

# Fighting CLABSI: An Interdisciplinary Approach for Best Practice Outcomes

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**Abstract:** Central line-associated bloodstream infections (CLABSI) are among the most lethal and financially costly compared to other hospital associated infections (HAI). With over 40,000 CLABSIs per year in the US, the impact on the healthcare system is significant. The economic strain of these infections is estimated to be upwards of \$26,000 per case. With the creation of a CLABSI task force came a nursing workshop, the purpose of which cascaded into a three-fold agenda: 1) review of evidence-based practice; 2) a hands-on workshop; and 3) patient-centered education. An auditing tool was subsequently created. Nursing completion of the daily audit tool increased to 75%, while CLABSI rates decreased 75%, from 2.92 to 0.74 per month from 2012 to 2013. After December 2013, we observed a CLABSI rate of 0.0 for seven (7) consecutive months. The integrated concept of combining the learning needs of the inpatient and outpatient nurses proved significant as an innovate structure actualized through this education process. The authors noted increased confidence and engagement in the nursing staff, which in turn led to the more experienced nurses educating and demonstrating to our novice nurses.

**Key words:** Central-line, infection, interdisciplinary, economic, education, nursing.

## 1. Introduction

Hospital-associated infections (HAI) are caused by an array of viruses, bacteria, and fungi. They are commonly attributed to invasive procedures, or extended inpatient length of stay, as this increases the patient's likelihood of exposure to nosocomial infections. These pervasive infections overburden the United States healthcare system, with an estimated 1 in 20 hospitalized patients experiencing an HAI every year [1].

The central line-associated bloodstream infection (CLABSI) has higher morbidity and mortality compared to other HAIs. The wide use of central lines in more critical and vulnerable patients makes CLABSIs a more significant concern for healthcare institutions. Forty-eight percent of all intensive care patients have central line access, which accounts for approximately 15 million central line days each year [2]. The CDC reports an estimated occurrence of 41,000 CLABSIs each year in U.S. hospitals [3]. Given the mortality rate

is upwards of 25%, the breadth of these infections exceeds the human lives they affect. Each case has serious financial repercussions costing a hospital approximately \$26,000, thus, having serious financial repercussions [4]. A report published in 2012 cites a 58% decrease in CLABSI cases represented an estimated health care cost savings of \$414 million nationwide [5].

Having noticed repeated spikes in our CLABSI rate coupled with potentially dramatic financial ramifications, the authors were prompted to develop a comprehensive and mandatory education workshop. The purpose of this workshop was, to acknowledge our current processes, and improve our approach to CLABSIs to quell their development.

## 2. Materials and Methods

Review of historical data revealed a steady decline in our CLABSI rate, but later Core Measures data deemed it necessary to define an action plan for performance improvement. The steep upturn from November to

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December of 2012 triggered the formation of an interdisciplinary CLABSI task force. The team consisted of physicians, advanced practice nurses, inpatient and infusion nurses, and representatives from quality and infection control. The initial meetings consisted of brainstorming sessions to identify reinforcement opportunities of infection prevention in the immuno-compromised population by improving the nurse's knowledge base, skills, and practice. The progress of the development and implementation of the mandatory nurse workshop was reported back to the task force.

The initial goal of the task force was to develop and implement a plan for a zero tolerance of CLABSI. Review of the literature suggested the incorporation of a central line care maintenance bundle, a recommendation heeded by the task force. The purpose of the nurse workshop cascaded into a three-fold agenda which encompassed: review of evidence-based practice resulting in the development of a study guide; a hands-on workshop to foster clinical expertise; and patient-centered education. A tangible result of the task force was the creation of a peripheral/central line auditing tool.

The development of the evidence-based study guide informed nurses of the current CLABSI rate, proper care and maintenance of central lines, and the importance for daily patient assessment as to the necessity of their central line. The workshop, mandatory for all registered nurses, required attendees through Return Demonstration, to demonstrate accessing and de-accessing implanted ports, perform dressing changes, practice venipuncture, as well as demonstrate proper documentation. To accommodate all nurses regardless of shift, three (3) workshops were scheduled per week, for two (2) weeks at 12 h per session. There were two (2) primary learning objectives for the workshop: the description care and maintenance for central lines; the demonstration of accessing and de-accessing implanted ports. Nurses who required further instruction for access and de-access of implanted ports were scheduled a four (4) h follow up session with a port room nurse. The task

force also included venipuncture education to decrease the use of central lines for the collection of lab specimens. Nurses were also provided the opportunity to gain further experience through a follow up session with a phlebotomist.

Return Demonstration played a major role in the nurses learning curriculum, and their assessment involved a knowledge post-test, clinical competency validation, and workshop evaluation. Additionally, patient education was provided during the workshops which included the definition of central lines, prevention of infection, and what signs and symptoms the patient should be aware of, should an infection develop. A daily audit tool was developed and implemented for both day and night shift charge nurse to complete. The tool is inclusive of such parameters as date of central line insertion, signs and symptoms of infection present (Y/N), and whether or not the central line is still a necessity. The authors' workshop is in accordance with Betty Neuman's conceptual model which promotes the optimal level of wellness among the patient system through nursing interventions. Ongoing nursing compliance and patient outcomes are measured via a weekly audit tool based on the Central Line Maintenance Bundle.

In April 2013, the authors' hospital observed another spike in our overall CLABSI rate, to which the task force responded by enhancing the audit tool to monitor the nursing staff's compliance with the use of 2% chlorhexidine gluconate (CHG) wipes. Starting as an inpatient initiative, further analysis of the structure, process, and outcomes indicated the scope of CHG monitoring should be inclusive of the outpatient setting as well. The unique educational roles of this targeted audience were addressed in planning the curriculum.

With yet another observed decrease and subsequent increase, an education workshop September 2013 was developed which included reinforcement education for the care and maintenance of central lines. The care and maintenance bundle for central lines was reviewed with all registered nurses.

The audit tool was once again revised April 2014 to include the charge nurse observing the nurse performing care and maintenance of the patient's

central line including dressing changes and accessing and de-accessing of implanted ports (Appendix—Fig. 1).

Date \_\_\_\_ Floor \_\_\_\_

### Night Shift Peripheral/Central Line Auditing Tool

Observation	Room # _____	Room # _____
Was sterile technique used? Gloves, masks, 30 sec. scrub?	YES or NO	YES or NO
If sterile technique was broken was a 2 <sup>nd</sup> kit obtained?	YES or NO	YES or NO
Is there a SWAB cap present? If line is not connected.	YES or NO	YES or NO
Is there a blood return with the central line? If not explain action taken in "comment" section.	YES or NO	YES or NO
<b>COMMENTS:</b>		

\*\*\* If NO observations please check the box:

Room # _____		Patient Initials _____		Pt Education Complete – Y/N		Need for necessity assessed- Y/N		CHG bath done- Y/N		Nurse Assigned to Patient _____						
PIV size	Date of PIV	Drug dry/intact	s/s of Infection	PORT	Date of access	Drug dry/intact	Biopatch Y/N	s/s of Infection	PICC	date of insertion	Drug dry/intact	Biopatch Y/N	s/s of Infection	TPN	IV Fluids time/date	Tubing time/date

Room # _____		Patient Initials _____		Pt Education Complete – Y/N		Need for necessity assessed- Y/N		CHG bath done- Y/N		Nurse Assigned to Patient _____						
PIV size	Date of PIV	Drug dry/intact	s/s of Infection	PORT	Date of access	Drug dry/intact	Biopatch Y/N	s/s of Infection	PICC	date of insertion	Drug dry/intact	Biopatch Y/N	s/s of Infection	TPN	IV Fluids time/date	Tubing time/date

Auditor \_\_\_\_\_

**Peripheral/Central Line Audit Tool Instructions**

- The charge nurse for night shift will be responsible to audit 2 patients per shift.
- The audit tool will be kept in the charge nurse binder

**Observation:** The goal is to observe the nurse performing tasks related to central line i.e. using sterile technique – needle changes, dressing changes, checking blood return, etc. Please observe the nurse caring for the patient with the central line performing these tasks when applicable. Please provide any comments/issues/intervention for follow up in the "comment" section under the patient's room #. Any emergent situations should be reported to Debbie Baldassarre X5536.

- Was the patient educated on central line care and maintenance – yes or no
- Was the need for necessity documented – yes or no
- Was the CHG bath performed 2 hours after the patient's bath—yes or no
- PIV size – include location of IV
- Date of PIV – insertion date
- Dressing dry/intact – is dressing dated, timed, initialed as well as clean, dry, & intact
- Signs /symptoms of infection – yes or no
- PORT – include location & left or right
- Date of access
- Dressing dry/intact – is dressing dated, timed, initialed as well as clean, dry, & intact
- Biopatch present- yes or no
- Signs /symptoms of infection – yes or no
- PICC – include location
- Date of insertion
- Dressing dry/intact – is dressing dated, timed, initialed as well as clean, dry, & intact
- Biopatch present- yes or no
- Signs /symptoms of infection – yes or no
- TPN – is TPN infusing, if so via PICC or Port?
- IV fluids timed & dated
- IV tubing timed & dated

**Remember to sign the audit tool at the bottom.**

**Fig. 1 Nursing central line audit tool (front and back respectively).**

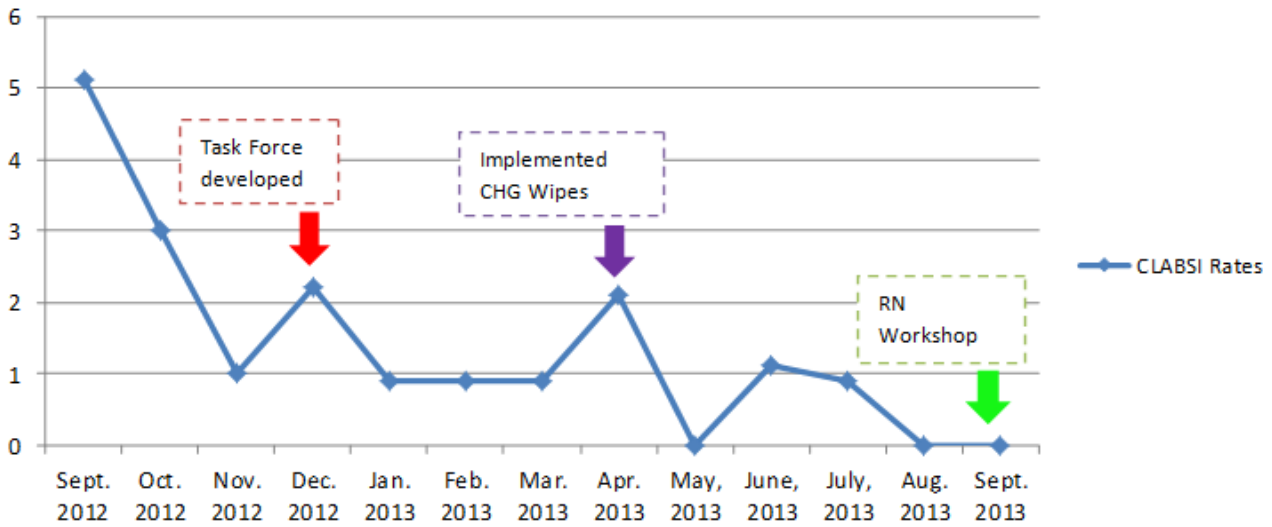


Fig. 2 CLABSI rates from September 2012-2013.

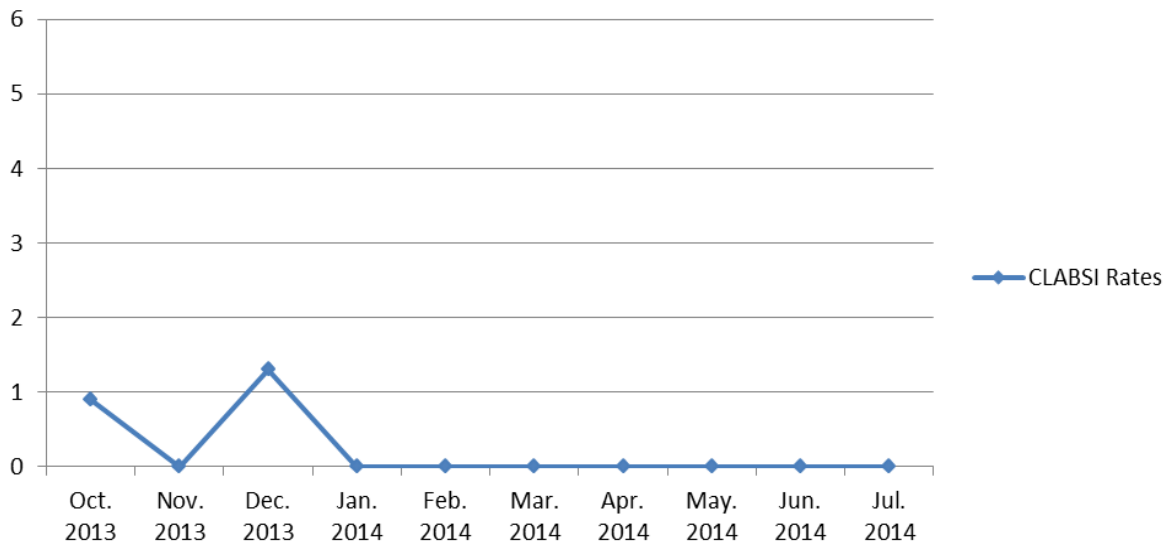


Fig. 3 CLABSI rates from October 2013-July 2014.

### 3. Results and Analysis

The authors’ education outcome measures since the January 2013 implementation have resulted in substantial improvements. Nursing compliance for completion of the daily audit tool increased from 45% to 75%, with a subsequent significant decrease (75%) in average CLABSI rate from 2.92 to 0.74 per month from 2012 to 2013 (Appendix—Fig. 2).

In October 2013, the observed CLABSI rate was 0.9, with another increase in December of the same year to a rate of 1.3, which equated to one (1) infection for 763

central line days. Subsequently, we have observed a rate of 0.0 for seven (7) consecutive months (Appendix—Fig. 3).

### 4. Discussion and Conclusions

The audit tool is one technique to engage the nursing staff and increase awareness to the proper care and maintenance of central lines. The charge nurse each shift is responsible for completing the audit by randomly selecting two patients and observing the nurse caring for the patient access, de-access, or change the dressing of the port. Nurse Practice Council

approved our “Stay Connected” policy, which provides guidelines for decreased Central Vascular Access Device (CVAD) manipulation for the purpose of medication and hydration. With this policy, the catheter remains connected to the primary tubing which maintains a closed-circuit system. Our minimal CVAD manipulation is inclusive of patients remaining connected for showers and ADLs.

Implications for oncology nursing practice were identified as a result of the mandatory nursing workshop. The integrated concept of combining the learning needs of the inpatient and outpatient nurses proved significant as an innovate structure actualized through this education process. It was later used as a framework to advance and improve the nurse educator's practice and expertise.

Nursing staff will be offered continuing education on care and maintenance of central lines to maintain clinical competence with the support of our nursing leadership. We are able to offer the program due to the interdisciplinary approach with the infection disease department and nursing. Our plan is to offer ongoing refresher workshops for our nurses, as it is well known both continuing education and reinforcement lead to changes in practice and culture. The audit tool led to increased confidence and engagement of our nursing

staff, which in turn led to the more experienced nurses educating and demonstrating to our novice nurses.

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