Central venous catheters (CVC) are commonly used intravenous catheters that are imperative for treatment of some hospitalized patients, specifically for patients who are critically ill. It is estimated around 5 million patients in the United States have a CVC inserted annually, amounting to over 15 million CVC days.

There are two types of CVC’s, tunneled catheters and non-tunneled catheters. Tunnel catheters are indicated for long-term use in patients receiving chemotherapy or hemodialysis. Non-tunneled catheters are indicated for short-term use and are the most commonly used CVC. The risk of infection is a preventable complication of all types of central venous catheters, referred to as central line associated bloodstream infections (CLABSI). CLABSI affects thousands of people within the United States resulting in billions of dollars more in associated with healthcare costs. There are roughly 250,000 to 500,000 CLABSI cases in the United States yearly, costing an estimated $46,000 per case. CLABSI can be deadly with annual mortality rates reportedly to be 12%-25%. CLABSI is thought to occur when there is a break in technique during insertion or maintenance of the CVC catheter. Infection occurs when bacteria enter the bloodstream through the CVC located in a large vein in the patient’s neck, chest, or groin area. With non-tunneled catheters, the catheter is placed inside of the body exposing only the hub – the access point of the catheter. Non-tunneled catheters have a higher incidence of CLABSI than tunneled catheters due to the percutaneous insertion technique that leads directly to the bloodstream. The catheter serves as a vehicle that allows for skin bacteria to migrate along the catheter to the bloodstream. The Centers for Disease Control (CDC) has identified the two most common reasons for bacterial contamination of a CVC occur at the time of insertion where there has been a break in the standard aseptic precautions or a break in protocols to during care and maintenance of the CVC by healthcare providers. CLABSI must be confirmed via a laboratory report that determines that the cause of infection is specific to the central line site during the time of catheter insertion or within 48 hours of CVC removal.

Prevention of CLABSI is critical and nurses play a pivotal role this. Nurses are expected to undergo initial training as well as annual competency assessments for CVC protocol among other skills to ensure that they are utilizing the most current evidence-based practices when providing direct care for patients. One method in preventing CLABSI is to bundle interventions to reduce CLABSI risk. The bundle consists of a list of evidence-based, interdisciplinary strategies that during insertion and maintenance that when used simultaneously, reduce infection risk. These bundle of strategies at the time of insertion include hand hygiene, chlorhexidine skin antisepsis, optimal site selection, use of ultrasound guidance during insertion, and maximum barrier precautions at the time of insertion (sterile procedures and drapes). Although these strategies are interdisciplinary, the nurse assists in provider-driven strategies including the optimal site selection and use of barrier precautions.

Daily care and maintenance incorporate a bundle of interventions that are primarily nurse-driven.

Hands are the most common vehicle for transmission of bacteria; therefore, using proper hand hygiene techniques by nurses and all other disciplines is one of the most imperative factors in breaking the chain of infection so that potentially harmful bacteria are not transferred from person to person. The proper procedure for hand washing includes using soap and water if hands are visibly soiled and vigorously scrubbing for 15 seconds; however, an alcohol-based hand sanitizer may be used as an alternative if hands are not visibly soiled. Nurses are responsible for ensuring that the patient received a chlorhexidine bath prior to the insertion of the catheter and daily while the CVC is in place. The purpose of the chlorhexidine bath is decreasing the bacterial load present on the patient’s skin, thus reducing the risk of
microbial contamination during insertion or maintenance of the catheter. In emergency cases where a chlorhexidine bath may not be possible, daily care protocols and surveillance by the nurse remain critically important. The nurse also plays a role in ensuring that the optimal site is selected because site selection may be situational and may vary between pediatric and adult patients. The femoral vein harbors many microbial organisms and other sites such the internal jugular and subclavian vein may be more preferable in an adult patient; however, the femoral vein may be accessed easier in an emergency situation. Yet, in a pediatric patient, the femoral vein is considered the safest sight to use. Although the Physician or Nurse Practitioner is responsible for the insertion of the CVC, the nurse’s role is imperative in ensuring that sterile technique is maintained, appropriate drapes and personal protective equipment (PPE) are utilized, as well as the utilization of aseptic procedures directly after the placement of the CVC as demonstrated by scrubbing the hub of the catheter post placement. During patient preparation and insertion of the CVC, the nurse may serve in the role of observer to carefully assess if there were any breaches in technique that could increase the risk of CLABSI. Additionally, the nurse’s role includes vigilant surveillance after the CVC is placed. Surveillance data is an essential component in infection prevention and control related to CLABSI, and is collected, analyzed, interpreted, and disseminated in order to signify the nature and magnitude of the problem and reduce morbidity and mortality rates. Nurse’s role in surveillance is critically important and includes assessment data such as risk assessments, chart review, and observations to ensure that sterile and aseptic techniques are adhered to. The nurse should perform daily assessments and care of the catheter site, consisting of using appropriate PPE, scrubbing the hub of the catheter prior to touching it with gloved hands ensuring that bacteria is not transferred to the catheter, ensuring that the dressing is secure and clean surrounding the insertion site, and changed appropriately depending on the type of dressing used and routine changing of intravenous tubing. Additionally, nurses are essential in screening patients to ensure CVCs are removed as soon as they no longer necessary. Patient education is integral in the role of the nurse, and patients should be instructed to avoid touching the catheter site and tubing in addition to cautioning visitors to avoid touching the site as well as to practice proper hand hygiene techniques. The nurse should educate the patient to contact the provider immediately if the dressing around the site of insertion becomes soiled or dirty, infected, or the patient develops chills.

When examining the potential to eliminate CLABSI, peer reviewed literature was analyzed dating no earlier than 2013 using the search terms hospital acquired infections, central line associated infections, preventing hospital acquired infections, bloodstream infections, and nurse’s role in CLABSI. Implications of the review included preventive techniques per the development of universal guidelines that have aided in decreasing the incidence and prevalence of CLABSI. Hospital acquired infections are highly preventable, and the aim is to eliminate the occurrence of CLABSI by establishing the nurse’s role in CLABSI prevention, as well as implementing guidelines that provide safety and quality care.

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**Title:**
Best Practices: The Nurse’s Role in CLABSI Prevention and Surveillance

**Keywords:**
CLABSI, Nurse’s role and surveillance

**References:**
Abstract Summary:

The nurse plays a significant role in CLABSI prevention and surveillance to improve patient outcomes. It is an interdisciplinary process; however, there are nurse-driven protocols for CLABSI prevention that illustrate the value nurses have in reducing CLABSI rates and improving patient outcomes.

Content Outline:

1. Introduction
   1. Central Venous catheters (CVC) are commonly placed at a rate of about 5 million catheters yearly within the United States.

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      1. Two types of CVC
         1. Tunneled catheters
         2. Non-tunneled catheters
      2. CLABSI
         1. Statistics
         2. CLABSI definition
   2. Prevention
      1. CLABSI bundle interventions
      2. Nurse-driven prevention and surveillance
         1. Hand Hygiene techniques
2. Chlorhexidine bath
3. Site selection
4. Surveillance
5. Patient education

3. Conclusion
   1. Literature review
   2. Decrease the incidence and prevalence of CLABSI
      1. Establishing nurse’s role in CLABSI prevention

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**Author Summary:** Cetina Tolbert returned to school in 2017 to obtain her post-bachelor's degree in Nursing from the University of South Carolina Beaufort and is in her senior year. As a nursing student, Cetina has earned the Braude and Sea Island Rotary scholarships. Building on her clinical experience, Cetina currently works at Coastal Carolina in their Nurse Extern program. Aside from being studious and working, Cetina finds time to create memories with her three year old daughter.

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