

Enhancing CLABSI Prevention through Staff Engagement: A Quality Improvement Project

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Executive Summary

Key Findings

- Central line maintenance bundle compliance improved from 60% to 100% following a nurse-led engagement intervention.
- The project exceeded the unit-established goal of 80% compliance, achieving full adherence during the implementation period.
- Zero central line-associated bloodstream infection (CLABSI) events were reported during the 12-week intervention.
- Structured audit and feedback processes implemented through the Plan-Do-Study-Act (PDSA) cycle improved staff accountability (Buetti et al., 2022).
- Weekly micro-learning (brief five-to-ten-minute educational sessions during shift huddles) and visual reinforcement strategies (e.g., posters, reminder signage) improved staff engagement and knowledge retention (Zadeh et al., 2023).
- Integration of interventions into daily nursing workflow (e.g., bedside reminders and rounding processes) increased consistency across shifts.
- Nurse-led quality improvement initiatives demonstrated effectiveness in strengthening infection prevention outcomes in acute care settings (Kim & Choi, 2023).

Background & Purpose

Central line-associated bloodstream infections remain a significant and largely preventable source of patient harm in acute care settings. These infections are associated with increased morbidity, mortality, prolonged hospital stays, and higher healthcare costs (Centers for

Disease Control and Prevention [CDC], 2024). Despite the availability of evidence-based guidelines and standardized maintenance bundles, inconsistent adherence to recommended practices continues to compromise patient safety (Agency for Healthcare Research and Quality [AHRQ], 2024).

At the project site, baseline compliance with central line maintenance bundle elements was 60%, indicating a substantial gap in the reliability of evidence-based practice. Variability in documentation, hub disinfection, and daily evaluation of line necessity suggested that system-level reinforcement strategies were needed rather than knowledge-based education alone.

The purpose of this Doctor of Nursing Practice (DNP) project was to improve central line maintenance reliability by increasing nursing staff engagement and adherence to maintenance bundle elements on a 32-bed adult medical-surgical unit within a large southeastern healthcare system. The project aimed to improve compliance to at least 80%, with an aspirational goal of achieving full adherence.

The intended audience includes bedside nurses, nurse leaders, infection prevention specialists, and healthcare administrators. The results of this project are intended to inform practice changes, strengthen infection prevention strategies, and support sustainable integration of evidence-based interventions into routine clinical workflows.

Methodology

A quasi-experimental pre-post design (comparing outcomes before and after the intervention without randomization) guided by the PDSA framework was used. (Institute for Healthcare Improvement [IHI], 2020). Baseline compliance data were obtained through structured chart audits conducted before implementation in early 2025.

A 12-week nurse-led intervention was implemented to strengthen engagement and improve adherence to central line maintenance practices. Intervention strategies included weekly micro-learning sessions delivered during shift huddles, visual reminders (e.g., posters and signage) placed in clinical areas, structured interdisciplinary rounding, and weekly audit and feedback sessions. A bedside accountability tracking tool (a checklist used by nurses to document completion of central line care tasks) was introduced to promote consistency across shifts.

The target population consisted of approximately 45 registered nurses providing direct patient care, infection prevention nurses, nursing assistants, and physicians. Data was collected weekly using a standardized audit tool assessing compliance with maintenance bundle elements, including dressing integrity, hub disinfection, and daily evaluation of line necessity.

Descriptive statistics were used to compare pre- and post-intervention compliance rates. Continuous data review supported iterative refinements in alignment with the multiple iterative PDSA cycles throughout the 12-week period.

Results

Following implementation of the 12-week intervention, central line maintenance bundle compliance improved from 60% at baseline to 100% post-intervention, representing a 40-percentage point increase. This exceeded the project's goal and demonstrated full adherence to evidence-based maintenance practices.

Compliance reached 100% during the final weeks of the implementation period, indicating high reliability following integration of reinforcement strategies into daily workflow. Additionally, zero CLABSI events were reported during the implementation period, supporting

the relationship between improved maintenance adherence and infection prevention (CDC, 2024).

Staff engagement increased throughout the intervention period, as evidenced by participation in micro-learning activities, audit-feedback sessions, and interdisciplinary rounding. Improved consistency in documentation and maintenance practices across shifts further supports the effectiveness of the intervention.

Strengths & Limitations

This project demonstrated several strengths. The use of an evidence-based, nurse-led intervention enhanced frontline engagement and ownership of practice change. Strong leadership support and collaboration with infection prevention specialists contributed to successful implementation. Additionally, integrating micro-learning sessions, visual reminders, and audit-feedback processes into the daily workflow improved feasibility and sustainability (Zadeh et al., 2023).

However, limitations must be acknowledged. The project was conducted on a single unit within one healthcare system, limiting transferability to other settings. The 12-week implementation period may not fully capture long-term sustainability. The potential influence of the Hawthorne effect (behavior change due to awareness of being observed), due to staff awareness of audits, may have temporarily influenced behavior. Variability in staffing and patient acuity may also have impacted adherence rates.

Implications & Conclusion

The findings of this project have important implications for patients, nursing practice, and healthcare systems. Improved maintenance bundle compliance reduces the risk of preventable

bloodstream infections, leading to improved patient outcomes, shorter hospital stays, and decreased healthcare costs (CDC, 2024).

For nursing practice, this project highlights the critical role of frontline engagement in sustaining evidence-based interventions. Structured audit and feedback, micro-learning, and accountability tools promote adherence and strengthen professional responsibility for patient safety (Buetti et al., 2022; Kim & Choi, 2023).

At the organizational level, improved compliance supports regulatory standards such as the Centers for Medicare & Medicaid Services (CMS) Hospital-Acquired Condition Reduction Program and CLABSI standardized infection ratio (SIR) benchmarks. Improved compliance also enhances quality metrics and reduces financial penalties associated with healthcare-associated infections. Additionally, CLABSIs are associated with significant costs (approximately \$25,000–\$50,000 per infection) and are not reimbursed by CMS, making prevention financially critical (CDC, 2024).

At the systems level, this project contributes to growing evidence supporting nurse-led engagement strategies as effective mechanisms for improving infection prevention practices. Sustainable improvements require ongoing reinforcement, leadership support, and integration of accountability into daily practice.

In conclusion, this nurse-led, evidence-based quality improvement initiative improved central line maintenance compliance from 60% to 100% and was associated with zero CLABSI events during the implementation period. These findings demonstrate that structured staff engagement and workflow-integrated interventions are effective in improving patient safety and reducing preventable infections in acute care settings.

References

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