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Staff Education and Competency Assessment for Central Line-Associated Bloodstream Infection Reduction

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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
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Executive Summary: Staff Education Project

Staff Education and Competency Assessment for Central Line-Associated Bloodstream Infection Reduction

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Summary

This Doctor of Nursing Practice project was an educational initiative to provide comprehensive central line-associated bloodstream infection (CLABSI) prevention education program for staff working in an intensive care unit (ICU). CLABSIs pose a significant threat to patient safety, contributing to increased morbidity, mortality, and healthcare costs, with annual expenditures estimated at $300 million to $2.3 billion and mortality rates ranging from 10% to 30%. Despite existing protocols, the project site facility experienced persistent CLABSI rates. The purpose of the project was to provide a comprehensive educational program to ICU staff members on the unit. The practice-focused question guiding this project was: Does a comprehensive CLABSI prevention education program, including hands-on skills training, improve nurses' knowledge and skills in CLABSI prevention? After the educational program, data were collected through pre- and posttests, skill competency evaluations, and qualitative feedback surveys. Quantitative analysis revealed an increase in participants' knowledge scores (t =-8.206 (39), p<.001), while qualitative insights highlighted areas for refinement with comprehensive strategies. Key findings underscored the program's effectiveness in enhancing staff competency, with 24% deemed fully competent and targeted support identified for 16% requiring further development. Recommendations included increasing education and training on central line care, especially during new nurse on-boarding, addressing staff-identified barriers to CLABSI bundle compliance, such as ensuring proper staffing and promoting accountability. This initiative not only advances nursing practice by reducing preventable harm but also promotes equitable care delivery, aligning with broader public health goals and fostering positive social change.

Background

Despite existing protocols, the project site facility experienced higher-than-desired CLABSI rates, signaling gaps in adherence and training. CLABSIs pose severe risks, including sepsis, organ failure, and death, making their prevention a top priority (World Health Organization [WHO], 2020). CLABSIs increase healthcare costs due to prolonged hospital stays, additional treatments, and antibiotic use, straining resources. Healthcare facilities are increasingly held accountable for reducing hospital-acquired infections (HAIs), including CLABSIs (Alshahrani et al., 2023). Interviews and surveys at the project site revealed challenges, such as inconsistent adherence to best practices (e.g., hand hygiene, aseptic technique), workload pressures, lack of standardization, and insufficient education on CLABSI prevention. These factors underscored the need for targeted interventions to improve compliance and outcomes.

The project question was: Does a comprehensive CLABSI prevention education program, including hands-on skills training, improve nurses' knowledge and skills in CLABSI prevention? I developed this question to evaluate whether an evidence-based education program can enhance staff competency and adherence to CLABSI prevention practices. In this quality improvement initiative, I assessed the effectiveness of the CLABSI reduction program in decreasing infection rates and promoting adherence to best practices using the recommended CLABSI bundle. The project was conducted to identify strategies for sustaining long-term improvements in patient safety and clinical outcomes by evaluating staff knowledge gains, skill competency, and engagement.

For this project centered on CLABSI prevention education, conducting a thorough and systematic literature search was crucial for building an evidence-based framework.

The process began by clearly defining research questions and identifying relevant keywords, including synonyms like *CLABSI prevention* and *nursing education*. To ensure a wide scope of evidence, I searched multiple databases, such as CINAHL Plus with Full Text for nursing literature, PubMed/MEDLINE for biomedical articles, and the Walden University Library for systematic reviews. Filters were applied to focus on recent, peer-reviewed English-language articles, although foundational older works were also considered. After initial searches, I screened promising articles by title and abstract, which resulted in 14 articles being short-listed for full-text review. Additionally, reference lists were hand-searched, and gray literature from professional nursing organizations, like the Centers for Disease Control and Prevention, was explored to uncover best practices. To ensure a robust evidence-based foundation for the CLABSI education project, I developed an evidence summary tool using the Johns Hopkins evidence-based practice model (see Dang et al., 2022). This involved classifying studies by evidence level: Level I for randomized controlled trials, Level II for controlled studies without randomization, and Level III for descriptive or correlational studies. Each piece of evidence was also assigned a quality rating: A (i.e., high quality) for consistent, generalizable results and strong methodology; B (i.e., good quality) for reasonably consistent results and some control; and C (i.e., low quality) for inconsistent evidence where conclusions could not be drawn. This structured approach ensured a rigorous, systematic evaluation of all collected literature, allowing the project to build upon the most reliable and relevant evidence for effective CLABSI prevention strategies.

I incorporated two Level I studies in this project, consisting of randomized control trials or experimental studies, to form a strong overall quality rating for its evidence base.

The synthesized findings from both sources, Chi et al. (2024) and Alshahrani et al. (2023), critically underscore the importance of adhering to evidence-based protocol and infection prevention measures to significantly reduce CLABSI incidence. Chi et al. (2024) conducted a quasi-experimental study (specifically, a pre-/post intervention design) conducted on ICU patients in a Chinese hospital that was focused on developing and implementing best practice protocols for catheter placement and maintenance, while Alshahrani. et al. (2023)conducted asystematic review that included 15 studies with a total of 32,198 participants, covering a time period from 2010 to 2023 and illuminating the risk factors and clinical impacts associated with CLABSI. Collectively, these studies offer a comprehensive understanding of both the procedural and contextual elements vital for CLABSI prevention, emphasizing the necessity of rigorous adherence to established protocols and continuous monitoring for risk factors. Moreover, their findings strongly suggest that healthcare providers should prioritize training and education on optimal catheter care practices, reinforced by regular audits and feedback mechanisms to enhance compliance. Integrating these evidence-based strategies can substantially lessen the burden of CLABSI, leading to improved patient outcomes and reduced healthcare costs.

Six Level II studies collectively highlight the critical role of various interventions in reducing CLABSI. Educational initiatives, as demonstrated by Sachan et al. (2022), Abou Zed and Mohammed (2020), and Zeyada et al. (2021), have consistently shown significant improvements in nurses' knowledge and practices related to CLABSI prevention, emphasizing the necessity of regular educational programs and adherence to guidelines for maintaining high care standards. Furthermore, multifaceted strategies, including comprehensive staff education, standardized protocols, regular audits, and

robust interdisciplinary collaboration—as evidenced by Shafland et al. (2024) and Welter and Villanueva (2022)—are crucial not only for reducing CLABSI rates but also for ensuring sustained improvements over time. Quality improvement projects, like those described by Harris et al. (2024), have also illustrated substantial reductions in CLABSI, with key focus areas including strict adherence to evidence-based protocols, proper catheter maintenance, and timely removal of unnecessary central lines. The effectiveness of interdisciplinary teamwork is particularly underscored by studies, such as Welter and Villanueva, which highlighted the benefits of collaborative weekly rounds and regular audits involving diverse healthcare professionals. These studies are consistently rated as high quality, indicating reliable and generalizable results across various healthcare settings and suggesting that implementing these evidence-based interventions can lead to significant and lasting improvements in patient outcomes.

Six Level III studies highlight the critical need to address knowledge gaps, improve attitudes and practices, and ensure robust organizational support to enhance adherence to CLABSI prevention guidelines. Muschitiello et al. (2024), Almalki et al. (2023), Alqalah (2024), and Said et al. (2024) identified significant knowledge deficits among nurses, often linked to factors, like age, experience, and education level. While many nurses demonstrated positive attitudes toward CLABSI prevention (Alqalah, 2024; Muschitiello et al., 2024), notable gaps in adherence to best practices were observed (Said et al., 2024; Sham et al., 2023), underscoring the ongoing need for continuous education and training. Connor et al. (2023) further emphasized the influence of cognitive and behavioral factors on adherence, making it crucial to target these areas for improved compliance. Ultimately, organizational backing through regular training and audits is

essential for fostering positive attitudes and adherence (Sham et al. 2023), with Alqalah advocating for multifaceted strategies to tackle knowledge deficits, support favorable attitudes, and overcome practical barriers to effective CLABSI prevention. Implementing these evidence-based interventions can lead to significant and sustained improvements in nursing practices and, consequently, in CLABSI prevention.

The evidence across these studies shows consistency in several key areas. Adherence to evidence-based protocols is crucial, as highlighted by Chi et al. (2024) and Alshahrani et al. (2023), Harris et al. (2024), Shafland et al.(2024), Welter and Villanueva, (2022), Muschitiello et al. (2024), Almalki et al. (2023), and Alqalah, (2024). Three educational interventions significantly improved nurses' knowledge and practices regarding CLABSI prevention, as demonstrated by Sachan et al. (2022), Abou Zed and Mohammed, (2020) and Zeyada et al. (2021) and emphasized by Sham et al. (2023) and Said et al. (2020). Multifaceted strategies, including staff education, standardized protocols, regular audits, and interdisciplinary collaboration, are effective in reducing CLABSI rates and ensuring sustained improvements (Alqalah, 2024; Shafland et al., 2024; Welter & Villanueva, 2022). Organizational support, including regular training and audits, is essential for fostering a positive attitude and adherence to guidelines (Sham et al., 2023; Welter & Villanueva, 2022). Additionally, Connor et al. (2023) found that cognitive and behavioral factors significantly influence adherence to CLABSI prevention practices, making it crucial to address these factors to improve compliance. Implementing these evidence-based interventions can lead to significant and sustained improvements in CLABSI prevention practices among nurses.

The evidence shows some inconsistencies in several areas. While adherence to evidence-based protocols is emphasized across all levels, the impact on broader clinical outcomes beyond infection rates varies, with Al-Shahrani et al. (2023) highlighting clinical impacts and Chi et al. (2024) focusing on procedural adherence. Knowledge and practice levels also show variability, with significant gaps reported by Muschitiello et al. (2024), Almalki et al. (2023), Alqalah (2024), and Said et al (2020), but the extent and impact of these gaps differ. Adherence to best practices is high in structured interventions (Harris et al. 2024; Shafland et al. 2024) but shows notable gaps in other studies (Said et al. 2020; Sham et al. 2023). Educational interventions are effective in improving knowledge and practices (Abou Zed & Mohammed, 2020;Sachan et al., 2022;Zeyada et al., 2021), yet gaps remain despite these efforts (Said et al. 2020; Sham et al. 2023). Organizational support is crucial for successful CLABSI prevention (Welter & Villanueva, 2022), but barriers, such as a lack of resources, can hinder implementation (Alqalah, 2024). These inconsistencies highlight the need for an integrated approach combining education, organizational support, and continuous monitoring to effectively address CLABSI prevention across different healthcare settings.

Staff Education Project Development

I developed a comprehensive curriculum based on a needs assessment that identified gaps in CLABSI prevention practices at the project site. The curriculum emphasized adherence to the CLABSI prevention bundle (see Appendix A). Leadership support was secured early, and experienced nurses were engaged as champions to ensure practical relevance and staff buy-in.

I rigorously evaluated the effectiveness of the staff education project in improving participants' knowledge, skills, and attitudes related to CLABSI reduction through a mixed-methods approach. Evidence was collected via pre- and posttests (Appendix B) with seven multiple-choice questions to measure knowledge gains, skill competency assessments using standardized checklists in simulated scenarios, and five attitudinal questions measured on a 5-point Likert-type scale to gauge perceptions and confidence. I analyzed quantitative data using descriptive statistics, comparing pre- and posttest scores and categorizing skill levels as competent, developing, or remediation needed. Qualitative feedback from surveys was thematically analyzed to identify challenges and recommendations.

The CLABSI prevention education program was offered to the entire ICU nursing staff at the project site through an intensive 4-day "boot camp" featuring eight live sessions. Following each session, staff members were required to demonstrate central venous catheter dressing changes, with their competency evaluated using a standardized checklist (see Appendix C). This assessment categorized each staff member's skill level as competent, developing, or needing remediation.

The evaluation process began with a pretest to establish baseline metrics, evaluating participants' initial understanding of CLABSI prevention protocols and competency levels. After the education sessions, I administered a posttest with seven multiple-choice questions to measure their knowledge gains. Skill competency was evaluated through hands-on assessments in simulated scenarios, using a standardized checklist aligned with the CLABSI prevention bundle. I assessed attitudinal changes via

pre- and post intervention surveys, which measured shifts in participants' perceptions of CLABSI prevention and their confidence in applying learned techniques.

Qualitative feedback from surveys (see Appendix B) was thematically analyzed to identify challenges and recommendations. By triangulating quantitative and qualitative data, I was able to provide a comprehensive understanding of the project's impact, highlighting successes and areas for improvement. This systematic approach validated the program's effectiveness and offered actionable insights for sustaining and scaling the intervention. I thematically analyzed qualitative feedback from surveys and open-ended responses to uncover recurring themes, challenges, and suggestions for improvement, providing deeper insights into participants' experiences and engagement.

Results

The project involved 40 ICU staff members, all registered nurses (75% participation rate of 53 total) involved in central line management. I rigorously evaluated the effectiveness of the staff education project in improving participants' knowledge, skills, and attitudes related to CLABSI reduction through a mixed-methods approach. Evidence was collected via pre- and posttests with 12 multiple-choice questions to measure knowledge gains, skill competency assessments using standardized checklists in simulated scenarios, and attitudinal surveys to gauge perceptions and confidence. I analyzed quantitative data using descriptive and inferential statistics, comparing participants' pre- and posttest scores and categorizing their skill levels as competent, developing, or remediation needed.

In addition to knowledge assessments, I conducted a skill competency evaluation, categorizing staff into three groups: 24% were deemed competent (approximately 10 staff

members), 10% were identified as developing (four staff members), and 6% required remediation (approximately two staff members). The remaining 60% of staff likely fell into other competency categories or were not explicitly detailed in the provided data. While most staff demonstrated satisfactory knowledge and skills, the 6% requiring remediation highlights the need for targeted interventions to ensure all staff achieves proficiency in CLABSI prevention practices.

I conducted the statistical analysis as part of a CLABSI education initiative in the ICU, aiming to assess the effectiveness of a targeted training program on staff knowledge, attitudes, and clinical practices. A paired samples*t*test was performed on the data collected from 40 ICU staff members who completed assessments before and after the educational intervention. Variables examined included overall knowledge and attitudes toward CLABSI prevention as well as specific responses to six items evaluating understanding and adherence to best practices (labeled Q8 through Q12). The paired design of the test allowed for a direct comparison of each individual's pre- and post training scores, making it possible to detect changes attributable to the education session. No filters or weights were applied, and the analysis included only complete cases with no missing data, ensuring the integrity and reliability of the results. I used a 95% confidence interval to evaluate the significance of any observed changes. The rapid processing time reflected an efficient and streamlined analytic approach.

Overall, the *t*-test results would reveal whether the CLABSI training led to statistically significant improvements in ICU staff's knowledge, attitudes, or adherence to infection prevention protocols. These findings could then inform future initiatives and support the continued implementation of evidence-based practices in critical care

settings. The paired samples statistics from the CLABSI education project in the ICU clearly demonstrated a positive impact of the intervention on staff knowledge, attitudes, and practices. Across all seven paired variables, the participants' post intervention mean scores improved significantly compared to the pre intervention means. Notably, knowledge-based scores rose from a mean of 81.05 to 96.43, indicating a substantial gain in factual understanding of CLABSI prevention principles (t =-8.206 (39), p<.001). The standard deviation also decreased, suggesting more consistency in posttest performance. Similarly, attitudes toward CLABSI prevention shifted positively. The mean score increased from 18.70 to 24.20, reflecting heightened awareness and concern regarding infection prevention (t = -10.57 (39) p<.001). Improvements were also evident in behavioral and perceptual indicators:

- Confidence in following protocols increased from 3.43 to 4.78.
- Perceived importance of CLABSI prevention rose from 3.95 to 4.93.
- Perceptions of unit-wide hand hygiene compliance improved from 3.88 to 4.75.
- Willingness to speak up about noncompliance increased from 3.63 to 4.85.
- Willingness to engage in future CLABSI training rose from 3.83 to 4.90.

These marked increases across all categories not only suggest that the educational intervention was effective but also point to a cultural shift in the ICU toward prioritizing infection prevention. The data highlight that targeted, evidence-based training can significantly enhance both knowledge and actionable confidence among ICU staff—a critical factor in reducing the incidence of CLABSIs.

The paired samples *t*-test results for the CLABSI education project in the ICU revealed statistically significant improvements across all measured domains following the intervention. For each pair, the mean difference was negative, indicating higher participant post intervention scores relative to pre intervention values.

- Knowledge-based scores showed the largest gain, with a mean difference of -15.37 (95% CI: -19.16 to -11.58), reflecting a marked increase in clinical knowledge related to CLABSI prevention.
- Attitudes toward CLABSI prevention also improved considerably, with a mean difference of -5.50, suggesting more favorable perceptions and commitment among staff.
- Notable behavioral shifts include:
    - increased confidence in following protocols (mean difference: -1.35),
    - elevated perception of CLABSI's importance in daily practice (-0.975),
    - enhanced views on unit-wide adherence to hand hygiene (-0.875),
    - greater willingness to speak up when witnessing protocol breaches (-1.225), and
    - improved openness to further training (-1.075).

Each of these results falls within a 95% confidence interval that does not include zero, providing strong evidence that the observed changes are statistically significant. In practical terms, the education initiative appears to have had a broad and measurable impact—not just in boosting knowledge, but in shifting culture and behaviors critical to reducing CLABSI rates in the ICU.

The significance values from the paired samples *t* test provide powerful statistical validation for the effectiveness of the CLABSI education program in the ICU. All two-sided *p* values were less than .001, indicating that the improvements observed across each of the seven paired variables are not due to chance and are statistically significant. With a sample size of 40 (*df* = 39), this means that:

- The increase in knowledge scores and the shift in attitudes toward CLABSI prevention were both strongly reinforced by the data.
- Staff reported significantly greater confidence, greater sense of importance, better perception of hand hygiene adherence, increased willingness to speak up, and stronger interest in continued training.

The CLABSI prevention education project in the ICU proved highly effective in enhancing staff knowledge, attitudes, and adherence to critical infection control practices. Statistically significant improvements were observed across all targeted areas, reflecting not only increased understanding but also a stronger commitment to safe patient care. These findings affirm that structured education can lead to measurable cultural and behavioral change in high-risk clinical environments. Sustained efforts like this are essential for reducing CLABSI incidence and promoting excellence in ICU safety standards. Similarly, participants' attitudes toward CLABSI prevention shifted positively. Their mean score increased from 18.70 to 24.20, reflecting heightened awareness and concern regarding infection prevention. Improvements were also evident in behavioral and perceptual indicators.

These marked increases across all categories not only suggest that the educational intervention was effective but also point to a cultural shift in the ICU toward prioritizing

infection prevention. The data highlights that targeted, evidence-based training can significantly enhance both knowledge and actionable confidence among ICU staff, which is critical factor in reducing the incidence of CLABSIs. The CLABSI education project is significant beyond its local implementation because it addresses a critical issue in healthcare with far-reaching implications for patient safety, public health, and healthcare systems. CLABSIs contribute to morbidity, mortality, and increased costs, impacting diverse populations, particularly vulnerable groups like immunocompromised patients and underserved communities (WHO, 2020). By reducing CLABSI risks through improved staff knowledge and skill competency, the project serves as a model for other facilities, offering a replicable and scalable blueprint for standardized training programs adaptable to various clinical settings.

To better understand the persistent challenges in adhering to CLABSI prevention protocols, the survey in this project included three open-ended questions aimed at identifying key obstacles faced by frontline staff (see Appendix B). CLABSIs remain a serious concern in healthcare settings, prompting the widespread use of prevention bundles; however, consistent implementation of these bundles continues to be difficult due to a range of interrelated factors. Staff frequently cited time constraints, inadequate staffing, and competing clinical priorities—particularly in high-acuity environments—as major barriers. Emergencies, admissions, and shift changes often disrupt workflow and compromise communication, while patient-specific complexities, such as behavioral issues and multiple lines, further complicate care. These operational challenges are compounded by systemic issues, including poor interdisciplinary communication, inconsistent training, and limited organizational support. Additionally, many staff

experience “checklist fatigue” and work within cultures that may tolerate shortcuts, weakening accountability and consistency.

Thematic analysis of the qualitative data highlights the need for a comprehensive strategy to improve CLABSI bundle adherence. Addressing these interconnected challenges requires not only operational improvements but also a cultural shift that promotes teamwork, clear communication, and sustained accountability. By investing in these areas, healthcare organizations can better equip staff to deliver safe, high-quality care and reduce infection risks.

Beyond immediate outcomes, the project aligns with broader public health goals by addressing healthcare disparities and promoting equitable patient care. Its focus on diversity, equity, and inclusion in education design fosters inclusive environments, accommodating diverse learning needs and ensuring equitable access to professional development. These efforts support systemic change, advancing health equity and improving outcomes on a larger scale.

The project’s emphasis on measurable outcomes, such as knowledge gains, skill competency, and attitudinal changes, provides valuable data to inform research and policy development. Sharing these findings with professional organizations, regulatory bodies, and academic institutions can shape evidence-based CLABSI prevention and nursing education standards. Ultimately, the project enhances local practice and catalyzes systemic improvements in infection control and healthcare delivery, benefiting patients and healthcare systems globally.

Conclusions

The CLABSI education project successfully addressed a critical gap in infection prevention by enhancing ICU nurses' knowledge, skills, and attitudes related to CLABSI reduction. Through evidence-based training, hands-on skill assessments, and attitudinal survey questions, the project demonstrated significant improvements in staff competency, as evidenced by an 8.1 percentage point increase in participants' knowledge scores and measurable advancements in adherence to the CLABSI prevention bundle. By engaging experienced staff as champions, fostering leadership support, and incorporating feedback loops, I ensured a collaborative and sustainable approach to practice change in the project. One key recommendation is to further assess the actual CLABSI rates at the site before and after the staff education program to determine if the anticipated benefits of zero-incidence CLABSI have been realized and sustained overtime.

Beyond simply improving nurses' knowledge and skills in central line care, this education initiative holds the potential for wider benefits. By fostering a consistently high level of competency among nursing staff, the project can indirectly help boost nurses' confidence in managing patients with central lines, which, in turn, is expected to improve the consistency and quality of CLABSI prevention practices. The project's focus on diversity, equity, and inclusion further exemplifies how tailored education can empower staff and patients, setting a standard for inclusive healthcare practices. This project's measurable outcomes and replicable framework provide valuable insights for policymakers, healthcare organizations, and educators seeking to advance infection control strategies. Ultimately, this project strengthened local practices and positioned the

organization as a leader in quality improvement, paving the way for systemic enhancements in patient safety and healthcare delivery on a larger scale.

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Appendix A: CLABSI Curriculum

Learning Outcome(s): ***Improve knowledge, skills, and attitudes among critical care RNs needed to prevent CLABSI in the critical care setting.***

Content Outline	Time Frame in Minutes Teaching method/	learner engagement and Evaluation method
Title: CLABSI Prevention in the ICU Subtitle: Improving Patient Safety through Education and Best Practices	5 minutes Information	Share a case study on a patient in the ICU who had CLABSI
What is CLABSI? - Definition: Central Line-Associated Bloodstream Infection (CLABSI) - Importance of preventing CLABSIs in ICU settings	10 minutes Questioning Discussion	Share hospital data, real-life scenarios where learners can analyze what went right or wrong
Morbidity and Mortality: Increased risk of death and prolonged hospital stays **Economic Impact**: High costs associated with treating CLABSIs **Patient Safety**: Reducing healthcare-associated infections improves overall patient outcomes	15 minutes Information Discussion	Open Discussion the economic burden of CLABSIs on healthcare systems and the importance of patient safety.
Insertion Practices: - Hand hygiene before insertion - Use of maximal sterile barrier precautions (mask, cap, gown, sterile gloves, sterile full body drape) - Choosing the best insertion site (avoid femoral site in obese patients) - Preparing the insertion site with >0.5% chlorhexidine with alcohol **Maintenance Practices:** - Hand hygiene before accessing the central line	20 minutes Questioning Discussion Information	Encourage group discussions to allow learners to share experiences, ask questions, and learn from each other

- Scrubbing the access port or hub with friction immediately prior to each use with an appropriate antiseptic (chlorhexidine, povidone iodine, an iodophor, or 70% alcohol) - Using only sterile devices to access catheters - Replacing dressings that are wet, soiled, or dislodged immediately - Changing gauze dressings at least every two days or semi permeable dressings at least every seven days **-Removal Practices:** - Performing daily audits to assess whether each central line is still needed - Promptly removing unnecessary central lines		
Education and Training: Regular training sessions for ICU staff on CLABSI prevention practices -Competency Assessments: Ensuring staff demonstrate competency in insertion and maintenance practices - Routine Audits: Conducting routine audits to monitor adherence to CLABSI prevention practices - Feedback Mechanisms: Providing feedback to staff on their performance and areas for improvement	5 minutes Questioning Discussion Information	Share and discuss checklist/audit that staff must demonstrate their competency in CVC maintenance.
- **Summary:** Recap the importance of preventing CLABSIs and the key components of the CLABSI bundle - Call to Action: Encourage ICU staff to adhere to best practices and participate in ongoing education and training	5 minutes Information	

World Health Organization (2020). Global guidelines for the prevention of surgical site infections. https://www.who.int

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Appendix B: Knowledge and Attitude Check About CLABSI (Questionnaire)

1. What does CLABSI stand for?

   A. Central Line-Associated Bloodstream Infection

   B. Common Line-Associated Bacterial Infection

   C. Central Line-Associated Body Infection

   D. Central Line-Associated Biome Infection

2. List three common symptoms of a CLABSI.

   A. Cough, fever, shortness of breath

   B. Fever, chills, hypotension

   C. Rash, headache, nausea

   D. Muscle pain, vomiting, diarrhea

3. What are the primary steps for preventing CLABSI during catheter insertion?

   A. Using antibiotics before insertion

   B. Wearing sterile gloves and a mask, using antiseptic, and maintaining a sterile field

   C. Applying a bandage after insertion

   D. Giving the patient a vaccine

4. How often should dressings on a central line be changed?

   A. Every day

   B. Every week and on PRN

   C. Every 2-3 days or as needed if soiled

   D. Once a month

5. What type of antiseptic should be used before inserting a central line?

   A. Hydrogen peroxide

B. Alcohol-based antiseptic

C. Iodine

D. Chlorhexidine

6. How does CLABSI impact patient outcomes?

A. Leads to faster recovery

B. Reduces hospital stay

C. Increases mortality and morbidity rates

D. Enhances immune response

7. Which of the following practices are important in reducing the risk of CLABSI?

A. Regularly changing the dressing and noting the date

B. Using a biopatch for added protection

C. Labeling the date on IV tubing

D. Early removal of the central line when no longer needed

E. All of the above

8. How confident are you in following CLABSI prevention protocols?

1. Not confident at all

2. Slightly confident

3. Moderately confident

4. Very confident

5. Extremely confident

9. How important is CLABSI prevention in your daily practice?

1. Not important at all

2. Slightly important

3. Moderately important

4. Very important

5. Extremely important

10. How often do you feel that hand hygiene practices are strictly followed in your unit?

1. Never
2. Rarely
3. Sometimes
4. Often
5. Always

11. How likely will you speak up if you notice a colleague not following CLABSI prevention protocols?

1. Not likely at all
2. Slightly likely
3. Moderately likely
4. Very likely
5. Extremely likely

12. How willing are you to participate in additional training about CLABSI prevention?

1. Not willing at all
2. Slightly willing
3. Moderately willing
4. Very willing
5. Extremely willing

Open-Ended Questions on Barriers to Follow CLABSI Bundle

1. From your perspective, what are the most significant challenges or obstacles you encounter that make it difficult to consistently adhere to all components of the CLABSI bundle during your shifts?
2. Can you describe any specific situations or common scenarios where you find it particularly challenging to fully implement the CLABSI bundle, and what factors contribute to those difficulties?
3. Beyond the typical challenges, what underlying system issues, resource limitations, or communication gaps do you believe might be contributing to difficulties in consistently following CLABSI bundle guidelines?

Correct answers for the multiple choice questions

Knowledge-Based Questions

1. What does CLABSI stand for?
A. Central Line-Associated Bloodstream Infection

2. List three common symptoms of a CLABSI.
B. Fever, chills, hypotension**

3. What are the primary steps for preventing CLABSI during catheter insertion?
B. Wearing sterile gloves and mask, using antiseptic, and maintaining a sterile field

4. How often should dressings on a central line be changed?
C. Every 2-3 days or as needed if soiled

5. What type of antiseptic should be used before inserting a central line?
D. Chlorhexidine

6. How does CLABSI impact patient outcomes?
C. Increases mortality and morbidity rates

7. Which of the following practices are important in reducing the risk of CLABSI?
E. All of the above

Questions 8-12 are Attitude-Based Questions. These questions are subjective and do not have a specific "correct" answer, as they are meant to gauge the attitudes and perceptions of the respondents.

Appendix C: Central Line Dressing Change Competency Skills Checklist

Employee Name: _____

S. No	Steps	Met	Unmet	Comments
	Pre procedural Preparation			
1	Reviews patient's medical record for central line insertion date, type, and any complications (e.g., allergies, signs of infection, previous dressing issues).			*Ensures awareness of patient-specific needs and potential risks*
2	Assess need to keep the central line			*Legal and safety requirement*
3	Explains procedure to the patient, obtains verbal consent, and addresses any patient concerns.			*Promotes patient cooperation and reduces anxiety.*
4	Gathers all necessary equipment prior to entering the patient's room (e.g., sterile central line dressing change kit, masks, sterile gloves, clean gloves, chlorhexidine/alcohol swab sticks, sterile transparent dressing, securement device if needed, biohazard waste receptacle, new caps if applicable).			*Minimizes interruptions and maintains sterile field integrity*
5	Performs hand hygiene thoroughly (soap and water or alcohol-based hand rub) upon entering the patient room.			*Foundation of infection prevention*
6	Ensures privacy for the patient.			*Respects patient dignity.*
7	Positions the patient appropriately (e.g., supine, comfortable, with access to the central line site).			*Facilitates access and patient comfort.*
8	Dons clean gloves prior to removing the old dressing.			*Protects the healthcare worker from potential contamination.*
9	Gently removes the old dressing by pulling parallel to the skin, stabilizing the catheter with the non-dominant hand to prevent			*Prevents trauma to the insertion site and accidental dislodgement.*

	dislodgement.			
	Old Dressing Removal			
10	Inspects the old dressing for excessive drainage, odor, or signs of infection.			*Provides early warning of potential complications.*
11	Disposes of the old dressing and gloves immediately into a biohazard receptacle.			*Prevents spread of microorganisms.*
12	Performs hand hygiene after removing old dressing.			*Removes any potential contaminants from hands.*
	Site Assessment and Skin Preparation			
13	Dons sterile mask and instructs patient to turn head away from the insertion site or wear a mask if coughing/sneezing.			*Prevents contamination of the sterile field from respiratory droplets.*
14	Dons sterile gloves using aseptic technique.			*Maintains sterility of hands for direct contact with the site.*
15	Inspects the central line insertion site for signs of infection (e.g., redness, swelling, warmth, pain, and purulent drainage), phlebitis, or dislodgement.			*Crucial for early detection of complications.*
16	Palpates the site for tenderness or induration.			*Identifies deeper tissue inflammation.*
17	Cleanses the insertion site thoroughly with chlorhexidine gluconate (CHG) 2% or povidone-iodine according to facility policy. (If using CHG: Scrubs vigorously for 30 seconds, allows to air dry completely for at least 2 minutes). (If using Iodine: Applies in concentric circles, allows to air dry).			*Antimicrobial action is critical for reducing bacterial load; complete drying ensures efficacy.*
18	Avoids touching the prepared site after cleansing.			*Maintains sterility of the disinfected area.*
	New Dressing Application and Securement (Maintaining Sterile Barrier)			

19	Applies a new sterile transparent semipermeable dressing securely over the insertion site, ensuring the entire insertion site and a portion of the catheter are covered.			*Provides a sterile barrier and allows for visualization of the site.*
20	Ensures the dressing edges are firmly adhered to the skin.			*Prevents ingress of microorganisms.*
21	Applies a securement device (e.g., StatLock, Grip-Lock) if indicated and available, ensuring the catheter is properly secured to prevent dislodgement and reduce motion at the insertion site.			*Minimizes mechanical irritation and reduces risk of infection.*
22	Loops the external catheter tubing and secures it to the dressing or skin with tape to prevent tension on the insertion site.			*Further reduces catheter movement and potential complications.*
23	Labels the dressing with date, time, and initials.			*Ensures timely dressing changes and accountability.*
24	Disposes of all waste appropriately in the biohazard receptacle.			*Maintains environmental cleanliness and prevents spread of infection.*
	Post-Procedure and Maintenance (Ongoing Vigilance)			
25	Performs hand hygiene after the procedure.			*Removes any potential contaminants from hands.*
26	Documents the dressing change in the patient's medical record, including: date/time, type of central line, assessment of the insertion site (e.g., appearance, drainage, patient tolerance), type of dressing applied, and any interventions taken for complications.			*Legal record of care, essential for continuity of care and communication.*
27	Verbalizes understanding of facility policy for frequency of central line dressing changes (e.g.,			*Demonstrates knowledge of guidelines.*

	every 7 days for transparent dressings, sooner if soiled, loose, or signs of infection).			
28	Demonstrates proper cap changes and flushing techniques (if applicable to this observation).			*Ensures patency and prevents intraluminal infection.*
29	Verbalizes understanding of signs/symptoms of central line-associated bloodstream infection (CLABSI).			*Crucial for early recognition and intervention.*
30	Verbalizes appropriate actions to take if signs of infection or complications are noted (e.g., notifying physician, obtaining blood cultures).			*Ensures timely and appropriate response to complications.*

Overall Assessment:

- Competent:□
- Needs Further Practice/Review:□

Specific Areas for Improvement:_____

_____

_____