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Project #91: Optimizing Vascular Access to Reduce CLABSI

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Project #91
Optimizing Vascular Access to
Reduce CLABSI
(Macomb)

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Optimizing Vascular Access to Reduce CLABSI

Henry Ford Macomb Hospital Vascular Access Committee Members

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AIM

Problem Statement: Henry Ford Macomb Hospital (HFM) experienced an increase in Central Line Associated Bloodstream Infections (CLABSI) in 2021. A significant portion were occurring in the MICU and were associated with *Candida sp.* Bloodstream infections negatively impact patient outcomes, provider workload, and are costly, with a median cost of \$48,108 based on a meta-analysis conducted by AHRQ in 2017.

Improvement Statement: By end of 2022, HFM aimed to reduce CLABSI incidence by 50%.

PLAN: CURRENT STATE

A Vascular Access Committee (VAC) of key stakeholders was established and based on root cause analysis (RCA) findings the following objectives were established:

- decrease central line days by 10%
- implement evidence-based IV maintenance measures
- establish ultrasound-guided peripheral IV program
- reduce CLABSI by 50%



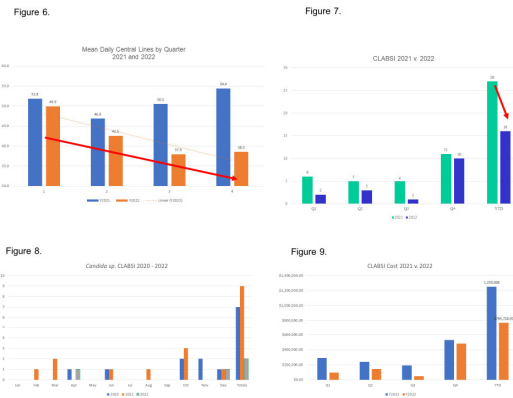
DO: CORRECTIVE ACTIONS / INTERVENTIONS

- Beginning Q1 each nursing unit to report total number of central lines, line duration, and removal plan at daily safety huddles
- Beginning Q2 central lines placed > 7 days prior and/or high-risk lines followed up on immediately following huddle with provider-to-provider conversation and plan for removal or transition to safer mechanism for venous access, prioritizing non-tunneled hemodialysis catheters
- Ultrasound-guided peripheral IV program established in Q1 2022 and expanded in Q2, Q3, Q4 to improve peripheral IV access options
- Supply transition: neutral-displacement needleless connectors and extension sets replaced with positive-displacement needleless connectors and extension sets Q2 2022 with initial nursing education prior to product conversion and continuing education and competency annually during nursing validation
- Education: initial education occurred to stakeholders (including resident physicians) prior to implementation of interventions through committees, safety huddles, and other educational platforms

CHECK (EVALUATION OF CHANGES)

- Central line reporting at safety huddles: initially total number of lines were being reported by each nursing unit with no significant reduction in number of central lines during Q1. During Q2, nursing leaders reported total number of lines, line types, line duration and plans for removal. Any high-risk lines without a removal plan require provider follow up immediately after huddle to identify safe removal plan. ANOVA was conducted and showed a statistically significant difference in the mean number of central lines between Q1 and Q4 2022 of approximately 11 lines/day, p < .05.
- Neutral displacement needleless connectors were replaced with positive displacement needleless connectors and extension sets Q3 2022 on all nursing units. CLABSIs were monitored in subsequent months following implementation. In the three months following implementation only one CLABSI was identified compared to 5 during the same timeframe in 2021.
- An ultrasound-guided peripheral IV program was initiated January 2022. Training and validation continued through Q3 with full program implementation in high-risk areas by Q4 with a goal of improving peripheral IV access and reducing number of central line days. Central lines continue to be tracked and reported at daily safety huddles.
- CLABSI revealed a 38.5% reduction over 2021 (26 infections v. 16 infections).
- CLABSI's related to *Candida sp.* pathogens decreased by 78% over 2021 (9 infections in 2021 v. 2 infections in 2022).
- CLABSI cost decreased by \$481,080.00 over 2021.

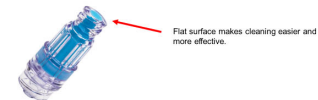
MEASURES



ACT: SUSTAIN AND SPREAD

- HFM continues to report central line numbers and follow up on high-risk lines immediately following safety huddle. Central line utilization has plateaued and continues to be significantly less than utilization in 2021.
- Positive displacement needleless connectors and extension sets continue to be used and have been implemented at other HFHS sites to reduce bloodstream infections.
- Overall CLABSI has shown significant reductions.
- CLABSIs with *Candida sp.* continue to show significant reductions over 2021.
- Root cause analysis continues to occur following each CLABSI and has revealed additional project opportunities for CLABSI reduction in 2023.

Additional Photos



•Figure 10. Positive displacement needleless connectors.

KEYS TO SUCCESS / LESSONS LEARNED

- Multidisciplinary teamwork was essential to achieving success in CLABSI reduction, to include physicians and resident physicians.
- A daily accountability structure built into the safety huddles with immediate follow up on high-risk lines was key to reducing central line utilization and duration.
- *Candida sp.* CLABSI reduction was likely influenced and associated with reduction in antimicrobial agents but was beyond the scope of this team and project.
- Recent RCAs revealed that most recent CLABSIs may be related to culturing practices and peripheral IVs. This will be the focus of the team in 2023.



This project scored high in:

- **Quality and Safety**
- **Value/Cost Efficiency**
- **Engagement**

**Project Owners: Melissa Jackson,
Kristen Ludwig, Megan Cahill**

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