

CLABSI Prevention in Adult Oncology: A Quality Improvement Initiative

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Problem Statement: A central line-associated bloodstream infection (CLABSI) is defined as the recovery of a pathogen from a blood culture in a patient with a central line in place or within 48 hours of its removal. CLABSIs are a significant healthcare-associated infection associated with increased mortality (2.71-fold increase), prolonged hospitalization (~20 days), and higher healthcare costs. Adult oncology inpatients are particularly vulnerable due to immunosuppression and frequent use of central venous access. Evidence-based strategies such as maintenance bundles, antimicrobial-impregnated discs, and chlorhexidine dressings have demonstrated effectiveness in reducing CLABSI risk. Nationally endorsed prevention guidelines emphasize routine auditing as a key strategy for sustaining intervention compliance. At the University of Minnesota Medical Center (UMMC), the total cost of CLABSIs in 2024 was \$3.36 million, and for the adult oncology unit (Unit 5A) alone was \$392,000 (8 cases). High compliance with central line care bundles ($\geq 95\%$) has been significantly associated with lower CLABSI rates, as demonstrated by Sandeep et al., 2023. However, the audit compliance rates within Unit 5A remain unclear, limiting our ability to evaluate and reinforce adherence. This quality improvement intervention aims to characterize audit compliance trends in the adult oncology unit and identify key gaps in bundle adherence that contribute to elevated CLABSI incidence in accordance with the literature.

Methods: As part of our quality improvement initiative to reduce CLABSIs in an adult oncology unit, we conducted audits over a period of 34 weeks to identify barriers to adherence to evidence-based central line maintenance protocols. Our institution developed the audit using local and national best-practice guidelines from the CDC, the Joint Commission, and the Minnesota Hospital Association. Once completed, the audits were recorded in REDCap, a secure platform for data management, for which the informational turnaround time was 2 weeks after data entry. Audit questions assessed seven key components: dressing integrity, antimicrobial disk placement, whether the IV tubing and medication bags were current and correctly labeled, Curocap presence, daily chlorhexidine gluconate (CHG) bathing, and daily discussion of line necessity. Each audit was scored on an all-or-nothing basis, where failure to meet any single criterion resulted in overall noncompliance. Audits were performed by an interprofessional team of PhD students, medical residents, medical students, and master's students in collaboration with the site's QI department. If audits identified noncompliance with any criteria, the interprofessional team provided patients with targeted education on central line care.

Data Analysis/Outcomes: From August 2024 through April 2025, a total of 450 line audits were completed in the adult oncology unit. Our data indicates only 225 (50.0%) of these audits were compliant. Monthly compliance rates were consistently below the national benchmark of $\geq 95\%$: 52.9%, 53.8%, 71.4%, 45.0%, 68.3%, 38.4%, 44.3%, 42.1%, and 34.8% from August 2024 to April 2025, respectively. These findings reveal significant gaps in adherence to infection prevention protocols. Furthermore, analysis of individual audit items revealed relatively higher noncompliance with CHG bathing (26%), tubing and bag labeling (20%), and tubing currency (14%). Dressing integrity (12%) also contributed to overall failures, whereas Curocap caps (6%), antimicrobial disk use (5%), and line documentation (4%) were less frequently missed. These results help localize where adherence barriers may exist and tailor future interventions. During the intervention time frame, there were 9 CLABSI

cases for an incident rate of 1.72 per 1000 line days. Among these CLABSI events, six had no audits on record; of these, one case likely developed due to line tampering. Of the remaining 3 cases with audits: one had two audits - one noncompliant for glove use and one compliant - with both noting that CHG bathing and anti-microbial disc were contraindicated; another had no audits during the CLABSI-detected admission but was readmitted within 15 days, during which all three audits documented patient refusal of CHG bathing; and one case had a single audit on record that failed due to missed CHG bath criterion. Despite significant time and investment in auditing patients with central lines, infection events were still going unmonitored. These results highlight issues in both surveillance and quality improvement. Discussion: We found that the adult oncology unit CLABSI incidence was 1.72 per 1000 line days - more than double the national benchmark of 0.8. Audit compliance was low, with only 50% of audits meeting criteria and several CLABSI events occurring without corresponding audits. To identify actionable improvements, we consulted the nurse manager on the adult oncology unit, who indicated that delays associated with REDCAP processing hindered timely feedback to staff. To address this, we created a "Central Line Defect Form" and launched it the week of 4/7/25. Completed with each audit, this form lists the room number and the specific defect that caused the audit failure. Once the nurse managers receive the defect form, they will follow up with the assigned nurse, enabling prompt, targeted feedback. Moving forward, our team is interested in seeing how this implementation affects audit compliance data. In parallel, we also identified low CHG bathing compliance (74%) as a priority for future work. CHG bathing is a well-established strategy to reduce CLABSI risk, and prior studies (e.g., Destine et al., 2023) have demonstrated that patient education can improve uptake by up to 15%. During audits, patients and their families frequently raised questions about CHG usage and associated benefits. This prompted us to create educational flyers and coordinate with the nurse manager about patient-education sessions. However, we recognize that audit failures stem from a range of factors, including staff turnover, increased patient volume, and unfamiliarity with site-specific protocols. The all-or-nothing scoring poses an additional challenge, particularly in the context of achieving a 95% adherence benchmark. To that end, we are collaborating with nurse managers and nursing staff to develop standardized onboarding material and refresher training for CLABSI prevention. Our overall goal is to build a more sustainable, system-wide approach that supports both clinical performance and patient safety.