

This document is a summary of key points as abstracted from the original publication by the PDI Clinical Affairs team. This summary is intended to be used for educational purposes only. Articles may be reviewed in its entirety by accessing through the standard publication process.

Author: Katelynn Maguire, MPH, MS, CIC; Angela Stomant, RN, BSN; and Jodie Watts, RN, BSN, CCRN
McLaren Greater Lansing

Publication: Title and Journal/Conference

Sustaining Over Three Years of Zero Central Line-Associated Bloodstream Infections with a Multidisciplinary Team Focus and Phased Interventions

AVA 2018 - Association for Vascular Access Annual Scientific Meeting, September 15-18, 2018

Background

Central Line-Associated Bloodstream Infections (CLABSI) are a preventable harm within healthcare. From late 2013 through mid-2014, our teaching hospital's sixteen bed medical/surgical Intensive Care Unit (ICU) had an unprecedented uptick in CLABSI, from a Standardized Infection Ratio (SIR) of 0.45 to a SIR of 1.69. Previously presented at APIC June 2017.

Methodology/Study Design

- Quasi experimental; 12 month systematic process improvement
- In July 2014, a multidisciplinary workgroup formed of representatives from all stakeholders in the ICU, including senior leadership.
- Objectives were to review procedures concerning central line maintenance, perform a gap analysis, implement appropriate changes, and monitor progress in eliminating CLABSI.
- CLABSI SIR was monitored throughout the project as an indicator of success.
- Once objectives were defined, a series of improvements were implemented from July 2014 through June 2015.

Experiment

- New policy and procedures were introduced concerning the cleaning of the needleless connector and the collection of blood cultures.
- A new, easy to clean and access, needleless connector was implemented.
- A 3.15% chlorhexidine gluconate (CHG)/ 70% isopropyl alcohol (IPA) swab to "scrub the hub" each time the line was accessed was introduced.
- Finally, education was delivered regarding the maintenance of the central line and indications for central lines to improve care and utilization.

Results/Conclusions

- The CLABSI SIR dropped significantly from 1.69 in early 2014 to zero starting in July 2014.
- This change has sustained and the ICU has not had a CLABSI event in over three years.
- CLABSI can be reduced by using a multidisciplinary team of stakeholders.
- Implementing better products and best practices significantly reduce infections.
- The inclusion of different points of view offers unique solutions to problems of device associated infection and promotes lasting change.

Sustaining Over Two Years of Zero Central Line-Associated Bloodstream Infections with a Multidisciplinary Team Focus and Phased Interventions

Katelynn Maguire, MPH, MS, CIC, Angela Stornant RN, BSN, Jodie Watts RN, BSN, CCRN

Abstract

Background

Central Line-Associated Bloodstream Infections (CLABSI) are a recognized preventable harm within healthcare. From late 2013 through mid-2014, our teaching hospital's sixteen bed Intensive Care Unit (ICU) had an unprecedented uptick in CLABSI, from a Standardized Infection Ratio (SIR) of 0.45 to a SIR of 1.69.

Methods

All cases were reviewed for common process improvement factors. The average time from central line insertion to infection was twelve days and the central line utilization ratio was over the ninetieth percentile compared to like facilities nationally. In July 2014, a multidisciplinary workgroup formed of representatives from all stakeholders in the ICU, including senior leadership. Objectives were to review procedures concerning central line maintenance, perform a gap analysis to find deviations from best practice, implement appropriate changes, and monitor progress in eliminating CLABSI. Central line standardized infection and utilization ratios were monitored throughout the project as an indicator of success, with a goal of significant reduction for both measures. Objectives were implemented from July 2014 through June 2015. New policy and procedures were introduced concerning the cleaning of the needleless connector and the collection of blood cultures. A new needleless connector that was easier to clean and a chlorhexidine swab used to "scrub the hub" were introduced.

Results

Education was implemented regarding the maintenance of the central line and indications for central line removal. The central line standardized infection ratio dropped significantly to zero, sustained over two years. The central line utilization ratio decreased significantly from 0.78 to 0.61 ($p < 0.05$), though central line utilization remains over the comparable pooled mean.

Conclusions

Central line associated infections can be reduced by using a multidisciplinary team of stakeholders. Implementing best products and practices can significantly reduce infection rates. The inclusion of different points of view offers unique solutions to problems of device associated infection and promotes lasting change.

Background

McLaren Greater Lansing is a 389 bed, two teaching hospital system in the Lansing area, and is part of the McLaren Healthcare Corporation. McLaren Greater Lansing has one Intensive Care Unit (ICU), a 16 bed mixed medical and surgical unit. Between January 2014 and July 2014, there were 7 CLABSI infections in the ICU, prompting the need for response by all stakeholders in the ICU beyond the best practice bundles used for years in the facility. A multidisciplinary team was brought together to make improvements in central line care and maintenance.

Objectives

The objectives of this multidisciplinary workgroup were to:

- Review current procedure and practice when concerning central lines to find gaps in best practice
- Implement strategies on how these gaps can be corrected and create lasting initiatives that support these changes in practice
- Monitor progress in changing practice and create additional strategies, if needed, to combat this patient safety risk

Figure Two. Progress Timeline: The Path to Zero!



Methods

Workgroup members included

- Chief Medical Officer
- ICU Intensivist and Residents
- Infection Disease Physician
- ICU and ED Nursing Management and Staff
- Quality Management
- Infection Prevention
- Laboratory
- Respiratory therapists
- Dialysis staff

The workgroup met initially monthly, then moved to bimonthly and quarterly meetings. Literature on best practices for line insertion and maintenance were discussed against practices at McLaren Greater Lansing.

An in depth analysis of all of the CLABSI infections was performed to correlate:

- Date of Infection vs. Date of Central Line Insertion
- Type of organism causing infection?
- Where the line was placed?

Workgroup members were asked to review the entire line placement, management, and blood culture process to find deviations from best practices

Interventions

Initially the following trends were identified concerning McLaren Greater Lansing's CLABSI cases:

- Three of the seven CLABSIs identified were from common commensal organisms
- In 25% of CLABSI cases, blood cultures were drawn by nursing staff off of the central line with no confirmatory peripheral blood culture, inappropriate to best practice and resulting in potentially contaminated
- Average time from line insertion to infection was approximately 12 days

Based on the defects associated with the seven CLABSI events and best practices for central line maintenance, interventions to prevent CLABSI included:

- Education to staff on appropriate central line maintenance, dressing changes, and scrubbing the hub
- Changing policy to provide more details on appropriate central line maintenance
- Enforcement of existing procedure that requires two blood cultures taken from peripheral sticks by a phlebotomist. This included empowering lab staff to speak up for this practice
- Requiring all blood cultures that must be taken from a central line be done with a phlebotomist to assist. This helped to maintain a aseptic environment for blood cultures to be taken.
- Changing of all central line bundle forms to reflect best practice bundles
- Ongoing education of all staff that use central lines of proper line maintenance
- Switching IV tubing and needleless connector to a more staff friendly product that was easier to clean and use
- Posting "Days Without Infection" in all units and celebrating milestones of prevention
- Addition of the PDI Preventatives® Device Swab to enhance the "Scrub the Hub" process and staff buy-in
- Education of residents on choosing the best, least invasive, vascular access device for the patient
- Tracking of line utilization and using that as a measure of success in the absence of infections

Figure Two outlines the timeline of interventions.

Results

- The McLaren Greater Lansing ICU has sustained over two years without a CLABSI infection
 - The last CLABSI event was in July 2014 (Figure One)
- The line utilization rate was reduced from 0.78 (January 2013-June 2014) to 0.65 (July 2014-December 2015).
 - This type of reduction implies that there may have been central lines being unnecessarily used, though this utilization remains over the NHSN pooled mean.

Limitation

- A limitation of this work is that several interventions were used at once, so it is difficult to attribute success to any particular intervention

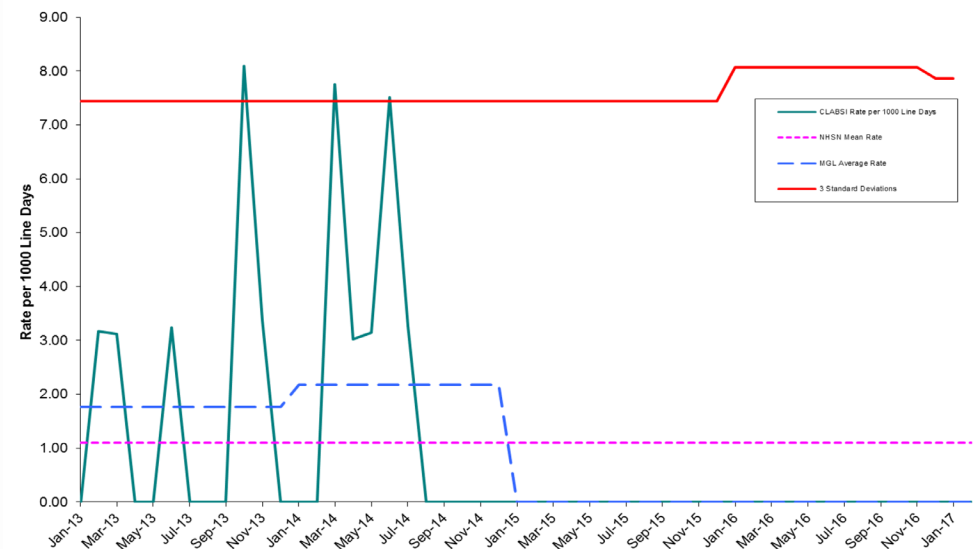
Conclusions

- A multidisciplinary approach to CLABSI prevention helped to create sustainable improvements across the board in the MGL ICU, resulting in zero CLABSI infections from July 2014-Present.
- The current focus for sustainability in this project is reduction of central line utilization. Our goal is to be below the national mean of line utilization by like units provided by NHSN.

Thank You

We would like to thank Dr. Linda Peterson, Dr. Chintalapudi Kumar, Dr. Christopher Farnum, Teresa Alfaro, Dawn Chapel, Pauline Fraser, Mary Hedin, Terrell Neal, Christine Stine, Cheryl Rozebloom, and all other group members for their dedication to this project. Thank you to Susan Burns and Scott Venema from PDI for their assistance. We would also like to thank the nursing staff, laboratory, and respiratory staff of the McLaren Greater Lansing for their dedication to patient safety.

Figure One: McLaren Greater Lansing ICU CLABSI Rate



References

- Associates for Professionals in Infection Control and Epidemiology (Ed.). (2015). Guide to Preventing Central Line-Associated Bloodstream Infections. Washington DC <https://www.cdc.gov/HAIs/toolkit/04-01-15.html>
- Margaret, A., Edwards, J. R., Allen-Bridson, K., Gross, C., Malinski, P. J., Peterson, K. D., ... & Sievert, D. M. (2015). National Healthcare Safety Network (NHSN) report, data summary for 2013. Device-associated module. *American journal of infection control*, 43(3), 206.
- <http://pdh.com/all-products/preventives/C2%AE-device>
- Yokoe, D. S., Anderson, D. J., Berenholtz, S. M., Callie, D. P., Duberka, E. R., Ellington, K. D., ... & Lo, E. (2014). A compendium of strategies to prevent healthcare-associated infections in acute care hospitals: 2014 updates. *American journal of infection control*, 42(9), 820-826.

