

# DECREASING CENTRAL LINE ASSOCIATED BLOODSTREAM INFECTIONS (CLABSIs) IN A CRITICAL CARE SETTING

Danny Chen MD FRCPC MSc, Maya Sinno RN EMBA CPHQ, Latha Jacob MSc CIC, Flavia Lui RN BScN BSc (Hons.), Leena John RN BScN, Christina Scerbo RN MN CCSNE, Saby Barameswaran MN RN BScN BSc, Safiyya Khamis BScN MPH CIC, Yuka Hutton BA CIC  
Mackenzie Health, Richmond Hill, ON



## ISSUE

A central line associated bloodstream infection (CLABSI) is a confirmed bloodstream infection (BSI) in a patient with a central line in place within the 48-hour period before the development of the BSI and is not related to an infection at another site. CLABSIs result in significant patient harm, increased length of hospital stay and increased healthcare costs. Of all the healthcare-associated infections, CLABSIs are associated with a high-cost burden, accounting for approximately \$46,000 per case.<sup>1</sup> CLABSIs are preventable through evidence-based bundle application, infection prevention and control (IPAC) practices and continuous quality improvement (CQI).

Despite the challenges posed by the ongoing COVID-19 pandemic, our quality aim committee continued its work towards achieving zero hospital-acquired CLABSIs in the critical care program.

Our community hospital in Ontario, Canada had a baseline CLABSI rate of 4.08 per 1000-line days in 2020. Our aim was to reduce CLABSIs by 25% each year and reach zero CLABSIs by 2023. Our target goal was 3.06 CLABSIs per 1000 central line days in 2021/22 FY.

## PROJECT

Prevention of CLABSI was selected as one of the organizational corporate quality aims. An interprofessional committee was established and comprised of physicians, nurses, allied health, IPAC, professional practice, educators, data analytics and quality and patient safety teams. The team conducted a common cause analysis to identify individual and system failure mechanisms (Figure 1) and to implement evidence-based interventions. A driver's diagram (Figure 2) was developed in collaboration with the key stakeholders to identify change ideas that could contribute to decreasing CLABSIs. The drivers diagram included governance and accountability, education and training, standardized central line processes, central line equipment, data and reporting, front line engagement, and culture of safety.

Figure 1: CLABSI Common Cause Analysis

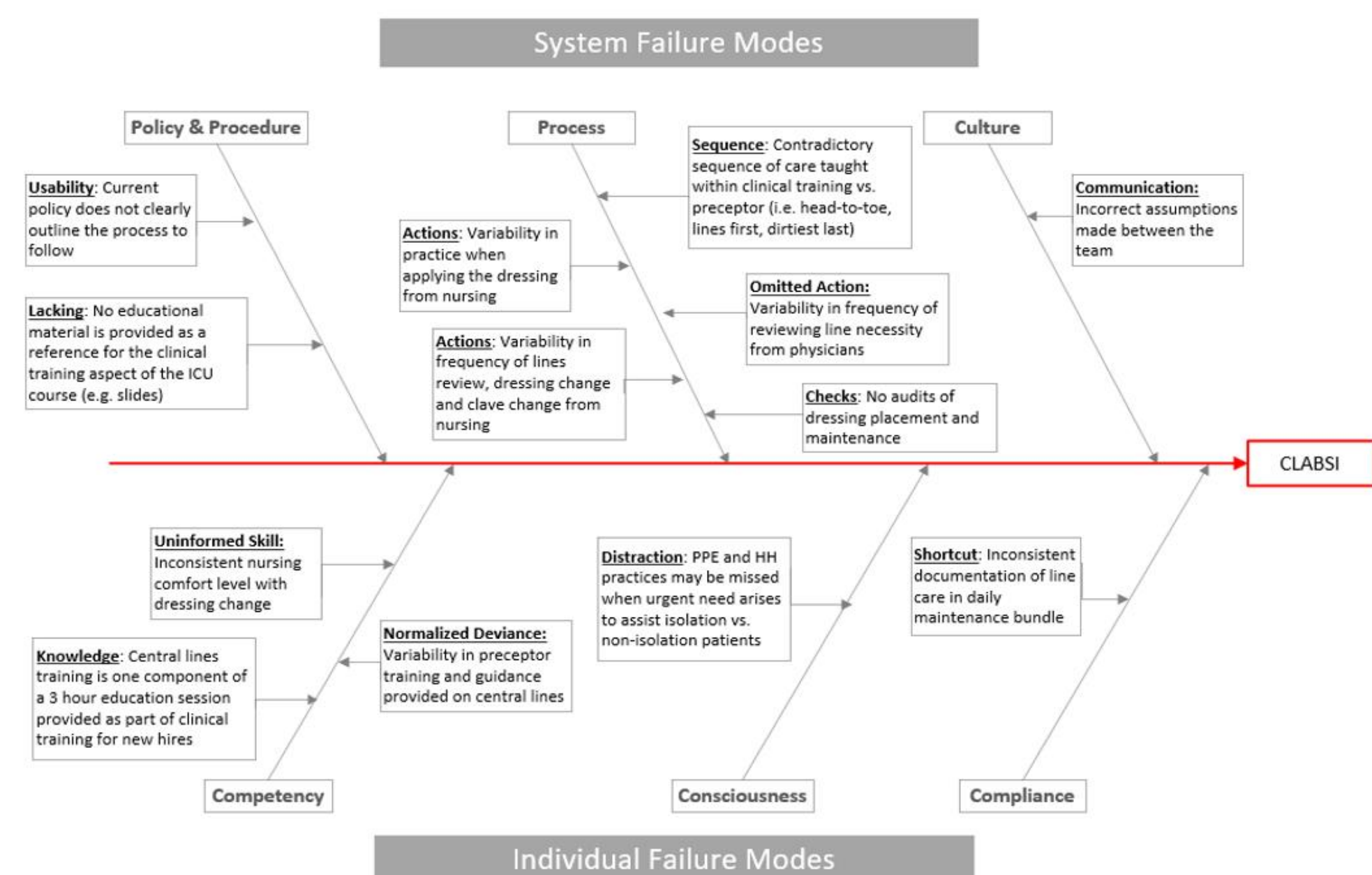
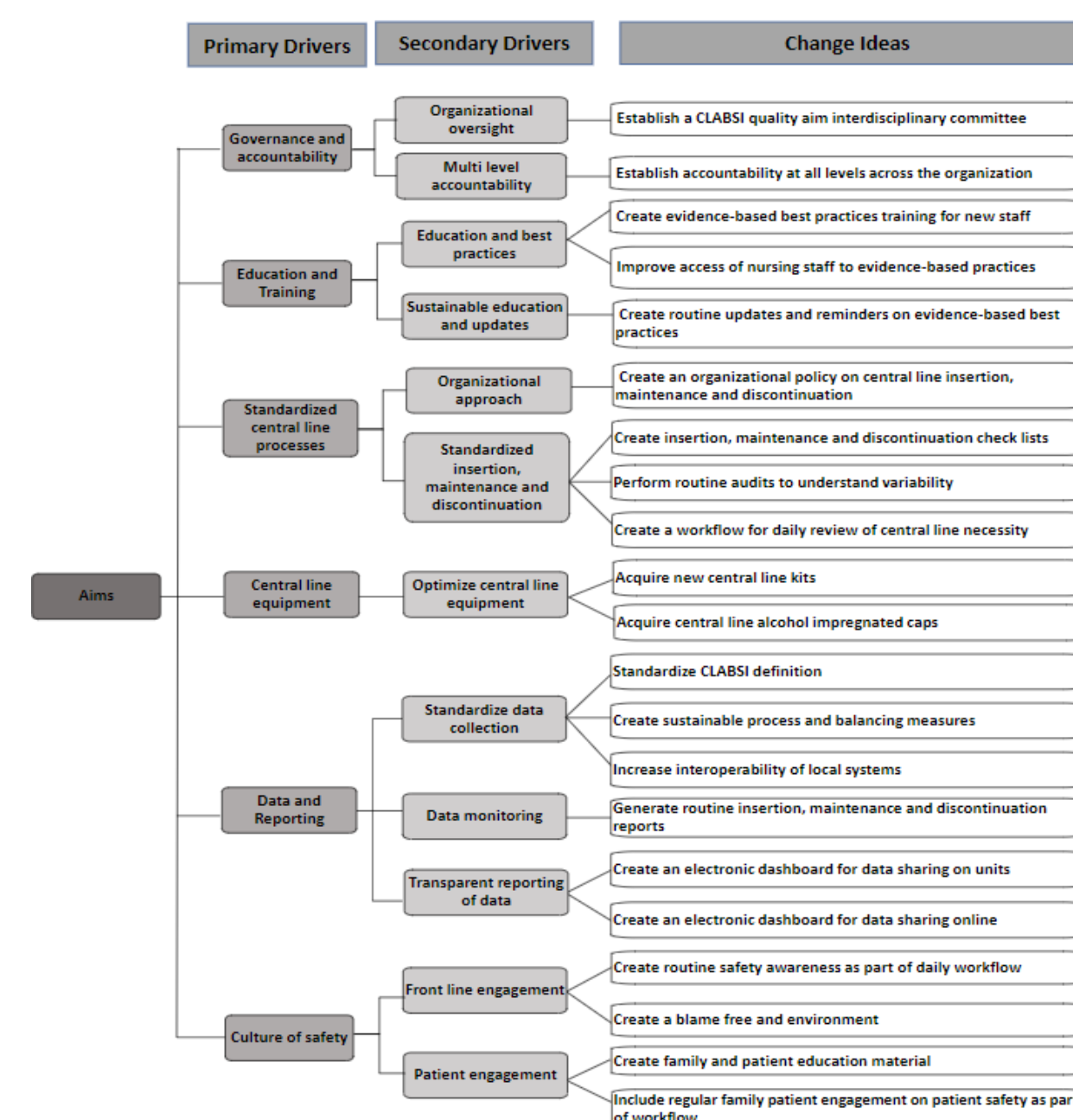


Figure 2: Driver's Diagram



## Initial Project Focused On Six Key Areas

- Optimizing our Electronic Medical Record (EMR) system to capture process measures  
E.g. trend of percent of lines changed within 14 days; dressings changed within 7 days (Figure 3)
- Standardizing insertion processes: optimising physician documentation of central lines in our EMR system by using a central line insertion checklist, physician lead conducting insertion audits and use of new central line insertion "kits"
- Standardizing maintenance processes: reviewing and updating maintenance bundle in the EMR and Critical Care educators conducting maintenance audits
- Implementing the use of capped lumens
- Implementing a "Scrub the Hub" educational campaign (Figure 4)
- Use of real time electronic dashboards in the intensive care units to showcase CLABSI numbers and rates and to engage frontline staff in the ownership of the CLABSI data

Figure 3: Process Trends in EMR

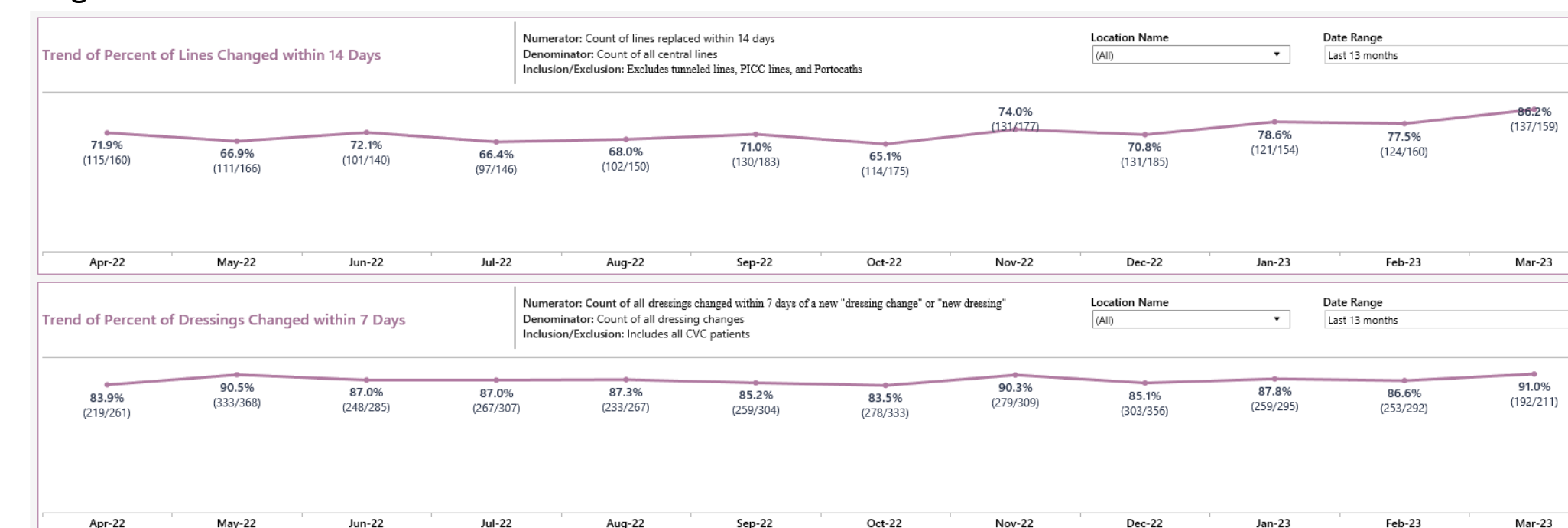
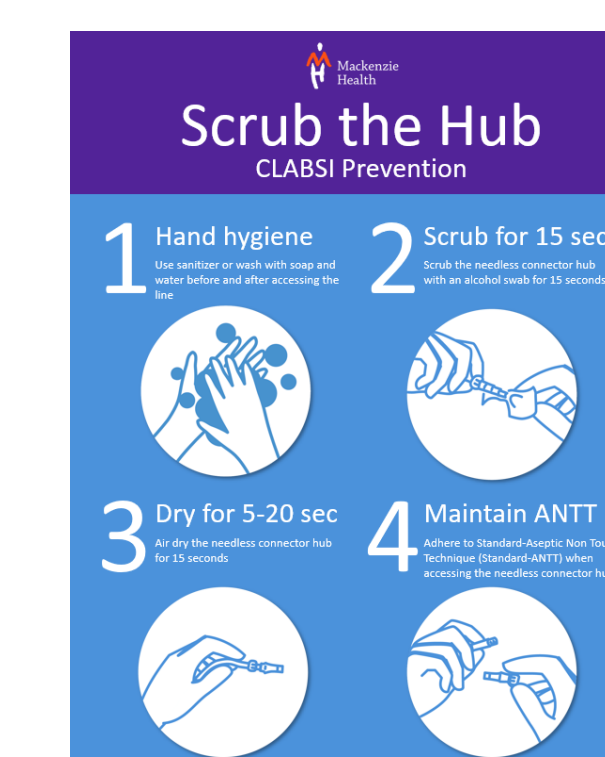


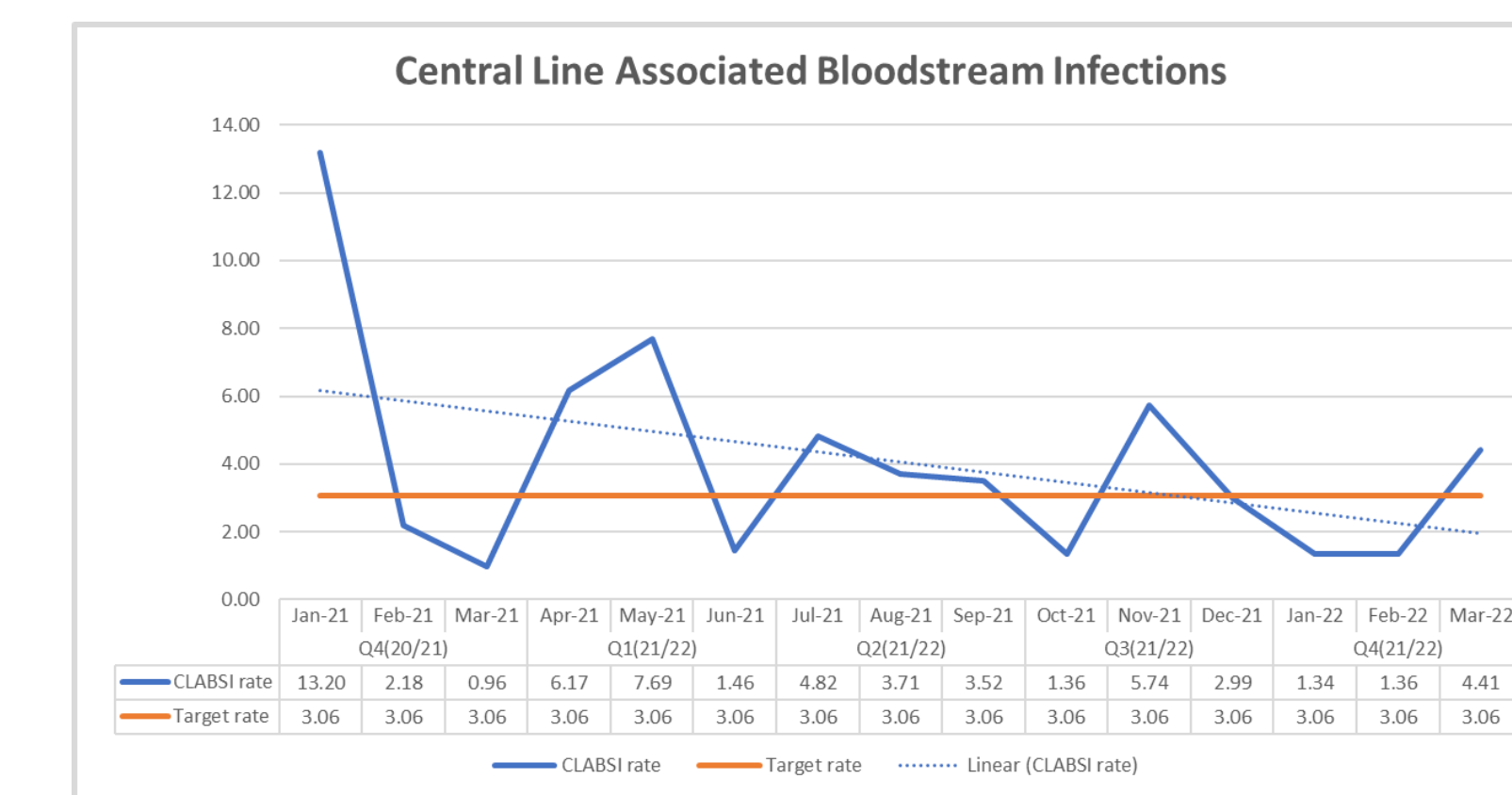
Figure 4: "Scrub the Hub" Campaign Poster



## RESULTS

Between Q4 20/21 and Q4 21/22 CLABSIs (Figure 5) decreased by 34% from 4.08 to 2.3 CLABSIs per 1000-line days thus surpassing our target goal. The rate of central line insertion checklists use increased from 22.8% to 56.9%, while the rate of central line capped lumens use increased from 72% to 94.3%. There was a 30% improvement from 61% to 91% post "Scrub the Hub" campaign launch in staff knowledge to scrub for 15 seconds.

Figure 5: CLABSI Rates



## LESSONS LEARNED

An interprofessional quality aim committee can champion multiple initiatives with ongoing education and training to successfully decrease CLABSIs in critical care settings. In order to achieve further decreases in CLABSIs to achieve our aim by 2023, the next stages of the project will focus on compliance of the maintenance bundle including dressing changes and line review necessity.

## REFERENCES

- Central Line Associated Blood Stream Infections; National Library of Medicine; Yazan Haddadin; Pavan Annamaraju; Hariharan Regunath.