The adult learner problems and situations in life create a readiness to learn.

5. *Immediate Application of Knowledge (Orientation to learning)*.The adult learner perspective changes over time toward the immediate application of knowledge, rather than the postponed application of knowledge.
6. Self-*Motivation*. The adult learner is stimulated by internal stimuli, rather than external stimuli. Therefore, the adult learner is self-motivated to solve immediate and practical problems.

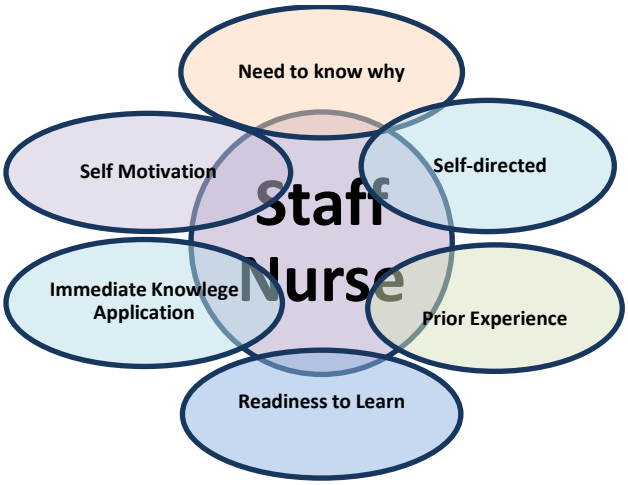

Figure 3. My application of Knowles's adult learning theory concepts.

Knowles characteristics of the adult learning theory will be applied to the education program as follows:

1. The education program makes assumptions about the staff nurses learning process.
2. The program assumes the staff nurses need to know why CLABSI prevention is important.

3. The program assumes once the importance and purpose of CLABSI practice skills are known that the staff nurses will demonstrate self-motivation, self-direction and a readiness to learn the CVL maintenance practice skills.
4. The program assumes once the staff nurses are given the knowledge and practice skills for CVL maintenance immediate application will occur therefore, an immediate practice change will occur using the new skills.
5. The program assumes the staff nurses will self-direct incorporating the new practice skills.
6. The program assumes the staff nurses will immediately apply the new knowledge and skills for CVL maintenance and incorporate the skills with the nurse's prior experience.

The Knowles's adult learning theory informs this DNP project by explaining the philosophy and characteristics, as the core principles of the adult learning process, which is used in the development of an instructional CVL maintenance model. Applying Knowles conceptual views to the CLABSI champion nurses and staff nurses describes their characteristics as showing a willingness to learn, being self-motivated and self-directed to learn the CVL maintenance practice skills and will need minimal support to perform the tasks (McEwen & Willis, 2007). Accordingly, a more effective education

module may be developed applying the philosophy and characteristics from the Knowles's adult learning theory. The principles explained above are applied to the CLABSI nurses learning-process for the instructional CVL maintenance education module and CLABSI prevention, also will be utilized in the development of the CLABSI champion nurses education module.

Relevance to Nursing Practice

Central Line-Associated Bloodstream Infections (CLABSI)

A Central line-associated bloodstream infection occurs when microorganisms enter the patient bloodstream through a CVL device (TJC, 2018). Figure 4 illustrates a CVL catheter device showing the parts inside the patient and the parts that remain outsid the patient. Once a CVL devic is placed, on the inside of the patient's body through the veins attached is a small hollow catheter line, and the tip of the line ends near the heart. But, on the outside of the patient's body attached are the lumens and ports of the CVL device for healthcare workers to access. The problem of CLABSI is directly linked to the frontline nursing staff accessing the lumens and ports of the CVL device (APIC, 2015; HICPAC, 2011). The frontline nursing staff are the ones that use and manipulate the device for the administration fluids, blood products, medications, parenteral nutrition, hemodynamic monitoring, and dialysis. The use and manipulation of the CVL device require stringent

techniques and practice skills to prevent microorganisms from entering the patient bloodstream (TJC, 2018).

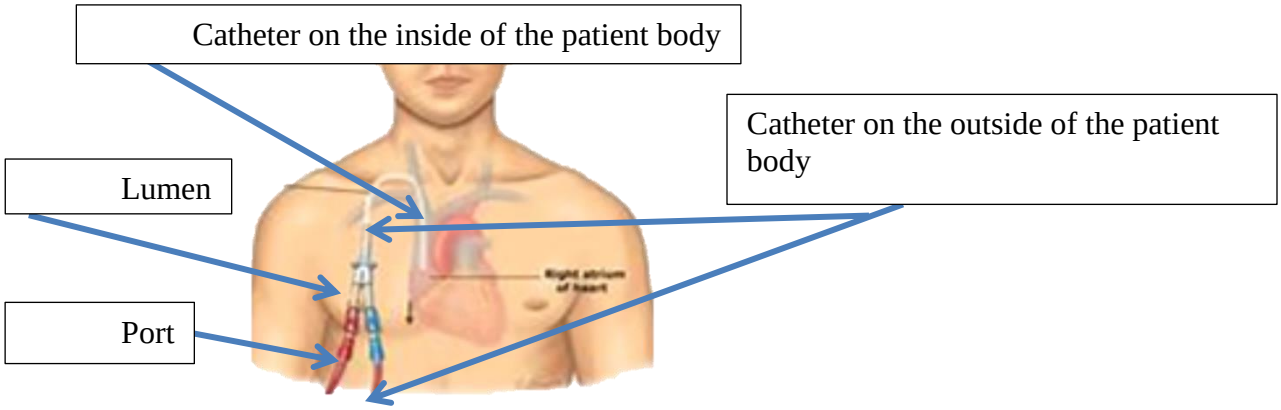

Figure 4. A central line catheter device retrieved from the yahoo search engine at https://images.search.yahoo.com/search/images.

Historical Problem in Nursing Practice

The current problem at the local hospital, the healthcare providers not immediately translating knowledge into the nursing practice to improve patient care and quality outcomes is a historical problem. In 1998, an Executive Quality Committee, cited in Crossing the Quality Chasm: A New Health System for the 21st Century, assembled to address the problem of a chasm or a gap between research and the actual standards of care being provided in healthcare (Institute of Medicine, 2001). According to the Executive Quality Committee, narrowing the chasm will happen if healthcare providers

respond to the advances in science and technology along with redesigning the delivery of healthcare. By responding to the advances in science, healthcare providers will translate research into nursing practice sooner than the historical seventeen-year delay. Finally, the committee developed six aims to assist hospitals with crossing the chasm, as follows: safety, avoiding injuries; effective, services based on scientific knowledge; patient-centered, respectful and responsive to individual preferences; timely, reducing delays; efficient, avoiding waste; equitable, provide quality care to everyone.

Current State of Nursing Practice

CLABSI Champion Nurse

The American Journal of Nursing continuing education program (AJN) reported the CLABSI champion nurse is expected to reinforce best practices for CVL maintenance on the unit and foster a team approach (2014). Further discussions of the AJN (2014) indicated the CLABSI champion nurses serve as expert resources by reviewing current guidelines and identifying practice updates to keep staff informed of practice changes. The AJN (2014) gives further details of the role, as citing the CLABSI champion nurses may perform peer-to-peer CVL maintenance practice skills check-offs, monitor the unit CVL devices for compliance, conduct observation rounds for handwashing, review patients chart for proper documentation or provide patient education on protecting the CVL device.

Bundle Adoption

The Association for Professional in Infection Control and Epidemiology (APIC) Guide to Preventing Central Line-Associated Bloodstream Infections (2015) states maintenance for the CVL device after the licensed personnel inserts the catheter requires bundle modification to develop practice skills. Bundle modification is a process that requires the adoption of practice skills from substantiated CLABSI bundles to target a specific goal and achieve quality patient outcomes. The APIC guide (2015) displays an expanded CVL maintenance bundle checklist based on the Centers for Disease Control and Prevention (2011) and the Healthcare Infection Control Practices Advisory Committee (HICPAC) recommendations for hospitals to follow to prevent CLABSI.

Advances in CLABSI Prevention Related to Nursing Practice

Education for Nurses

Evidence-based research indicated nurses need education post CVL device insertion for infection prevention and control practices for CVL maintenance (TJC, 2018). A more in-depth understanding of CLABSI pathogenesis revealed that microorganism colonized on the external service of the CVL device and intra-luminal of the device at the fluid pathway. Nurses are the ones that access and manipulate the external CVL device to administrator fluids, blood products, medications, parenteral nutrition, hemodynamic monitoring, and dialysis. Therefore, nurses must be educated on

preventing the microorganism from entering the patient bloodstream through the CVL device.

O'Grady et al. (2011), the Healthcare Infection Control Practices Advisory Committee (HICPAC), developed the Prevention of Intravascular Catheter-related Infections Executive Summary Guidelines for the Prevention of CLABSI. HICPAC (2011) reported the Executive Summary Guidelines are for health care workers who are responsible for managing CVL devices through surveillance and control of infections in the hospitals. The goal of the Executive Summary Guidelines (2011) is to provide evidence-based recommendations for preventing CVL catheter-related infections. The evidence-based recommendations (2011) that apply to the nursing field are educating and training the health care workers that maintain the CVL devices. The guidelines state healthcare providers need to educate healthcare workers regarding the indications for the use of CVL devices, maintenance, and appropriate measures to prevent infection.

The Health Research and Educational Trust (2017) identified the lack of awareness and education for evidence-based CLABSI prevention practices as the biggest barrier to eliminating CLABSI. Perez et al. (2010) agreed that a lack of awareness or familiarity with the CLABSI prevention guidelines is a major barrier for the use of the practice skills. In a study conducted by Perez et al. (2010) education was implemented for the sole purpose as an intervention tool for reducing CLABSI. The study results showed a

30% reduction in the number of CLABSI occurrences after the education intervention. Staff nurses understanding the procedures for preventing CLABSI is a key step to maintaining compliance.

Healthy People 2020 reported evidence-based research has shown educating and training health care workers increases compliance and adoption of CVL maintenance practice skills. Health care workers that lack the best practices of educating and training for CVL maintenance are less likely to perform the practice skills needed to prevent the microorganisms from entering the patient's bloodstream and stopping CLABSI (TJC, 2018). All healthcare workers that use CVL devices must remain current on the proper techniques and procedures for CLABSI prevention, and accountability is a key factor for compliance.

Therefore, I proposed to develop an instructional education module on CVL maintenance for the staff nurses that the hospital has identified as CLABSI champions. The DNP instructional, educational module should fill the gap in nursing practice for evidence-based CVL maintenance practice skills, after the local IPC experts have validated and approved the education module. Working with the local IPC experts and unit representatives on the development should allow the instructional CVL maintenance educational module to have a successful implementation, integration, and dissemination at the local hospital.

Local Background and Context

As a result of the IPC drill-downs to determine the causes of CLABSIs only two (5%) were identified as insertion site infections which indicates 95% of the infection are related to CVL maintenance (IPC Director, August 12, 2018). CVL maintenance is the nurse's responsibility, at this hospital. After reviewing evidence-based practice initiatives for CLABSI prevention related to CVL maintenance, the IPC recommended an education program for a new role as CLABSI champion. Currently, no program exists for training CLABSI champion nurses. The CLABSI champion role is being initiated to raise the staff nurses awareness, improve knowledge and guide the staff nurses to use the appropriate practice skills to prevent CLABSI. The IPC plan is to place a CLABSI champion on each floor in the hospital after they have completed the education module.

Institutional Context

The DNP project takes place through the infection control department, of a private, 1,050 bed, not-for-profit academic hospital affiliated with a major university in the Southern region of the United States. The purpose of the Infection Prevention and Control Department (IPC) is to stop and prevent the spread of infections in the hospital (The Centers for Disease Control and Prevention [CDC], 2016). As part of the risk assessment plan, the IPC is responsible for CLABSI surveillance, developing and

monitoring interventions, in addition to, reporting each occurrence to the National Healthcare Safety Network national database.

State and Federal Contexts

The Centers for Medicare and Medicaid (2018) and the Centers for Disease Control and Prevention (2018) hold the hospital accountable for reporting CLABSI events, to the National Healthcare Safety Network, national database (2018). Hospitals that do not comply with the accountable reporting receive a reduction in reimbursement payments from several different federal performance improvement initiatives. For example, failure to report CLABSI could result in payment reductions from the Inpatient Prospective Payment System, the Value-Based Purchasing (VBP): Hospital Acquired Infections (HAI) and Hospital-Acquired Conditions (HAC) which are all inter-related programs with separate penalties.

In contrast, the Centers for Medicare and Medicaid (2018), Pay for Performance Program: Inpatient Prospective Payment System (IPPS) and Hospital-Acquired Condition Reduction Program (HACRP) are payment incentive programs to improve the quality of patient care and prevent CLABSI (CMS, 2018). The Pay for Performance Program links the Centers for Medicare and Medicaid (2018) reimbursement payments to the patients quality of care and not the number of services the patient received during an admission.

Hospitals that rank in the lowest twenty-five percentile of quality performances are financially penalized.

Role of the DNP Student

Professional Context and Relationship to the Doctoral Project

The professional context for this DNP project is applying the AACN (2015) Essentials, as a DNP student in the IPC department, to a specific clinical practice problem. Recent dashboard data, at the clinical site, showed a substantial elevation of the number of CLABSI occurrences greater than then near-zero, clinical expectation (IPC Director, August 12, 2018). I was able to confirm the problem existed through, the IPC surveillance of an information technology systems, DNP Essential IV; Information Systems/Technology. As a result, the IPC conducted drill-downs that showed 95% of the CLABSI occurrences was related to CVL maintenance. In response to the CVL maintenance problems, the IPC recommended a new role as CLABSI champion nurse. Currently, no program exists for training nurse champions.

As a DNP student in the IPC department, I collaborated with the IPC team on the identified need of an instructional CVL maintenance education module for the CLABSI champion nurses and plans for the development. The IPC team was favorable toward my plan. They believe an instructional education module on CVL maintenance would improve the CLABSI champion nurse's CVL maintenances practice skills and would

improve the staff nurse's CVL maintenance practice skills which have been an on-going problem at the hospital (IPC Director, August 12, 2018).

Once the IPC team adopted my CVL maintenance instructional education plan, I participated in multiple inter-professional collaborations with unit representatives during the monthly IPC meetings, to gain buy-in and relay information of the roll-out date. The unit representatives were supportive of the new CLABSI champion nurse's role because potentially, the champions could influence or impact other nurses on the unit to use evidence-based CVL maintenance practice skills, which would eventually lower each unit CLABSI occurrences to near zero or zero. Additionally, each unit was asked to select a CLABSI champion nurse for the role. After the IPC approval, I sent e-mails out with the expected go-live date.

Role in the DNP Project

My role in the DNP project was to develop the content for an instructional CVL maintenance education module. I collaborated with the IPC department and unit representatives on the development of the education module content. The instructional CVL maintenance education module was developed using evidence-based resources. The power-point presentation covered the objectives, background, pathogenesis, model and theory for development and the newly developed practice skills. Working with the hospital leaders on the content needed in the module and coordination of the roll-out

dates made the goal possible to develop a comprehensive instructional CVL maintenance education module for the CLABSI champions.

For the IPC experts to effectively evaluate the content in the education module, I created a 5 point Likert survey (Appendix A). The survey contained five choices to answer each question. The survey contained eleven questions regarding the education module content and space for recommendations. I used both formative and summative evaluations, to provide a descriptive analysis of the results.

Motivations for this DNP Project

The motivation for the DNP project was to uphold the healthcare workers vow "first, do no harm" a quotation that references providing highly reliable, safe, quality care for patients in the hospital (Bauer, 2018). Holding the "no harm" torch connects healthcare workers such as myself to the patient's unavoidable suffering that happens when specific dysfunctions and breaks occur in the way healthcare is delivered. For this DNP project, I chose CVL maintenance, hoping that the staff nurses would improve their awareness, knowledge and practice skills to prevent CLABSI, at the local hospital so no more harm would happen to the patients from CLABSI occurrences. Research indicates CLABSIs are preventable, through applying evidence-based practice skills and health care workers must remain current on the latest evidence to be successful at prevention (IHI, 2012; TJC, 2018).

Additionally, the motivation for the project was my interest to work as a risk manager, in the hospital. I have been a nurse for twenty-six years and align my critical thinking skills to that as a risk manager role and responsibilities. I have a risk manager's license from the state where I live. Therefore, I do possess the basic knowledge of a risk manager. My three previous practicum experiences took place in the risk management department, which continued to develop my skills for being a risk manager. Currently, my focus as a risk manager is identifying and eliminating risks for the hospitals.

Therefore, for my DNP project, I chose CLABSI prevention through CVL maintenance. I hoped to eliminate the risk associated with CLABSI through educating the CLABSI staff nurses on CVL maintenance because research indicates CLABSI is preventable through applying evidence-based practice skills. I hoped the staff nurses would utilize the skills from the education program, in everyday patient care. I anticipated the number of CLABSI occurrences would continue to increase unless accountability to adopt the practice skills take place. The skills are not lengthy in performance but, more knowledge base and directing the skills that nurses already possess, but are not using correctly to decrease CLABSI.

Potential Bias

My responsibility as a DNP student is to anticipate and identify personal biases when working with evidence-based projects (Creswell, 2009). I recognized my bias toward believing no harm should occur to the patients due to the staff nurses lack of knowledge or lack of practice skills for CVL maintenance to prevent CLABSI. However, no personal bias exists. Identifying personal biases and remaining neutral requires understanding that bias exists (2009). I will anticipate and prepare to remain neutral if ethical biases or issues arise because biased beliefs may cultivate through my life experiences, my culture, and my religious beliefs. Therefore The knowledge to avoid personal bias and ethical issues are essential for this DNP project, to have impartial results.

The Role of Project Team

As part of the development process, the IPC team has agreed to take part in evaluating the instructional CVL maintenance education module. The method of evaluation for the IPC experts was a 5-point Likert survey, with eleven questions. Each IPC expert was allowed two hours to review the educational program and provided feedback and recommendations on the educational program, after being placed in a quiet room. I used the data collected from the IPC experts to make changes to the educational module. In addition, I kept the data collected from the survey anonymous. I modified the

education module based on the IPC staff recommendations and feedback, before presenting the final instructional education module to the IPC team. Next, I presented the education module to the IPC team and begin the plan for dissemination with the IPC for a later date.

The IPC team members decided to pilot the CLABSI champion nurse's role, beginning with the critical care units first because those units are most likely, to have CVL devices in use. The pilot lasted one month before a re-evaluation of progress took place. The IPC continued the CLABSI champion nurses rollout every month until the implementated throughout the hospital. The IPC team was able to benchmark data for results after the CLABSI champion nurse's role was implemented and gave the units real-time results to determine the project sustainability.

Also, the IPC team made plans for the future to transfer the education module to the central education division with the belief the module will be more accessible to employees at that location. Once uploaded in the central education system, all employees may access the instructional CVL maintenance education module at any time. The instructional module may be used as a resource.

Summary

The practice problem identified for this DNP project was the lack of an instructional comprehensive CVL maintenance education module and the need for staff

nurses with the expertise to assist other nurses in improving practice skills. The chain of infection model and the Knowles's adult learning theory was used to inform the development of the educational module. My role in the development of the instructional education module was to analyze the need, develop the module content, and coordinate roll-out dates through interpersonal collaboration with the unit representatives and the IPC team. The project team role was to evaluate the module content and monitor benchmarks to determine sustainability. In Section 3, I will discuss the collection and analysis of evidence.

Section 3: Collection and Analysis of Evidence

Introduction

As a DNP student in the IPC department, I collaborated with the IPC team and unit representatives on the identified need of an instructional education module for the CLABSI champion nurses and plans for the development. My role in the DNP project was to develop the content for an instructional CVL maintenance education module. As part of the developing process, the IPC team has agreed to take part in evaluating the instructional CVL maintenance education module. The method of evaluation for the IPC experts was a 5-point Likert survey. I used the data from the IPC experts feedback and recommendations to modify the education module before presenting the final instructional module to the IPC team, for dissemination. Section 3, will cover the practice focus question, sources of evidence, analysis and synthesis and a summary.

Practice Focused Question

As a result of the IPC drill-downs to determine the causes of CLABSIs only two (5%) were identified as insertion site infections which indicates 95% of the infection are related to CVL maintenance (IPC Director, August 12, 2018). CVL maintenance is the nurse's responsibility, at this hospital. After reviewing evidence-based practice initiatives for CLABSI prevention related to CVL maintenance, the IPC recommended an education program for a new role as CLABSI champion. Currently, no program exists for training nurse champions.

To address the IPC concerns, the practice problem identified for this DNP project was the lack of a comprehensive instructional CVL maintenance education module and

the need for staff nurses with the expertise to assist other nurses in improving practice skills. After obtaining the IPC team and unit representatives support, the question I sought to answer for this project was, Will an instructional education module on CVL maintenance practice skills provide the CLABSI champion nurses with instruction on how to perform the lastest CVL maintenance practice skills? The DNP project approach was evidence, validation, and dissemination. I developed an instructional education module. The IPC team evaluated the module. I made changes to the module based on feedback from the IPC team, before representing the education module to the IPC team for dissemination to CLABSI champion nurses, at a later date.

The project learner objectives:

- Nurses will respond and accept that CLABSIs are a problem by accepting the CLABSI champion role
- Describe keeping the CVL system close
- Explain the steps for sanitizing the injection portal hub
- Identify how often the CVL dressing needs changing
- Identify the reasons a CVL dressing must be changed immediately
- Identify how often the CVL administration set need changing
- List the CVL administration sets that are used only once
- Describe the steps for performing a CVL dressing change
- Identify how often a chlorhexidine bath is given to the patient with a CVL device
- Compare the difference between Curos caps and needless connectors

The project outcomes:

- Develop the CVL education module that has multiple practice skills.
- Review the content of the education module with the IPC experts.
- Provide the latest evidence on CVL maintenance practice skills for the CLABSI champions.

Nature of the Project

The first phase, I applied a PICO analysis to this DNP project. The PICO analysis read:

- P- the hospital staff nurses identified as CLABSI champions
- I- develop an instructional education module on CVL maintenance with modifications based on the local IPC expert feedback and recommendations
- C- latest evidence-based CVL maintenance practice skills
- O- provide education on evidence-based CVL maintenance practice skills to the CLABSI champions after being approved by the IPC local experts

Sources of Evidence

The second phase was a collection of sources of evidence. The Walden University Staff Education Manuel (2018) was used as a guide for the DNP staff education module. In addition, a comprehensive literature review was conducted. A literature review was conducted to examine studies between the years 2010 to 2018. The designated search strategy took place at the Walden University Library. The Walden health science research section provided access to the Cumulative Index to Nursing and Allied Health Literature

(CINAHL) and MEDLINE databases for a simultaneous search, also the Elton B. Steven Company database (EBSCO). The database search included key focus words for the project, such as CLABSI prevention, CVL maintenance bundles, CLABSI education, and CLABSI champion roles. The inclusion criteria consisted of peer-reviewed, full-text articles, published in the English language, within the past ten years.

The sources of evidence were used in the development of the evidence-based instructional CVL maintenance education module. I synthesized the Joint Commission Toolkit and Monograph (2018) CVL Maintenance Bundles for potential evidence-based CVL maintenance practice skills. I synthesized the sources of evidence from the expert recommendations for the pathogenesis of CLABSI, and expert recommendations or opinions for CLABSI prevention in an acute care hospital setting. Additionally, I synthesized the expert resources to validate education as a valid, evidence-based intervention to improve the CLABSI champion nurses CVL maintenance practice skills. Finally, I synthesized the literature for similar acute care hospitals interventions to improve the nurses CVL maintenance practice skills.

The expert sources used:

- The Health Research and Educational Trust (HRET), Preventing Harm from CLABSI (2017).
- The Healthcare Infection Control Practices Advisory Committee (HICPAC), Guidelines for the Prevention of Intravascular Catheter-related Infections (2011).

- The Association for Professional in Infection Control and Epidemiology (APIC), Guide to Preventing Central Line-Associated Bloodstream Infections (2015).
- The Infection Control and Hospital Epidemiology of America (SHEA), Strategies to Prevent Central Line-Associated Bloodstream Infections in Acute Care Hospitals (2014).
- The Toolkit and Monograph (2018) for CVL Maintenance Bundles and Expert Guidelines.

Relationship of this Evidence to the Purpose

The purpose of the DNP project was to develop an educational module on CVL maintenance practice skills for the CLABSI champion nurses. The proposed education program was used to give the staff nurses the latest evidence for CVL maintenance practice skills. Therefore, a comprehensive literature review revealed the latest evidence-based practice skills for CVL maintenance relevant for the teaching content that addressed the program objectives. The newly developed CVL maintenance practice skill was adopted from the Toolkit and Monograph (2018) CVL Maintenance Bundles and reinforced by the peer-reviewed journals and expert recommendations on CVL maintenance. The named sources of literature above contained the latest evidence-based practice skills that have been proven to prevent CLABSI. Once the module was developed, the IPC expert panel provided thorough feedback about the usefulness of the teaching content for the CLABSI champion nurses CVL maintenance practice skills.

Evidence Generated for the Doctoral Project

For the IPC experts to effectively evaluate the education content in the education model, a 5 point Likert survey was created. The survey contained eleven questions regarding the education module content. The survey contained five choices to answer each question and space for recommendations to improve the module.

Collection and Analysis of Evidence

To address the practice-focused question: Will an instructional education module on CVL maintenance practice skills provide the CLABSI champion nurses with instruction on how to perform the lastest CVL maintenance practice skills? I conducted a comprehensive literature review for the CLABSI staff education module. After reviewing the latest evidence-based literature for CVL maintenance practice skills, I used the chain of infection model and the Knowles adult learning theory to guide the development of the education module for the CLABSI champion nurses (CDC, 2012; McEwen & Willis, 2007).

Following the initial development of the CVL maintenance education module, I asked five local experts from the IPC to review the education module and two unit representives. The five local experts were expected to provide feedback and recommendations for the education module. Accordingly, I made the changes to the education module as recommended by the experts. Lastly, in the third phase, the education module was presented to the local experts by power-point presentation. The power-point presentation covered the objectives, background, pathogenesis, model and

theory for development and the newly developed practice skills. The IPC team implemented the education model at a later date.

Data Collection

After IRB approval, I collected data for the DNP project on the site of the local hospital at the IPC department. The participants in the survey process were five local experts from the IPC department, one director, physician, two nurses and one microbiologist, along with two unit representatives. All the IPC participants have more than five years of experience and have a Certification in Infection Control (CIC). Five of the local IPC experts and 2 unit representatives were asked to evaluate the developed educational program.

The method of evaluation for the IPC experts was a 5-point Likert survey, with eleven questions. Each IPC expert was allowed two hours to review the educational program and provided feedback on the educational program, after being placed in a quiet room. I used the data from the feedback to make the necessary changes in the educational module that align with the recommendations from the experts. I kept the data collected from the survey anonymous. Once all the recommendations had been included in the education program, the revised education module was presented to the IPC department.

Protections

The staff education project was approved by the Institutional Review Board (IRB) #04-30-19-0047553. The project poses no risk to human subjects, as no identifiable patient information will be used for the project. Also, I am not directly involved with any

patient care. The name of the organization for whom the project is completed will remain masked as recommended by the Walden IRB.

Analysis and Synthesis

Next, the five local experts were asked to complete a five-point Likert survey based on the content of the new staff education module on the CVL maintenance practice skills. The Likert survey contained eleven questions and one area for improvement recommendations. The questions related to the content as follows: organize, clear, easy to comprehend, raise CVL maintenance awareness, nurses role clear, improve knowledge on infection prevention for CVL device, improve knowledge on CVL maintenance practice skills, reinforced knowledge on CVL maintenance practice skills, met the clinical standards for CVL maintenance, met education objectives, and recommend education program (Appendix A).

The five-point Likert survey question choices were:

- Strongly Agree
- Agree
- Neither Agree or Disagree
- Disagree
- Strongly Disagree

The common field for recommendations

The local expert questionnaire and feedback validated the education content. Revisions to the educational module were made based on the feedback obtained from the survey analysis. Per Walden DNP Manual for Staff Education Project (2019), I included

a synthesis of the findings using descriptive statistics to report the results of the five-point Likert survey.

Project Plan Evaluation

This DNP project consisted of both formative and summative evaluations. Using a five-point Likert survey, I was able to obtain from the IPC local experts and two-unit representatives a formative evaluation during the process of providing feedback on the education module. The module was adjusted based on the local expert responses. Next, the eleven question five-point Likert survey provided a summary of results based on the content of the education module, which gave a summative evaluation. Both the formative and summative processes provided valuable assessments of the education module.

Summary

In this section, I outlined the development of the newly developed CVL maintenance educational program. The newly-developed CVL maintenance program was guided by the latest evidence-based practice skills, as approved by IPC experts, for developing and implementing an education program. I included five local infection control experts in the developmental process who provided feedback that was used to amend the education module and two-unit representatives. Once developed and validated, I presented the education module to IPC department for a later implementation date and possible future training tool. Potentially, the education module on CVL maintenance practice skills will improve the CLABSI nurses awareness, knowledge and guide practice skills to improve CVL maintenance, and ultimately will prevent CLABSI. In addition, potentially, a positive social change will occur because improving the nurse's practice

skills for CVL maintenance will prevent CLABSI and decrease the patient's hospital stays and costs, in addition to, morbidity and mortality that is associated with CLABSI. In the next section, I will discuss the project evaluation and findings.

Section 4: Findings and Recommendations

Introduction

In Section 4 of this DNP project, I provide the details of the results of a Likert scale survey that was administered to the expert panel to evaluate the instructional CVL maintenance education module content. In addition, I considered the implication of the results. The purpose of the education module was to develop an instructional CVL maintenance education module, then have the IPC team evaluate the content of the module using a Likert scale survey. I asked seven local experts and two-unit representatives to evaluate the content of the instructional CVL maintenance education module. The survey results were analyzed using descriptive analysis. Next, I modified the module based on the feedback and recommendations of the IPC team, before presenting the module to the CLABSI champion nurses.

Project Overview

The problem identified for this DNP project was that the local hospital IPC dashboard showed forty CLABSIs occurred that were related to the nurses CVL maintenance practice skills which exceeded the clinical expectation of zero (IPC Director, August 12, 2018). As a result of the IPC drill-downs to determine the causes of CLABSIs, only two (5%) were identified as insertion site infections which indicates 95% of the infection were related to CVL maintenance (IPC Director, August 12, 2018). CVL maintenance is the nurse's responsibility, at this hospital. After reviewing evidence-based practice initiatives for CLABSI prevention related to CVL maintenance, the IPC

recommended an education program for a new role as CLABSI champion. Currently, no program exists for training CLABSI champion nurses.

To address the IPC concerns, the practice problem identified for this DNP project was the lack of a comprehensive instructional CVL maintenance education module and the need for staff nurses with the expertise to assist other nurses in improving practice skills. The guiding practice-focused question: Will an instructional education module on CVL maintenance practice skills provide the CLABSI champion nurses with instruction on how to perform the latest CVL maintenance practice skills? For this DNP project, I proposed to develop an instructional education module on CVL maintenance for the staff nurses that the hospital has identified as CLABSI champions. I used the Knowles's adult learning theory and the chain of infection model to develop the instructional CVL maintenance education module. The DNP instructional, education module should fill the knowledge gap in nursing practice for evidence-based CVL maintenance practice skills being used in the hospital by the staff nurses.

Sources of Evidence

The Walden University Staff Education Manual (2018) was used as a guide for the DNP staff education module. In addition, a comprehensive literature review was conducted. A literature review was conducted to examine studies between the years 2010 to 2018. The designated search strategy took place at the Walden University Library. The Walden health science research section provided access to the Cumulative Index to Nursing and Allied Health Literature (CINAHL) and MEDLINE databases for a simultaneous search, also the Elton B. Steven Company database (EBSCO). The database

search included key focus words for the project, such as CLABSI prevention, CVL maintenance bundles, CLABSI education, and CLABSI champion roles. The inclusion criteria consisted of peer-reviewed, full-text articles, published in the English language, within the past ten years.

The sources of evidence were used in the development of the evidence-based instructional CVL maintenance education module. I synthesized the Joint Commission Toolkit and Monograph (2018) CVL Maintenance Bundles for potential evidence-based CVL maintenance practice skills. I synthesized the sources of evidence from the expert recommendations for the pathogenesis of CLABSI, and expert recommendations or opinions for CLABSI prevention in an acute care hospital setting. Additionally, I synthesized the expert resources to validate education as a valid, evidence-based intervention to improve the CLABSI champion nurses CVL maintenance practice skills. Finally, I synthesized the literature for similar acute care hospitals interventions to improve the nurses CVL maintenance practice skills.

The expert sources used:

- The Health Research and Educational Trust (HRET), Preventing Harm from CLABSI (2017).
- The Healthcare Infection Control Practices Advisory Committee (HICPAC), Guidelines for the Prevention of Intravascular Catheter-related Infections (2011).

- The Association for Professional in Infection Control and Epidemiology (APIC), Guide to Preventing Central Line-Associated Bloodstream Infections (2015).
- The Infection Control and Hospital Epidemiology of America (SHEA), Strategies to Prevent Central Line-Associated Bloodstream Infections in Acute Care Hospitals (2014).
- The Toolkit and Monograph (2018) for CVL Maintenance Bundles and Expert Guidelines.

Findings and Implications

Findings

A comprehensive literature review revealed expert resources indicated that staff education was needed to prevent CLABSI occurrences in the hospital. Similarly, the literature review provided the latest evidence-based CVL maintenance practice skills which were relevant for the teaching content that addressed the module objectives. The new CVL maintenance practice skills were developed using the bundle adoption process from the Joint Commission Toolkit and Monograph (2018) CVL Maintenance Bundles and reinforced by the peer-reviewed journals and expert recommendations on CVL maintenance. For example, Jones et al. (2014) and Latif et al. (2015) demonstrated the use of the adoption processes for making changes to substantiated CLABSI bundles, to align the nurses CVL maintenance problem to the desired CVL maintenance practice skills for CLABSI prevention. In addition, the Knowles's adult learning theory aided in the development of the education module by providing the concepts for teaching adult

nurses. Likewise, the chain of infection model provided the concepts for the CVL maintenance practice skills covered in the module, both were vital for the development of the education module. Other findings included the use of the AACN Essentials (2006) I, II, III, 1V, VI.

Initial Likert Survey Findings

The majority of the panel experts 8(89%) provided a neutral response to the usefulness of the instructional CVL maintenance education module content, indicating changes needed to be made to improve the content. Therefore, I made changes to the module to meet the expert panel standards and expectations. In addition, a large percentage 8(89%) of the expert panel favorably indicated the content was easy to understand, but written recommendations preferred the education module to be presented at a higher level for the nursing audience. Overall the panel thought the educational module would raise awareness for the need of CVL maintenance improvement 7(78%) and will instruct the CLABSI champions nurses on the use of the evidenced-based CVL maintenance practice skills 7(78%) due to the nurse's role being clearly stated. However, none of the expert-panel members thought the educational module would be recommendable in the current state, 9(100%), therefore changes were made according to the expert suggestions, as follows. The expert panel recommendations for improvement were: 1). The content could be presented at a higher level considering the intended audience. 2). The presentation provided a basic overview but not thorough enough to meet the clinical standards for CVL maintenance and CLABSI prevention. 3). Integrate

better objectives for the learner. 4). Add more information to the dressing changes section.

Table 1.

Initial Expert Panel Likert Survey

Total Expert Panel (*N* = 9)		N=%	N=%	N=%	N=%	N=%
Answer Category		Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
1.	Content Organize		1(11%)	8(89%)		
2.	Content Clear			8(89%)	1(11%)	
3.	Content Easy to Comprehend	1(11%)	8(89%)			
4.	Raise CVL Maintenance Awareness		7(78%)	2(22%)		
5.	Nurses Role Clear		7(78%)	1(11%)	1(11%)	
6.	Content Improve Knowledge on Infection Prevention for CVL device			9(100%)		
7.	Content Improve Knowledge on CVL Maintenance Practice Skills			9(100%)		
8.	Content Reinforced Knowledge on CVL Maintenance Practice Skills			9(100%)		
9.	Content Met the Clinical Standards for CVL Maintenance			1(11%)	8(89%)	
10.	Content Met Objectives			8(89%)	1(11%)	
11.	Recommend Education Program to Staff				9(100%)	

To address the panel's recommendation of presenting the content at a higher level considering the audience, I compared the expert recommendations from the literature review and synthesized the CVL maintenance practice skills within the scope of nursing practice. A recognizable expert recommendation pattern was easy to identify among the expert resources for the nurses CVL maintenance practice skills and those were included in the education module.

The expert sources used:

- The Health Research and Educational Trust (HRET), Preventing Harm from CLABSI (2017).
- The Healthcare Infection Control Practices Advisory Committee (HICPAC), Guidelines for the Prevention of Intravascular Catheter-related Infections (2011).
- The Association for Professional in Infection Control and Epidemiology (APIC), Guide to Preventing Central Line-Associated Bloodstream Infections (2015).
- The Infection Control and Hospital Epidemiology of America (SHEA), Strategies to Prevent Central Line-Associated Bloodstream Infections in Acute Care Hospitals (2014).
- The Toolkit and Monograph (2018) for CVL Maintenance Bundles and Expert Guidelines.

Furthermore, I included the recommendations from the two expert panel Quality leaders to incorporate, the K-Card. The K-Card was a hospital intervention that was

implemented but the leaders felt not many units knew about the K-Card or was not routinely using the K-Card. The K-Card is a hand size list of the CVL maintenance practice skills made for encouraging the frontline nurses use at the patient bedside. The K-Card has a checkbox next to each skill so the nurse can check off the skills as being provided, then given to management to show compliance.

To address the panel's recommendation of providing clear clinical standards. I created a project overview list which shows all the CVL maintenance practice skills and content covered in the education module and I developed specific learner objectives that align with the CVL maintenance practice skills. The project overview list covered all aspects of the CVL device and use.

- The project overview list is as follows: Define central venous line device, Explain the central venous line device parts, Explain the purpose of the central venous line device, Define central line-associated blood stream infection (CLABSI), Explain the causes of central line-associated blood stream infection, Explain the importance of preventing CLABSI, Identify the nurses role for preventing CLABSI using evidence-based practice skills, and the hospital K-Card.
- The project CVL maintenance practice skills list covered in the education module is as follows: Hand hygiene, Sanitizing the injection portal hub or needless connectors, Flush the CVL injection portal, Changing the CVL administration set, Daily chlorhexidine bath, Daily CVL dressing assessment, Assessing the need for the CVL device, Keeping the CVL

device system close, Accessing the CVL injection portal for medications, Accessing the CVL injection portal for blood draws, and CVL sterile dressing changes.

Further, to address the panel's recommendation of better learner objectives, I developed detailed learner objectives for the education module to direct the learner toward performing and understanding the CVL maintenance practice skills. In addition, I created short quizzes for the learner's use throughout the education module to promote a thorough review of the CVL maintenance practice skills.

To address the panel's recommendation of providing more dressing change information, I developed a dressing change review by identifying a step by step review process for sterile dressing changes which was included in the module content. Also, the CVL sterile dressing change kit and contents of the kit were featured in the education module.

Table 2

Final Expert Panel Likert Survey After Amendment to the Education Module

Total Expert Panel (N=9)		N=%	N=%	N=%	N=%	N=%
Answer Category		Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
1.	Content Organize	8(89%)	1(11%)			
2.	Content Clear	9(100%)				
3.	Content Easy to Comprehend	9(100%)				
4.	Raise CVL Maintenance Awareness	9(100%)				
5.	Nurses Role Clear	9(100%)				
6.	Content Improve Knowledge on Infection Prevention for CVL device	9(100%)				
7.	Content Improve Knowledge on CVL Maintenance Practice Skills	8(89%)	1(11%)			
8.	Content Reinforced Knowledge on CVL Maintenance Practice Skills	9(100%)				
9.	Content Met the Clinical Standards for CVL Maintenance	9(100%)				
10.	Content Met Objectives	9(100%)				
11.	Recommend Education Program to Staff	9(100%)				

Final Likert Survey Findings

After changes were made using the expert panel's recommendations, the panel reexamined the content using the same criteria and the results are shown in Table 2. Each member of the expert panel 9(100%) strongly agree the content was clear, easy to comprehend, the nurse role was clear, improve knowledge on infection prevention for the CVL device, reinforced knowledge on CVL maintenance practice skills, also the content met clinical standards and objectives. The majority 8(89%) of the expert panel strongly agree the content was organized and one expert panel 1(11%) agree. In addition, the majority 8(89%) of the expert panel strongly agree the content improves knowledge on CVL maintenance practice skills and one expert panel 1(11%) agree. Finally, all the expert panel 9(100%) strongly agree they would recommend the education program to staff and the program would raise CVL maintenance awareness for improvement. No further recommendations were made from the expert panel.

Limitations

Many of the expert articles had recommendations for preventing CLABSI in the hospital using measures out of the scope of nursing practice. Those recommendations were specific for physician CVL insertion methods and initial CLABSI program set-up which would require hospital administration approval. Also, the study was limited due to my having asked only nine expert participants to review the CVL maintenance

educational module and provide feedback which was used to amend the module. A small sample size makes the study results difficult to generalize.

Implications for Social Change

This project has the potential to impact the local organization, leaders and staff nurses by improving CVL maintenance practice skills, and reducing and preventing CLABSI occurrences to near zero. Implications for positive social changes at the local site include efficiency in the patient care for CVL maintenance practice skills, standardization of CVL maintenance practice skills, and improved education for the CLABSI champion nurses in one hospital. Research indicates CLABSIs are preventable if evidenced-based CVL maintenance practice skills are followed (APIC, 2014; HICPAC, 2011; IHI, 2012; SHEA, 2015; TJC, 2018). Therefore, implementing and integrating evidence-based practice skills for the CLABSI champion nurses, potentially will reduce and prevent of CLABSI, as well as, decrease patient's hospital stay and cost, and morbidity and mortality associated with CLABSI. Also, the nursing education module has the potential to be a future resource for healthcare workers.

Recommendations

The CVL maintenance education module included adpoted practice skills from the Joint Commission (2018) Toolkit and Monograph CVL Maintenance Bundle, and expert recommendations, to close the nurse's gap of knowledge to the evidence-based

CVL maintenance practice skills. The Joint Commission Toolkit and Monograph (2018) in Appendix B, contained practice skills that are evidenced-based proven to prevent and reduce CLABSI. Each component of the bundle is a standard of care and a credible and reliable intervention (APIC, 2014; HICPAC, 2011; IHI, 2012; SHEA, 2015; TJC, 2018). Therefore, I collaborated with an expert panel and used the evidenced-based practice skills synthesized from the literature review, and the Joint Commission Toolkit and Monograph CVL Maintenance Bundle (2018), to develop the instructional CVL maintenance education module created as a power-point presentation. The IPC department implemented the education module for the CLABSI champion nurses, at a later date.

Based on the expert recommendations in the Joint Commission Toolkit and Monograph (2018) if the evidence-based practice strategies are implemented then, CLABSI occurrences will be prevented or reduced, in the hospital. Also, the Toolkit and Monograph (2018) recommended educating and training the staff on the practice skills for CLABSI prevention and reduction. The expert resources recommended education as being a successful clinical intervention for preventing and reducing the number of CLABSI occurrences, at the current hospital (APIC, 2014; HICPAC, 2011; IHI, 2012; SHEA, 2015; TJC, 2018

Contribution of the Doctoral Project Team

Each of the panel experts reviewed and evaluated the instructional CVL maintenance education module using a 5 point Likert survey. The expert panel included nine members in total. Each of the IPC members of the expert panel had at least five years of experience in infection prevention and control and had a Certification in Infection Control (CIC). The members of the panel included the director, physician, two nurses, two biomedical technologists, and one microbiologist. In addition, the two-unit representatives were Magnet Quality leaders who participated in the survey. The expert panel initial evaluation responses are shown in Table 1. The expert panel final evaluation responses are shown in Table 2.

Extend the DNP Project

The IPC team made plans for the future to transfer the education module to the central education division with the belief the module will be more accessible to employees at that location. Once uploaded in the central education system, all employees may access the instructional CVL maintenance education module at any time. The instructional module may be used as a resource.

Strength and Limitations of the Project

The CVL maintenance education module strength was the support I had from the IPC staff and the two-unit representatives helping develop the content for the education

module. The IPC department showed commitment and support by participating and offering advice until the project was finished. Another strength was the evidence-based resources from the Joint Commission Toolkit and Monograph (2018) CVL Maintenance Bundles. The CVL maintenance evidence-based practice skills have been proven to prevent and reduce CLABSI.

A potential limitation for the doctor of nursing practice project is observing the matrices that will show a decrease in the number of CLABSI occurrences in the hospital. According to the IPC expert panel, the results of implementing the CLABSI nurse's CVL maintenance practice skills will take six months to one year to see any decrease in the number of CLABSI occurrences. Unfortunately, I will not have access to the IPC department data at that time.

Recommendations for Future Projects

My recommendations for future projects for CVL maintenance improvement includes extending the education program to the hospital associated specialty clinics such as dialysis and apheresis clinics. During the DNP project process, I observed patients with hemodialysis ports and apheresis ports that had been accessed only outside the facility caused the hospital to receive a reportable CLABSI and subsequent financial penalties (IPC Director, August, 12, 2018). Therefore, the current instructional CVL maintenance education module could be extended to the hospital affiliated clinics to

improve the nurses CVL maintenance practice skills, as well as, reduce and prevent CLABSI.

Section 5: Dissemination Plan

The educational module dissemination process initiated from the hospital IPC which routinely collaborates with nursing to prevent hospital infections (IPC Director, August 12, 2018). This DNP project was developed in collaboration with the IPC department and unit representatives to address an identified problem of not having an instructional CVL maintenance education module for a new role the hospital identified as CLABSI champion nurse. I presented the education module to the IPC team after modifying, then begin the plan for dissemination for a later date.

This DNP project, the development of an instructional CVL maintenance education module is relevant to all audiences that have an interest in improving the staff nurses CVL maintenance practice skills, in addition to, reducing and preventing CLABSI occurrences. The dissemination of the instructional CVL maintenance education module is appropriate for any healthcare institutions which has hospital patients that use CVL devices except pediatrics. The APIC convention may be a place for a poster presentation on CVL maintenance for reducing CLABSI. Publications that may have an interest in the education module are those interested in preventing infections such as, *Healthcare Infection Control Practices Advisory Committee (HICPAC)* or *Infection Control and Hospital Epidemiology of America (SHEA)*, peer-reviewed journals.

Analysis of Self

Studying to obtain a DNP degree has taught me to set goals and priorities, self-discipline, time-management, self-motivation, perseverance, and confidence. I have acquired new knowledge and skills that I will be able to use for the rest of my life as a nurse leader. I have gained insight as DNP prepared nurse leader that it is my responsibility to ensure evidence-based practices are being translated and integrated into patient care practices in my workplace, home, and community. I have gained insight as, a DNP prepared nurse leader that it is my responsibility to make positive social changes in the aggregate, organization and policy level. Additionally, I have gained insight that it is my responsibility to promote health and wellness for individuals and groups in my workplace, home, and community. Completing this DNP program has reinforced my belief that I am able to use the knowledge and skills that I have gained to achieve positive social changes in my community.

My DNP journey has been treacherous due to the many setbacks I encountered. Although I experienced disappointment on my journey, still my goal of wanting to become a DNP leader out-weighed the weariness and thoughts of quitting. I believe the values that my mother and grandmother instilled in me as a child played a huge part in my perseverance to endure until the end. My grandmother and mother both were public servants until they retired. I attributed my mother graduating from a four-year college as

the “wind beneath my wings," thus came the expectations for me to graduate, as well. A continued push for education came from my mother who was an elementary school teacher for forty-two years. These two ladies have been my inspiration in life and helped cultivate my humanitarian beliefs.

Practitioner

I believe I was shaped in my mother’s womb to become a practitioner of nursing fostering contributions to the profession that are unique to me. I believe each nurse has a gift to offer the profession of nursing practice and mine is the spirit of compassion. My professional motto now is inspired by the song “I’ll Rise UP”, by Andra Day. The chorus of the song: I’ll rise up, I’ll rise like the day, I’ll rise up, I’ll rise unafraid, I’ll rise up, and I’ll do it a thousand times again, for you, for you, for you, for you. To me, nursing is more than just observation and interventions but, must include an element of human interactions that show genuine concern and compassion for the patients, families, and co-workers. I believe my practitioner skills and values addresses both the “art and science” of nursing, which makes me sensitive to the whole patient, physical, psychological, social and spiritual needs.

I have practiced professional nursing for twenty-six years, always as a registered nurse. I have worked as a floor nurse in the following clinical areas; Medical Intensive Care Unit, Progressive-Care Unit, Medical Surgical-Telemetry, Endoscopy,

Rehabilitation, Corrections, Psychiatric, Nursing Home, Hospice and Home Health. I find my experience in the many different clinical areas has improved my critical thinking skills. Also, I believe working in different clinical areas has strengthened my assessment skills for different patient populations.

The DNP role as a practitioner has led me down a leadership path that requires me to develop skills that will assist me to be an effective change agent in my workplace, organizations, and community. As an effective change agent of the scholarly DNP project, I am able to identify a practice problem, formulate a practice-focus question, synthesize the latest evidence, translate new knowledge into practice and integrate the knowledge across disciplines (AACN, 2015). I am able to lead inter-professional teams through collaboration, translate the patient need as urgent and communicate a clear vision (Kotter, 2007). I am able to use computer technology to identify aggregate problems, set and monitor benchmarks and create sustainability for a successful intervention. The result, I was able to apply the DNP knowledge and leadership skills to develop a scholarly project during my DNP journey, that will improve patient outcomes.

My future role as DNP nurse leader resides in my desire to work as a risk manager or possible nursing home administrator both require limiting risk for patient care. My short-term goals are to receive a risk management certification and a nursing home administrator license. A future role in the risk management field dictates that my

profession will be centered around identifying aggregate level data and making changes on the policy and organizational level for the safety of the patient population. Essentially, both the role of the risk manager and nursing home administrator requires DNP knowledge and skills to be successful at making evidence-based changes.

Scholar

My humanitarian beliefs influenced my desire to be a leader of change in the nursing field. I have a purpose-driven need to be a part of a larger community that want to improve the patient experience and produce quality outcomes. My desire to become a nurse leader led me to academically pursue a master's degree in nursing, with a specialization in leadership and management. Additionally, I accepted the challenge to learn more about the roles and responsibilities of the DNP nurse leader to further my commitment to lead change.

As a DNP scholar, I was able to participate in 1000-hour clinical practicum to gain leadership experience, in risk management, infection control, and the quality department. The clinical experience afforded many opportunities for DNP leadership experiences. Through the leadership opportunities, I was able to combine my past nursing experiences and critical thinking skills to my newly developed DNP leadership insights and skills.

Project Manager

Part of my becoming a successful project manager is accepting the accountability for being a DNP nurse leader. Accountability as a DNP leader entails me leading evidence-based changes through three dimensions, leading relationships, change processes, and culture changes, also being a role model (Salmela et al., 2012). As a project manager, I was able to develop a scholarly DNP project. The DNP project afforded me an opportunity to collaborate and build relationships with other health professional and make a positive social change in one hospital that potentially could decrease the hospital CLABSI patient's morbidity and mortality, in addition to, stays and costs. I was able to develop an instructional CVL maintenance education module for the nurses the hospital identified as CLABSI champions, which could potentially improve CVL maintenance practice skills for all the hospital staff nurses. I have demonstrated as a project manager, I am able to identify a practice problem, facilitators and barriers, select appropriate theories and translation models, then integrate and disseminate the evidence into practice. Most important, the DNP project, may be peer-reviewed, replicated and disseminated by other health professionals.

The challenges presented during the DNP project was my needing buy-in and a selected CLABSI champion from each unit to participate in the education program, also not being directly involved in the selection process. However, my needs were

communicated to the IPC team and quality leaders before meetings which demonstrated a collaborative effort to overcome barriers. As a DNP student, I was allowed to accompany the IPC team to the planned CLABSI workgroup meetings. In addition, I was allowed to visualize the collaborative efforts between the IPC, quality leaders and stakeholders for the CLABSI champion role.

Completing the DNP project has given me the confidence I needed to be an effective DNP nurse leader in the scholarship of nursing. Now, I understand the importance of the DNP nurse leader role which is to evolve in the scholarship of discovery, teaching, practice, and integration (AACN, 2015). I anticipate the newly developed skills and confidence that I have gained will guide me to be an effective change agent in the risk management area or nursing home administrator field, as well as, in my home, workplace, and community.

Summary

I designed this project to address the lack of a comprehensive instructional CVL maintenance education module and the need for staff nurses with the expertise to assist other nurses in improving CVL maintenance practice skills. The staff nurses performing evidence-based CVL maintenance practice skills are important because it could lead to decreasing CLABSI infections in the hospital. I conducted a comprehensive literature review which revealed the latest evidence-based practice skills for CVL maintenance

relevant for the teaching content that addressed the module objectives. The newly developed CVL maintenance practice skills were adopted from the Joint Commission Toolkit and Monograph (2018) CVL Maintenance Bundles and reinforced by the peer-reviewed journals and expert recommendations on CVL maintenance. In addition, the literature review findings indicated the need for staff education to prevent the number of CLABSI occurrences at the current hospital. I collaborated with the infection prevention and control department and unit representatives to develop an instructional CVL maintenance education module for a select group of nurses who will serve as CLABSI champion. A panel of seven local IPC experts and two-unit representatives evaluated the content and provided feedback that indicated the module provided awareness and educational benefits for the CLABSI champion nurses. The DNP instructional, educational module filled the gap in nursing practice for the evidence-based CVL maintenance practice skills being used by the hospital staff nurses. This project may be disseminated to other acute care health institutions that show a need for staff nurses improving CVL maintenance practice skills.

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Appendix A: Likert Survey

Directions: Please check one box that most appropriately represent your view.

Choices: 5=Strongly Agree, 4=Agree, 3=Neither Agree nor Disagree, 2=Disagree, 1= Strongly disagree

Category	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
12. Content Organize					
13. Content Clear					
14. Content Easy to Comprehend					
15. Raise CVL Maintenance Awareness					
16. Nurses Role Clear					
17. Content Improve Knowledge on Infection Prevention for CVL device					
18. Content Improve Knowledge on CVL Maintenance Practice Skills					
19. Content Reinforced Knowledge on CVL Maintenance Practice Skills					
20. Content Met the Clinical Standards for CVL Maintenance					
21. Content Met Objectives					
22. Recommend Education Program to Staff					

Directions: Please provide any recommendations for improvement of the presentation.

Directions: Please check one box that most appropriately represent your view.

Choices: 5=Strongly Agree, 4=Agree, 3=Neither Agree nor Disagree, 2=Disagree, 1= Strongly disagree.

Category	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
1. Content Organize			✓		
2. Content Clear			✓		
3. Content Easy to Comprehend		✓			
4. Raise CVL Maintenance Awareness		✓			
5. Nurses Role Clear		✓			
6. Content Improve Knowledge on Infection Prevention for CVL device			✓		
7. Content Improve Knowledge on CVL Maintenance Practice Skills			✓		
8. Content Reinforced Knowledge on CVL Maintenance Practice Skills			✓		
9. Content Met the Clinical Standards for CVL Maintenance				✓	
10. Content Met Objectives					
11. Recommend Education Program to Staff				✓	

Please provide any recommendations for improvement of the presentation:

None

Directions: Please check one box that most appropriately represent your view.

Choices: 5=Strongly Agree, 4=Agree, 3=Neither Agree nor Disagree, 2=Disagree, 1= Strongly disagree.

Category	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
1. Content Organize			✓		
2. Content Clear			✓		
3. Content Easy to Comprehend		✓			
4. Raise CVL Maintenance Awareness		✓			
5. Nurses Role Clear		✓			
6. Content Improve Knowledge on Infection Prevention for CVL device			✓		
7. Content Improve Knowledge on CVL Maintenance Practice Skills			✓		
8. Content Reinforced Knowledge on CVL Maintenance Practice Skills			✓		
9. Content Met the Clinical Standards for CVL Maintenance				✓	
10. Content Met Objectives					
11. Recommend Education Program to Staff				✓	

Please provide any recommendations for improvement of the presentation:

State the dressing change process clearer the dressing change site should use sterile technique + should be dis-infected I c.H.G or other antiseptic.

Providine - Iodine is not typically used for scrubing the hub the hospital

Directions: Please check one box that most appropriately represent your view.

Choices: 5=Strongly Agree, 4=Agree, 3=Neither Agree nor Disagree, 2=Disagree, 1= Strongly disagree.

Category	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
1. Content Organize			✓		
2. Content Clear			✓		
3. Content Easy to Comprehend		✓			
4. Raise CVL Maintenance Awareness		✓			
5. Nurses Role Clear		✓			
6. Content Improve Knowledge on Infection Prevention for CVL device			✓		
7. Content Improve Knowledge on CVL Maintenance Practice Skills			✓		
8. Content Reinforced Knowledge on CVL Maintenance Practice Skills			✓		
9. Content Met the Clinical Standards for CVL Maintenance				✓	
10. Content Met Objectives					
11. Recommend Education Program to Staff				✓	

Please provide any recommendations for improvement of the presentation:

NONE

Directions: Please check one box that most appropriately represent your view.

Choices: 5=Strongly Agree, 4=Agree, 3=Neither Agree nor Disagree, 2=Disagree, 1= Strongly disagree.

Category	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
1. Content Organize			✓		
2. Content Clear			✓		
3. Content Easy to Comprehend		✓			
4. Raise CVL Maintenance Awareness		✓			
5. Nurses Role Clear		✓			
6. Content Improve Knowledge on Infection Prevention for CVL device			✓		
7. Content Improve Knowledge on CVL Maintenance Practice Skills			✓		
8. Content Reinforced Knowledge on CVL Maintenance Practice Skills			✓		
9. Content Met the Clinical Standards for CVL Maintenance				✓	
10. Content Met Objectives					
11. Recommend Education Program to Staff				✓	

Please provide any recommendations for improvement of the presentation:

State the dressing change process clearer the dressing change site should use sterile technique + should be dis-infected I c.H.G or other antiseptic.

Providine - Iodine is not typically used for scrubing the hub the hospital

Directions: Please check one box that most appropriately represent your view.

Choices: 5=Strongly Agree, 4=Agree, 3=Neither Agree nor Disagree, 2=Disagree, 1= Strongly disagree.

Category	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
1. Content Organize			✓		
2. Content Clear					
3. Content Easy to Comprehend	✓ but incomplete				
4. Raise CVL Maintenance Awareness			✓		
5. Nurses Role Clear			✓		
6. Content Improve Knowledge on Infection Prevention for CVL device			✓		
7. Content Improve Knowledge on CVL Maintenance Practice Skills			✓		
8. Content Reinforced Knowledge on CVL Maintenance Practice Skills			✓		
9. Content Met the Clinical Standards for CVL Maintenance			✓		
10. Content Met Objectives			✓		
11. Recommend Education Program to Staff				✓	

Please provide any recommendations for improvement of the presentation:

Review for grammar. Slide 6- mortality: reconsider use of chosen graphics. CVL device + purpose could be better defined. Causes of CLABSIs not well defined in presentation. Overall, the content could be presented at a higher level, considering intended audience. This presentation provides a very simple, basic overview but not thorough enough to meet the clinical standards for CVL maintenance + CLABSI prevention.

Directions: Please check one box that most appropriately represent your view.

Choices: 5=Strongly Agree, 4=Agree, 3=Neither Agree nor Disagree, 2=Disagree, 1= Strongly disagree.

Category	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
1. Content Organize			✓		
2. Content Clear			✓		
3. Content Easy to Comprehend		✓			
4. Raise CVL Maintenance Awareness		✓			
5. Nurses Role Clear		✓			
6. Content Improve Knowledge on Infection Prevention for CVL device			✓		
7. Content Improve Knowledge on CVL Maintenance Practice Skills			✓		
8. Content Reinforced Knowledge on CVL Maintenance Practice Skills			✓		
9. Content Met the Clinical Standards for CVL Maintenance				✓	
10. Content Met Objectives			✓		
11. Recommend Education Program to Staff				✓	

Please provide any recommendations for improvement of the presentation:

Slide 2: Some bullets look like objectives. Move them to objectives.
Slide 10: NOT sure the purpose of slide
Slide 12: Not sure purpose of slide.
Slide 14: NOT sure the purpose of slide. Out of place.
Slide 15: wording could be improved such as "Here are possible portals of entry for bacteria."
Slide 16: Same as 15. wording doesn't describe Picture
Slide 19: Content Confusing- Is it daily or every shift?
Slide 20: Content Confusing- Alcohol caps are used with needleless connectors.

Directions: Please check one box that most appropriately represent your view.

Choices: 5=Strongly Agree, 4=Agree, 3=Neither Agree nor Disagree, 2=Disagree, 1= Strongly disagree.

Category	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
1. Content Organize		✓	but needs reformatting/professional		
2. Content Clear				✓	
3. Content Easy to Comprehend		✓	but superficial		
4. Raise CVL Maintenance Awareness			✓		
5. Nurses Role Clear				✓	
6. Content Improve Knowledge on Infection Prevention for CVL device			✓		
7. Content Improve Knowledge on CVL Maintenance Practice Skills			✓		
8. Content Reinforced Knowledge on CVL Maintenance Practice Skills			✓		
9. Content Met the Clinical Standards for CVL Maintenance				✓	
10. Content Met Objectives	need to better define				
11. Recommend Education Program to Staff	not currently - with revisions/ feedback			✓	

are you only trying to impact knowledge or practice/ application?

Please provide any recommendations for improvement of the presentation:

- Integrate module overview/objectives to better define learner objectives
- Overall formatting/presentation not at professional level re: design/content
- Recommend standard language/definitions - Central versus line catheters not standard nomenclature & not defined accurately
- Superficial overview missing key components of evidence-based preventative care/maintenance or details to support application
- Consider alternate teaching strategies - didactic + skills/competency voice overlay & description. It would not be clear re: practice expectation/skill or have sufficient knowledge to apply best practices at the bedside based on current content.
- Recommend review of evidence-based teaching strategies

Directions: Please check one box that most appropriately represent your view.

Choices: 5=Strongly Agree, 4=Agree, 3=Neither Agree nor Disagree, 2=Disagree, 1= Strongly disagree.

Category	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
1. Content Organize			✓		
2. Content Clear			✓		
3. Content Easy to Comprehend		✓			
4. Raise CVL Maintenance Awareness		✓			
5. Nurses Role Clear		✓			
6. Content Improve Knowledge on Infection Prevention for CVL device			✓		
7. Content Improve Knowledge on CVL Maintenance Practice Skills			✓		
8. Content Reinforced Knowledge on CVL Maintenance Practice Skills			✓		
9. Content Met the Clinical Standards for CVL Maintenance				✓	
10. Content Met Objectives					
11. Recommend Education Program to Staff				✓	

Please provide any recommendations for improvement of the presentation:

Add more information to dressing changes sterile technique and how often the dressing is changed

Directions: Please check one box that most appropriately represent your view.

Choices: 5=Strongly Agree, 4=Agree, 3=Neither Agree nor Disagree, 2=Disagree, 1= Strongly disagree.

Category	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
1. Content Organize			✓		
2. Content Clear			✓		
3. Content Easy to Comprehend		✓			
4. Raise CVL Maintenance Awareness		✓			
5. Nurses Role Clear		✓			
6. Content Improve Knowledge on Infection Prevention for CVL device			✓		
7. Content Improve Knowledge on CVL Maintenance Practice Skills			✓		
8. Content Reinforced Knowledge on CVL Maintenance Practice Skills			✓		
9. Content Met the Clinical Standards for CVL Maintenance				✓	
10. Content Met Objectives					
11. Recommend Education Program to Staff				✓	

Please provide any recommendations for improvement of the presentation:

None

Appendix B: The Joint Commission CVL Maintenance Bundle

Central venous catheters (CVCs) can be in place from hours to weeks or longer and are manipulated by a multitude of staff members. CVCs are accessed many times while in place, to deliver fluids and medications and to collect blood specimens. Because each entry into access points in the delivery system is an opportunity to introduce microorganisms, the post–CVC insertion period presents multiple opportunities for risk of infection.

Almost 72% of all central line-associated bloodstream infections (CLABSIs) reported to the National Healthcare Safety Network (NHSN) by Pennsylvania acute care hospitals in 2010 occurred more than five days after insertion, suggesting that infection prevention lapses likely occurred in the postinsertion care and maintenance of the CVCs.[1] Shapey et al. sought to assess staff members' practice and knowledge of CVC postinsertion care in a tertiary care hospital, finding that lapses in proper infection prevention techniques occurred in 45% of postinsertion care episodes; **the most common lapses were related to keeping caps and site dressings in place**.[2]

Many of the evidence-based practices used for the insertion of CVCs are also important in the care and maintenance of these catheters (for example, hand hygiene, proper skin antisepsis at the insertion site, dressing changes, thorough disinfection of CVC hubs and injection ports, replacement of administration sets and fluids, daily assessment of the continued need for the CVC).[3,4] The use of insertion bundles has resulted in more consistent application of evidence-based practices during the insertion of CVCs, but much less is known about the potential impact postinsertion bundles might have on the prevention of CLABSIs.

Potential Maintenance Bundle Components/Elements

■Daily review of line necessity with prompt removal of unnecessary CVCs and documentation

- Daily review of continued need for CVCs can be done in the following ways:
  - o During multidisciplinary patient care rounds
  - o By using reminders (such as stickers on patient records or order sets)
  - o for CVCs can be done in the Via automated computer alerts

■ Details of removal documented in the records (including date, location, and signature and name of operator undertaking removal)

■Hand hygiene before manipulation of the IV system

■Catheter injection ports

- Open lumens (such as catheter hubs or stopcocks) are covered by injection ports, sterile end-caps or needleless connectors.
- Access ports are sanitized with alcohol, chlorhexidine/alcohol, povidone-iodine, and iodophors before and after each use, a method known as the "Scrub the Hub" protocol.
- Caps are changed no more often than 72 hours (or according to the manufacturer's recommendations and whenever the administration set is changed).[5]

■Proper procedures for catheter site dressing monitoring/changes

- Change gauze dressing every 2 days, clear dressings every 7 days (and more frequently if soiled, damp, or loose).[5]

■Catheter access/manipulation

- Aseptic techniques are used for all access to the line.
- Catheter site care is performed with chlorhexidine at dressing changes.[5] In the absence of chlorhexidine, use povidone iodine.
- Ports or hubs are cleaned using “Scrub the Hub” protocol prior to catheter access.

■Administration set (primary and secondary) replacement

- Set is replaced no more frequently than every 96 hours, and at least every 7 days, after initiation of use unless contamination occurs. This replacement interval is safe and permits considerable cost savings to health care organizations,[6,3,7] with the following exceptions:
  - Set is replaced immediately after administration of blood/blood products. o Set is replaced after 24 hours following administration of infusates that enhance microbial growth (for example, fat emulsions combined with amino acids and glucose in three-in-one admixture or infused separately). [6,3,7]
  - Needleless components should be changed at least as often as the administration set and no more often than every 72 hours.[3]
- The evidence is less clear for intravenous sets that are used intermittently, due to a lack of published research in this area.

■Infusate preparation using aseptic technique

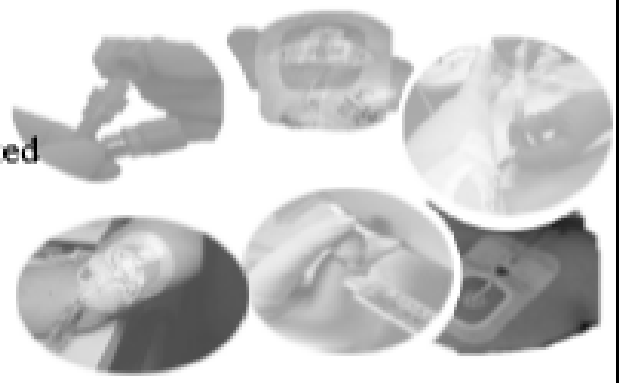
■Health care personnel training

- All staff members manipulating CVCs could be required to attend a hands-on training class in the proper techniques for caring for and accessing catheters followed by a competency evaluation of CVC insertion site and hub care.

Appendix C: Education Module

Nurses
Central Venous Line Maintenance

For
Reducing
Central Line-Associated
Bloodstream
Infections



Education Module Overview

- Define Central Venous Line Device
- Explain the Central Venous Line Device Parts
- Explain the Purpose of the Central Venous Line Device
- Define Central Line-Associated Blood Stream Infection (CLABSI)
- Explain the Causes of Central Line-Associated Blood Stream Infection
- Explain the Importance of Preventing CLABSI

- Identify the Nurses Role for Preventing CLABSI using Evidence-base practice skills
- K-Card
- Hand hygiene
- Sanitizing the injection portal hub or needless connectors
- Flush the CVL injection portal
- Changing the CVL administration set
- Chlorhexidine bath
- Daily CVL dressing assessment
- Changing the CVL Dressing

- Assessing the need for the CVL device
- Keeping the CVL device and system close
- Accessing the CVL injection portal for medications
- Accessing the CVL Injection portal for Blood draws
- CVL Sterile Dressing Change

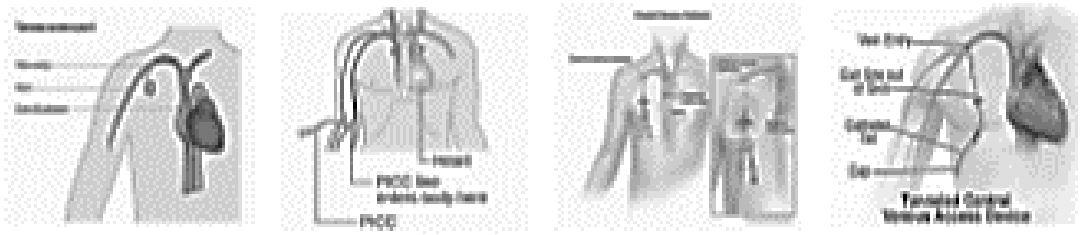
Education Module Objectives

- Nurses will respond and accept that CLABSIs are a problem by accepting the CLABSI champion role
- Describe keeping the CVL system close
- Explain the steps for sanitizing the injection portal hub
- Identify how often the CVL dressing need changing
- Identify how often the CVL administration set need changing
- List the CVL administration sets that are used only once
- Describe the steps for performing a central line dressing change
- Identify how often a chlorhexidine bath is given to the patient with a CVL device
- Compare the difference between Curos caps and needless connectors

What is a Central Venous Line Catheter(CVL)?

- Interchangeable used Terms: CVC, CVL and CVAD
  - Refers to all venous access devices that have a hollow catheter with a tip that ends in the distal superior vena cava or the inferior vena cava of the heart. This includes temporary and tunneled CVADs, Peripheral Inserted Central Catheter (PICC), Dialysis Catheters, and Implanted Ports.

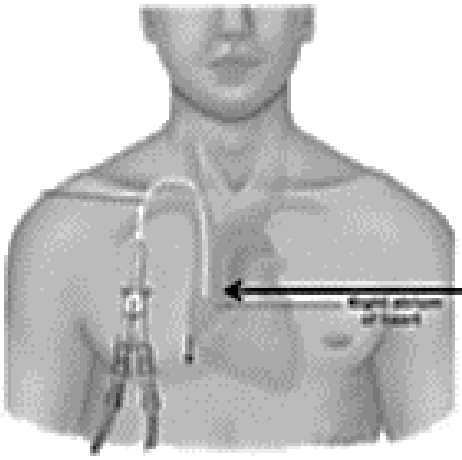
(APIC, 2015; HICAC, 2011; SHEA, 2014; IHC, 2010)



Types of Central Venous Line Access Devices

(AIPC, 2015; HCAC, 2011; SHEA, 2014; TJC, 2010)

Central Venous Line Catheter

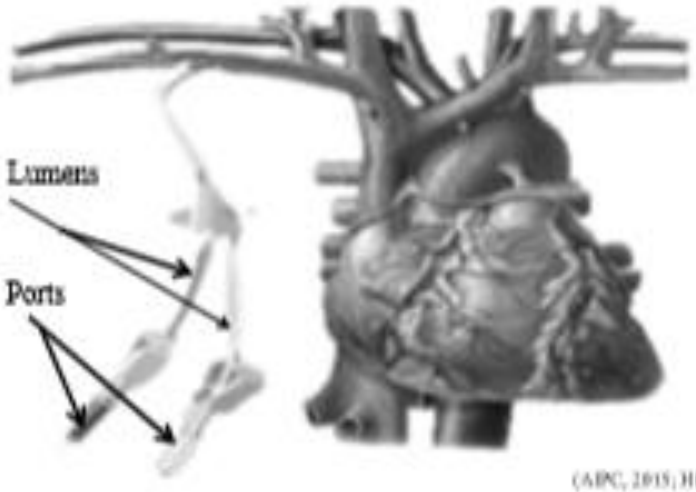


The Catheter Tip Ends Near the Heart

On the Inside of the patient body

(AIPC, 2015; HCAC, 2011; SHEA, 2014; TJC, 2010)

Central Venous Line Catheter



The Catheter Lumens and Ports On the Outside of the patient body

(APIC, 2015; HICAC, 2011; SHEA, 2014; TJC, 2018).

Central Venous Line Catheter

Central Venous Line Dressing Must Include the Date, Time and Initials

(Magnet Quality Director, 2019)

What is the Purpose of the CVL Device?

- Used for administration of intravenous (IV) fluids
- IV medications
- IV Blood products, Parenteral Nutrition, Hemodynamic monitoring and Dialysis

(AJIC, 2015; HICAC, 2011; SHEA, 2014; TJC, 2010)

What is a Central Line-Associated Bloodstream Infection (CLABSI)?

- **CLABSI** is a laboratory confirmed primary bloodstream infection in a patient with a central line (CVL) at the time of placement or within 48 hours prior to the onset of symptoms and the infection is not related to an infection from another site.
  - Laboratory determines a positive blood-culture also, the patient has signs and symptoms of infection.

(CDC, NHSN, 2010)

What is the Purpose of the CVL Device?

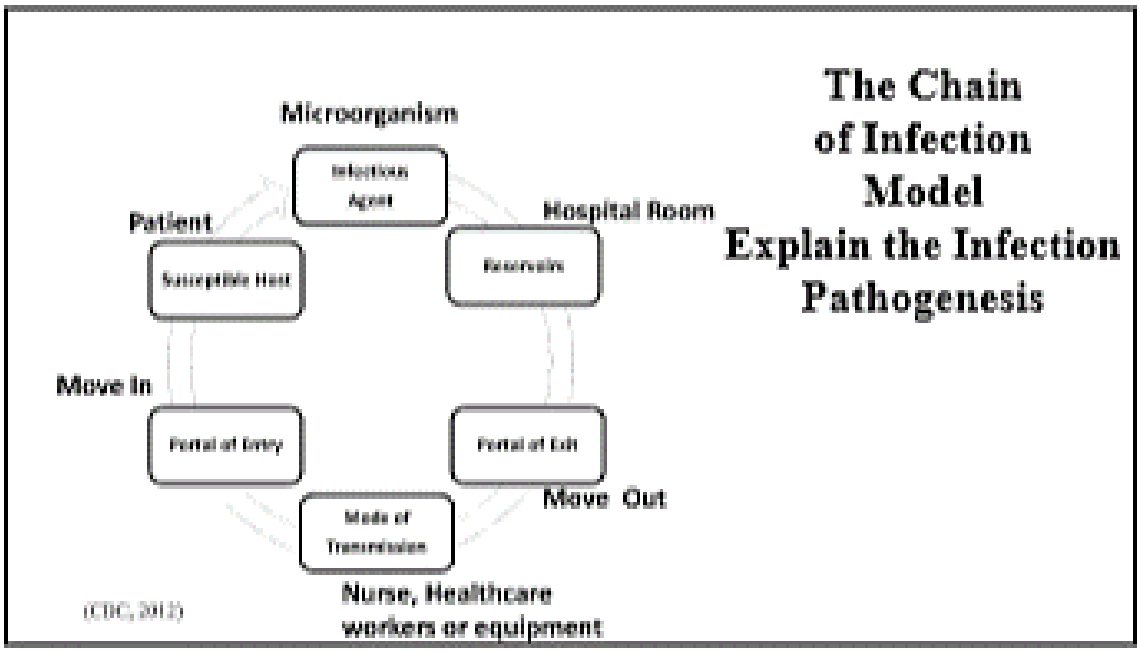
- Used for administration of intravenous (IV) fluids
- IV medications
- IV Blood products, Parenteral Nutrition, Hemodynamic monitoring and Dialysis

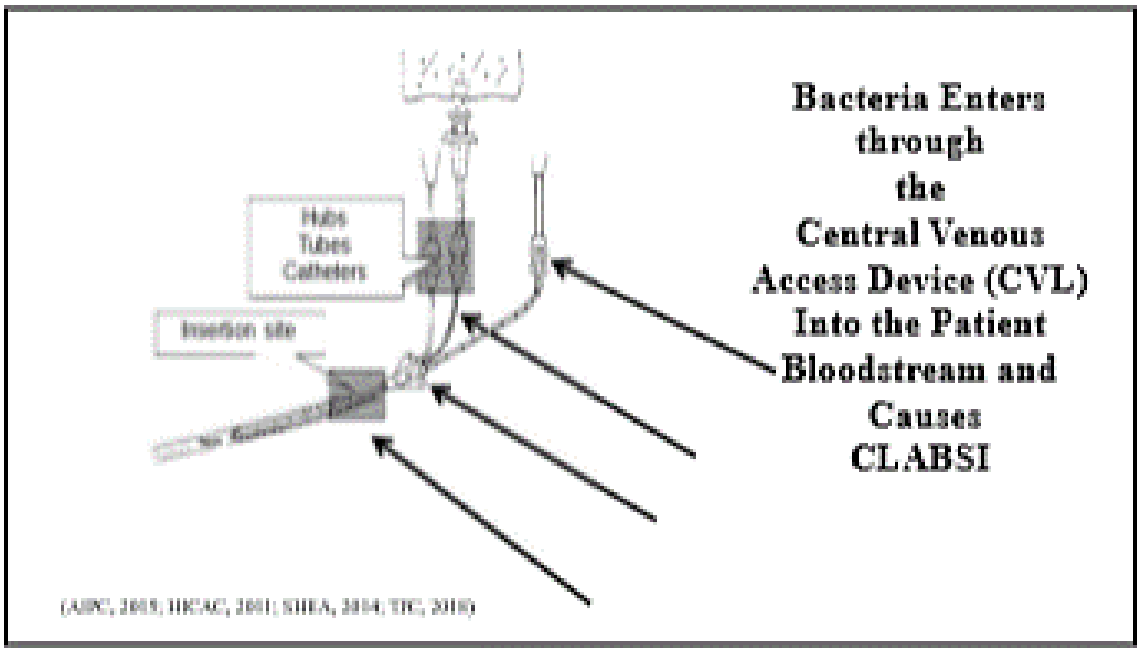
(AHC, 2015; HICAC, 2011; NHSA, 2014; TJC, 2016)

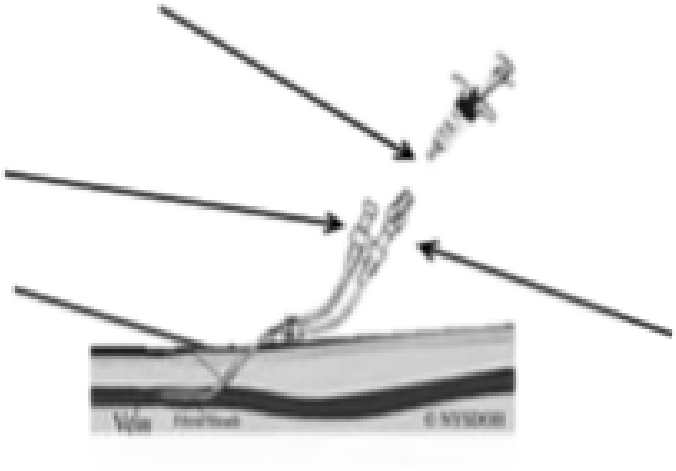
What Causes CLABSI?

CLABSI occurs when microorganisms (bacteria) colonize on the external surface of the CVL device or the fluid pathway, also when the device is inserted or manipulated after insertion by nurses or other healthcare workers.

(The Joint Commission, 2016)


Microorganism
Infectious Agent
Patient
Susceptible Host
Hospital Room
Reservoirs
Move In
Portal of Entry
Portal of Exit
Move Out
Mode of Transmission
Nurse, Healthcare workers or equipment
(CDC, 2012)
The Chain of Infection Model Explain the Infection Pathogenesis


Hubs
Tubes
Catheters
Insertion site
Bacteria Enters through the Central Venous Access Device (CVL) Into the Patient Bloodstream and Causes CLABSI
(AJIC, 2015; HICAC, 2011; SHEA, 2014; TJC, 2016)



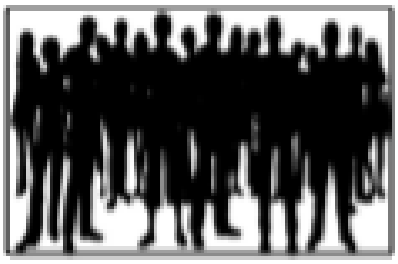
Bacteria Enters Through The Central Venous Access Device (CVL) Into the Patient Bloodstream and Causes CLABSI

(AJPC, 2015; HICAC, 2011; SHEA, 2014; TIC, 2018)

Why is CLABSI Prevention important?

Importance

- 1 out of 20 Hospitalized Patients Acquire Central-Line Associated Bloodstream Infection



(AJPC, 2015; HICAC, 2011; SHEA, 2014; TIC, 2010)

Importance

- CLABSI Mortality Rates Yearly 20% to 25%

(AJPC, 2015; HICAC, 2011; SHEA, 2014; TIC, 2010)

Importance

- Each Central Line-Associated Bloodstream Infection Cost the Hospital $36,000 to $75,000

(AIPC, 2013; HICAC, 2011; SHEA, 2014; TIC, 2010)

Importance

CLABSI Prolongs the Patient Hospital Stay

(AIPC, 2013; HICAC, 2011; SHEA, 2014; TIC, 2010)

Importance

- Central Line-Associated Bloodstream Infections are Preventable
  - When following evidence-based practice skills such as the CLABSI Prevention Bundle
  - Nurses will respond and accept that CLABSIs are a problem by accepting the CLABSI champion role and accept accountability for assisting to help improve CVL maintenance practice skills

(AHC, 2015; IHCAC, 2011; SHEA, 2014; TJC, 2018)

Review

- **Why is CLABSI Prevention Important?**
  - **Pause the presentation and answer questions True or False.**

1. __ Nurses will respond and accept that CLABSIs are a problem by accepting the CLABSI champion role and accept accountability for assisting to help improve CVL maintenance practice skills.
2. __ Each Central Line-Associated Bloodstream Infection Cost the Hospital $36,000 to $75,000.
3. __ Central Line Associated Bloodstream Infection Mortality Rates Yearly 20% to 25%.
4. __ Central Line-Associated Bloodstream Infections are preventable when nurses use evidence-based practice skills.

What are the CVL Maintenance Evidence-based Practice Skills?

For

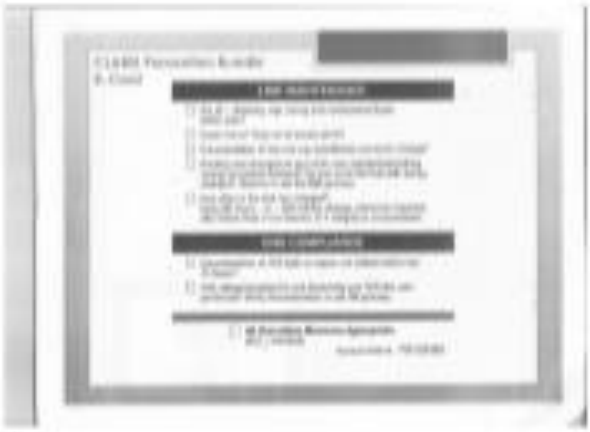
The Hospital

K-CARD

- What is the purpose of the K-Card?
  - The K-Card is a CVL maintenance skills check-off list.
  - The hospital uses K-Card Rounding so the frontline nursing staff can have a reference for the CVL Maintenance Practice Skills at the bedside.
  - The K-card reminds the nursing staff to escalate the conversation for discontinuing the patient CVL to the physician daily.
  - The K-Card will be used randomly by the CLABSI champion nurses to audit the frontline nurses staff for CVL maintenance compliance.

(Magnet Quality Director, 2019)

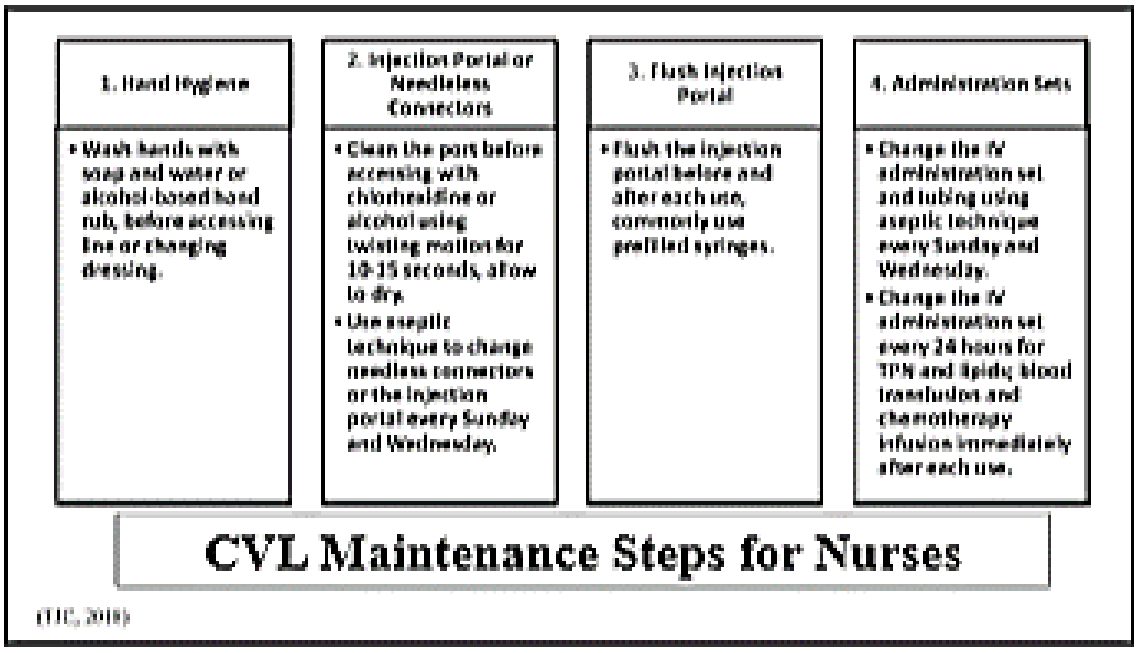
Example of the Hospital K-CARD



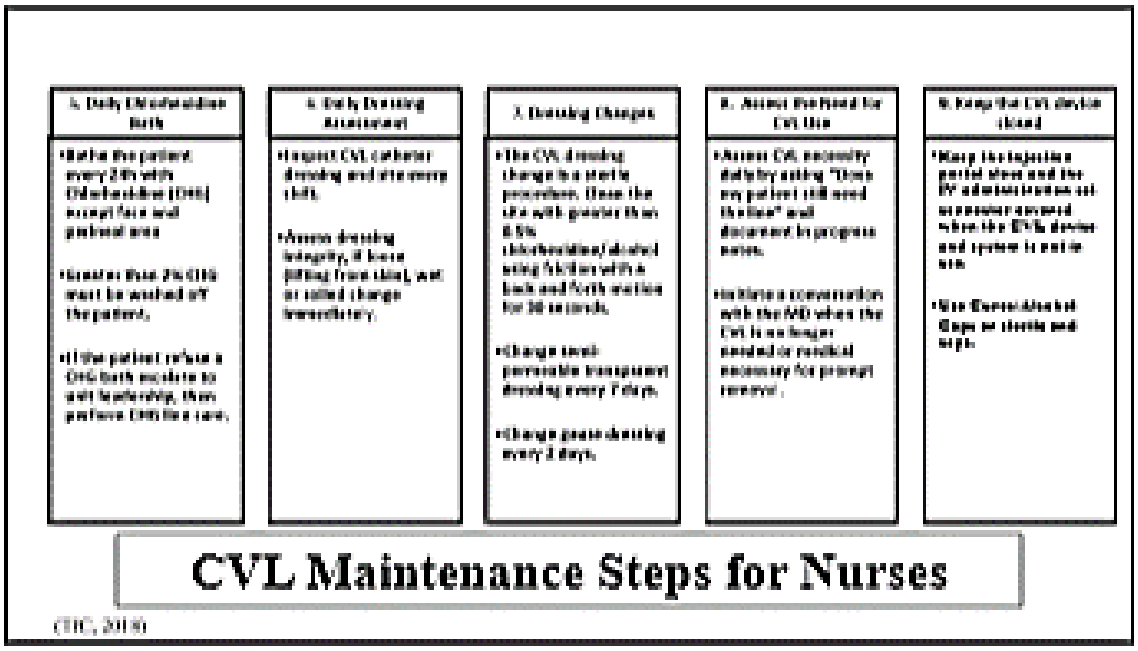
(Magnet Quality Director, 2019)

What are the CVL Maintenance Evidence-based Practice Skills?

For the Hospital

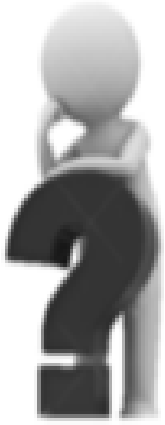


(UC, 2018)



(UC, 2018)

How Do Nurses Access the CVL Device for Blood draws, Medication Administration, and Transfusion?



CVL Maintenance Steps for Nurses Accessing the Injection Portal

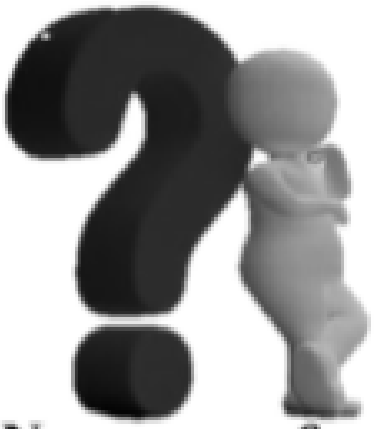
Hand Hygiene	Hand Hygiene is performed, and clean gloves worn for every catheter entry (using aseptic technique)
Sanitize	Scrub the injection portal hub with alcohol or chlorhexidine alcohol for 15 seconds and allow to dry
Flush Port	Flush port before use to determine patency, commonly use prefilled syringes
Perform Desired Procedure	IV administration, IV push medications and transfusion
Flush Port	Flush port after each use keeps the line open and patent, commonly use prefilled syringes
Port Protectors	Keep the line closed when not in use. Use the alcohol port protectors/Green Gurus Caps or sterile end caps.

(TIC, 2018)

CVL Maintenance Steps for Nurses Accessing Injection Portal For Blood Draws

Hand Hygiene	Hand Hygiene is performed, and clean gloves worn for every catheter entry(using aseptic technique)
Sanitize	Swab the injection portal hub with alcohol or chlorhexidine/alcohol for 15 seconds and allow to dry
Flush Port	Flush port before use to determine patency, commonly use prefilled syringes
Connect Vacutainer	Connect Vacutainer, Attach waste tube, discard sample Attach Specimen tube, Collect Specimen
Disconnect Vacutainer	Disconnect Vacutainer and Flush Port with 10ml NS
Flush Port	Flush port with 10ml NS after each use to keep the line open and patent, commonly use prefilled syringes
Port Protectors	Keep the line closed when not in use. Use the alcohol port protectors/Green Caress Caps or sterile end caps.

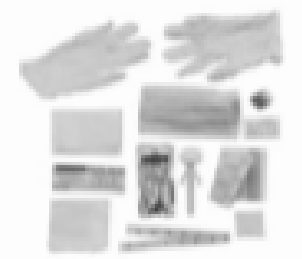
(TIC, 2018)



How do Nurses perform a CVL Sterile Dressing Change?

(TIC, 2018)

CVL Sterile Dressing Change Kit



CVL Sterile Dressing Change Steps Review

- Use CVL dressing kits whenever possible (gather supplies)
- Perform Hand Hygiene
- Don clean glove, put mask on patient, then put mask on self
- Remove old dressing (toward insertion site) and discard
- Remove gloves, perform hand hygiene and don sterile gloves
- Inspect catheter site
- Cleanse site with Chlorhexidine for 30 seconds creating friction using a back and forth motion

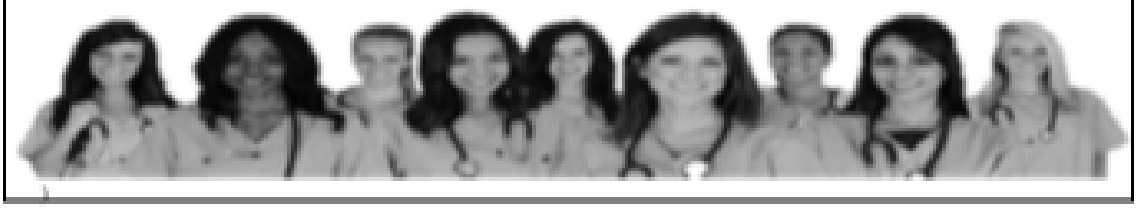
(IHC, 2018)

CVL Sterile Dressing Change Steps Review

- Allow to air dry
- Secure catheter in place
- Apply bio-patch to catheter site
- Apply semi-permeable transparent dressing over site and bio-patch
- Document the date, time and initials on dressing
- Document procedure in EPIC (EMR), catheter length and any complications

(UIC, 2010)

Central Venous Line Evidence-based Practice Skills The Nurses Role to Prevent CLABSI



Hand Washing

- Wash hands with soap and water or alcohol-based waterless hand cleaner
- Wash hands before and after accessing the CVL device:
- Replacing injection portal
- Replacing administration set
- Changing the CVL device dressing

(TIC, 2010)

Flush Injection Portal

- Flush port before and after each use, commonly use prefilled syringes

(TIC, 2010

Sanitize the Injection Portal

- Perform hand hygiene.
- Don clean gloves prior to accessing the line.
- **Sanitize the injection portal hub, stop-clocks,** injection ports into bags or bottles, injection ports on administration sets, and needleless connectors **using alcohol or chlorhexidine**
- **Use only one sanitizing pad per port**
- **Allow to air dry**
- **Replace the CVL injection portal or needleless connectors every Sunday and Wednesday per hospital protocol.**

(TJC, 2018)

Sanitize the Injection Portal

- **Scrub the injection portal Hub for 10 to 15 seconds with the sanitizing agent**
- **Use a twisting motion**
- **Allow to air dry**

(TJC, 2018

Review

➢ **Explain the steps for sanitizing the injection portal hub.**

- **Pause the presentation and answer True or False to the sentence that explains the steps for sanitizing the injection portal.**

1. __Sanitize the injection portal hub, stop-clocks, injection ports into bags or bottles, injection ports on administration sets, and needleless connectors using alcohol or chlorhexidine.
2. __Use only one sanitizing pad per port.
3. __Scrub the injection portal hub for 10 to 15 seconds with a sanitizing agent.
4. __Use a back and forth motion when scrubbing the hub of the injection portal.

Review

➢ **Explain why sanitizing the CVL device injection portal hub is necessary before each use.**

- **Pause the presentation and answer True or False to the sentence that explains the steps for sanitizing the injection portal.**

1. __The injection portal or needleless connector are recognized as sources for microbial contamination.
2. __The injection portal or needleless connector must be thoroughly disinfected performing a minimum 15 second scrub before use to kill microorganism.

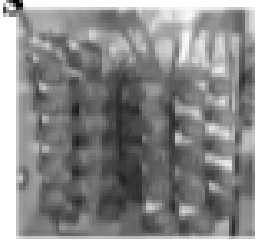
Change IV Administration Set

- Using aseptic technique change IV administration set and tubing every Sunday and Wednesday per hospital protocol

(TIC, 2018

Change the End Caps

- Change the CVL end caps and Injection portal every Sunday and Wednesday with the IV administration set per hospital protocol



Green Curos End Caps

Injection Portal/Needleless Connectors

(TIC, 2018

Change IV Administration Set for infusions that cause Microbial Growth

- Change IV administration set every 24 hours for TPN and Lipids

(TJC, 2018)

Change IV Administration Set Immediately

- Change IV administration immediately after blood each transfusion and after each chemotherapy infusion.

Blood Transfusion

chemotherapy infusion

Review

- **Compare the difference between Curos caps and Needleless connectors.**
- **Pause the presentation and answer True or False to the sentence that makes the correct comparison.**

1. __ Change the CVL sterile end caps/Curos caps and Needleless connectors/Injection portal every Sunday and Wednesday with the IV administration set per hospital protocol.
2. __ Change the CVL sterile end caps/Curos caps and Needleless connectors/Injection portal every time the nurse accesses the line.

Review

- **Identify how often the CVL administration set needs changing and which set is used only once.**
- **Pause the presentation and answer True or False to the sentence that identifies how often the CVL administration set needs changing and identify from the list which CVL administration set is used only once.**

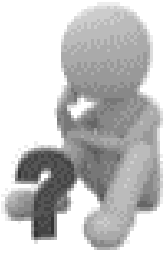
1. __ Change IV administration set for medications and fluids, along with tubing every Sunday and Wednesday per hospital protocol.
2. __ Change IV administration set every 24 hours for TPN and Lipids.
3. __ Change IV administration immediately after each blood transfusion and after each chemotherapy infusion.

CVL Chlorhexidine Bathing

- **Bathe the patient every 24h with Chlorhexidine (CHG) wipes except face and perineal area**
- **Greater than 2% CHG must be washed off the patient, allow to dry then rinse with warm water**
- **If patient refuse CHG bath escalate to unit leadership, then perform CHG line care.**

(TIC, 2010)

Review



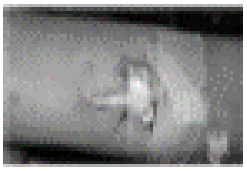
- **Describe the steps for performing a chlorhexidine bath and identify how often the bath is given.**
- **Pause the presentation and answer True or False to the sentence that describes the steps for performing a chlorhexidine bath and identify how often the bath is given.**

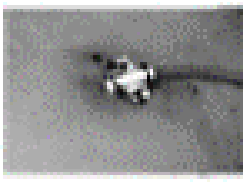
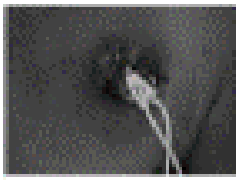
1. __Bathe the CVL patient every 24h with Chlorhexidine (CHG) wipes except face and perineal area.
2. __Bathe the CVL patient every 24h with Chlorhexidine (CHG) wipes using a twisting motion to remove microorganisms.
3. __Greater than 2% CHG must be washed off the patient, allow to dry then rinse with warm water.
4. __If patient refuse the CHG bath escalate to unit leadership, then perform CHG line care.
5. __Bathe the CVL patient every shift with Chlorhexidine (CHG) to remove microorganisms.

Daily Dressing Assessment

Monitor the CVL Dressing Every Shift

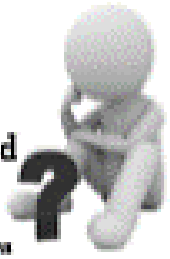
- **Use visual observation or palpation through the intact dressing**
- **Monitor for tenderness, redness or swelling**
- **Monitor for secure and intact dressing not lifting, wet or soiled, if lifting, loose, wet or soiled change immediately.**



(TJC, 2018)

Review

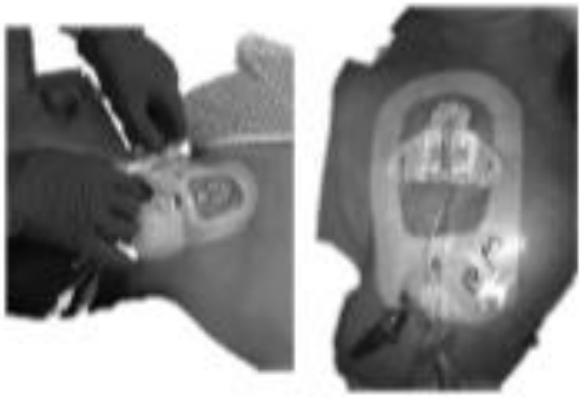


- **Identify the reasons a CVL dressing must be changed immediately.**
- **Pause the presentation and answer True or False to the sentence that identifies the reasons a CVL dressing must be changed immediately.**

1. __Change the CVL dressing immediately if visual observation was missed for 24 hours.
2. __Change the CVL dressing immediately if palpation was done through the intact dressing.
3. __Change the CVL dressing immediately if lifting, loose, wet or soiled.

Change CVL Transparent Dressing

- Change CVL transparent semi-permeable occlusive dressing every 7 days.
- Document the initials date and time in the EMR



(TIC, 2018)

Change CVL Gauze Dressings

- Change gauze dressings every 2 days
- Document Initials, Date and time in the EMR

(TIC, 2018)

Review

- **Identify how often the CVL dressing needs changing.**
- **Pause the prestation and answer True or False to the sentence that identifies how often the CVL dressing needs changing correctly**

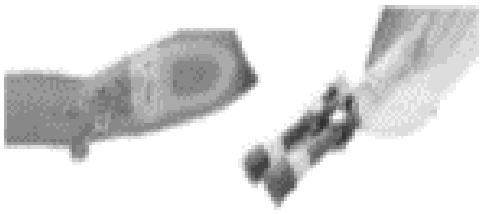
1. __Change CVL transparent semi-permeable occlusive dressing every 10 days, then document and date in the EMR
2. __Change gauze dressings every 3 days, then document and date in the EMR

- **Complete the following Sentences.**

1. __Change the CVL transparent semi-permeable occlusive dressing every ____ days.
2. __Change the CVL gauze dressing every _____ days.

Keep the CVL Device System Close

- **Keep the injection portal hub close and the IV administration set connector covered when the CVL device and system is not in use.**



- **Use Curos/Alcohol Caps or sterile caps**

(TIC, 2010)

Review

➢ Describe Keeping the CVL Line Close.

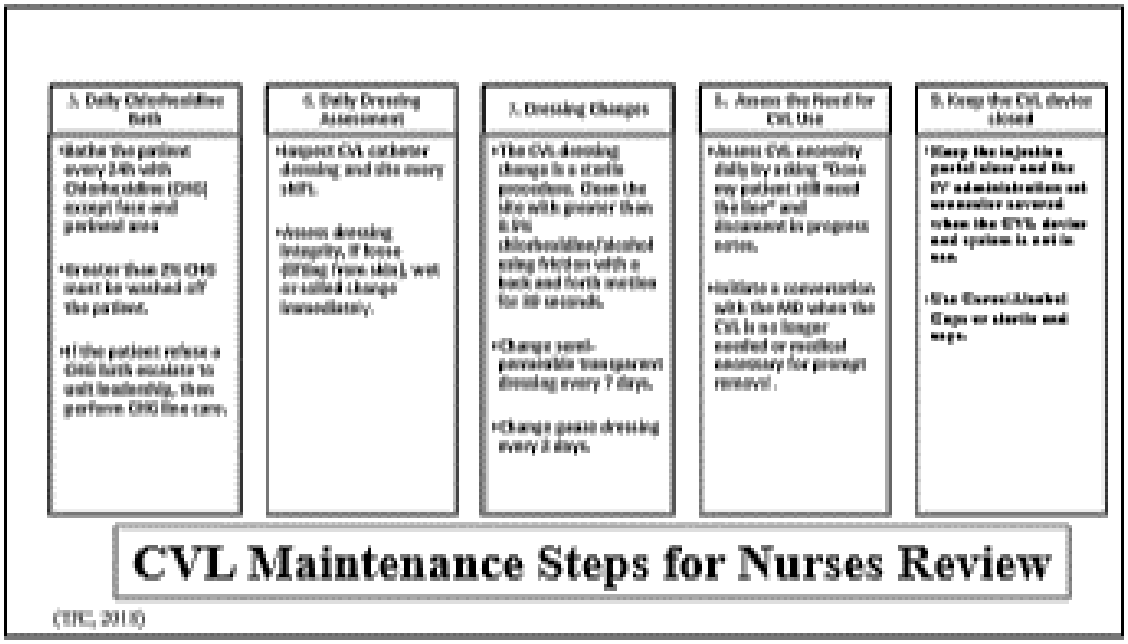
➢ **Pause the presentation and answer True or False to the sentence that describes keeping the CVL device and system close, also identify from the list the devices used to keep the system close.**

1. __Keep the CVL IV administration set close by attaching the line into one of available hubs on the IV line and the injection portal hub close by using any available end caps.
2. __Keep the CVL injection portal hub and the IV administration set covered when the CVL device and system is not in use.
3. __Keep the CVL injection portal hub and the IV administration set close by using Caree/Alcohol Caps or sterile end caps.

1. Hand Hygiene	2. Injection Portal or Needleless Connectors	3. Flush Injection Portal	4. Administration Sets
• Wash hands with soap and water or alcohol-based hand rub, before accessing line or changing dressing.	• Clean the port before accessing with chlorhexidine or alcohol using twisting motion for 10-15 seconds, allow to dry. • Use aseptic technique to change needless connectors or the injection portal every Sunday and Wednesday.	• Flush the injection portal before and after each use, commonly use prefilled syringes.	• Change the IV administration set and tubing using aseptic technique every Sunday and Wednesday. • Change the IV administration set every 24 hours for TPN and lipids; blood transfusion and chemotherapy infusion immediately after each use.

CVL Maintenance Steps for Nurses Review

(TIC, 2018)



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The End

Appendix D: Education Module Answer Key

I. **Why is CLABSI Prevention Important?**

Pause the presentation and answer questions True or False.

1. **True.** Nurses will respond and accept that CLABSIs are a problem by accepting the CLABSI champion role and accept accountability for assisting to help improve CVL maintenance practice skills.
2. **True**. Each Central Line-Associated Bloodstream Infection Cost the Hospital $36,000 to $75,000.
3. **True.** Central-Line Associated Bloodstream Infection Mortality Rates Yearly 20% to 25%.
4. **True**. Central Line-Associated Bloodstream Infections are preventable when nurses use evidence-based practice skills.

I. **Explain the steps for sanitizing the injection portal hub.**

- **Pause the presentation and answer True or False to the sentence that explains the steps for sanitizing the injection portal.**

1. **True.** Sanitize the injection portal hub, stop-clocks, injection ports into bags or bottles, injection ports on administration sets, and needleless connectors using alcohol or chlorhexidine.
2 **True**. Use only one sanitizing pad per port.
3. **True.** Scrub the injection portal hub for 10 to 15 seconds with a sanitizing agent.
4. **False.** Use a back and forth motion when scrubbing the hub of the injection portal. Use a twisting motion to rub microorganism loose from the device.

II. **Explain why sanitizing the CVL device injection portal hub is necessary before each use.**

- **Pause the presentation and answer True or False to the sentence that explains the steps for sanitizing the injection portal.**

1. **True.** The injection portal or needleless connector are recognized as sources for microbial contamination.
2. **False.** The injection portal or needleless connector must be thoroughly disinfected performing a minimum 15-second scrub before use to kill microorganism.

III. **Compare the difference between Curos caps and Needless connectors.**

- **Pause the presentation and answer True or False to the sentence that makes the correct comparison.**

1. **True.** Change the CVL sterile end caps/Curos caps and Needleless connectors/Injection portal every Sunday and Wednesday with the IV administration set per hospital protocol.
2. **False.** Change the CVL sterile end caps/Curos caps and Needleless connectors/Injection portal every time the nurse accesses the line.

IV. **Identify how often the CVL administration set needs changing and which set is used only once.**

- **Pause the presentation and answer True or False to the sentence that identifies how often the CVL administration set needs changing and identify from the list which CVL administration set is used only once.**

1. **True.** Change IV administration set for medications and fluids, along with tubing every Sunday and Wednesday per hospital protocol.
2. **True.** Change IV administration set every 24 hours for TPN and Lipids.

3. **True.** Change IV administration immediately after each blood transfusion and after each chemotherapy infusion

V. **Describe the steps for performing a chlorhexidine bath and identify how often the bath is given.**

- **Pause the presentation and answer True or False to the sentence that describes the steps for performing a chlorhexidine bath and identify how often the bath is given.**

1. **True.** Bathe the CVL patient every 24h with Chlorhexidine (CHG) wipes except face and perineal area.
2. **False.** Bathe the CVL patient every 24h with Chlorhexidine (CHG) wipes using a twisting motion to remove microorganisms. A patient bath does not require a twisting motion.
3. **True.** Greater than 2% CHG must be washed off the patient, allow to dry then rinse with warm water.
4. **True.** If the patient refuses the CHG bath escalate to unit leadership, then perform CHG line care.
5. **False.** Bathe the CVL patient every shift with Chlorhexidine (CHG) to remove

VI. **Identify the reasons a CVL dressing must be changed immediately.**

- **Pause the presentation and answer True or False to the sentence that identifies the reasons a CVL dressing must be changed immediately.**

1. **False.** Change the CVL dressing immediately if the visual observation was missed for 24 hours.
2. **False.** Change the CVL dressing immediately if palpation was done through the intact dressing.
3. **True.** Change the CVL dressing immediately if lifting, loose, wet or soiled.

VII. **Identify how often the CVL dressing needs changing.**

- **Pause the presentation and answer True or False to the sentence that identifies how often the CVL dressing needs changing correctly.**

1. **False.** Change CVL transparent semi-permeable occlusive dressing every 10 days, then document and date in the EMR
2. **False.** Change gauze dressings every 3 days, then document and date in the EMR

- **Complete the following Sentences.**

1. __Change the CVL transparent semi-permeable occlusive dressing every __7__ day.
2. __Change the CVL gauze dressing every __2__ day.

VIII. **Describe Keeping the CVL Line Close.**

- **Pause the presentation and answer True or False to the sentence that describes keeping the CVL device and system close, also identify from the list the devices used to keep the system close.**

1. **False.** Keep the CVL IV administration set close by attaching the line into one of the available hubs on the IV line and the injection portal hub close by using any available end caps.
2. **True.** Keep the CVL injection portal hub and the IV administration set covered when the CVL device and system are not in use.

3. **True.** Keep the CVL injection portal hub and the IV administration set close by using Curos/Alcohol Caps or sterile end caps.