Reducing Neonatal Central Line Infections with the Implementation of a Maintenance Bundle

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Problem Statement

Problem:
- Newborns in the neonatal intensive care unit (NICU) rely on central venous catheters (CVCs) for vital medical interventions, but these pose a significant risk of central line-associated bloodstream infections (CLABSIs).
- Despite national efforts to reduce CLABSI rates, NICUs continue to face challenges, leading to increased morbidity, mortality, and substantial financial burdens on the healthcare system.
- CLABSI rates were identified to be above the standardized infection ratio (SIR) for four of ten quarterly reports in a large urban academic level IV NICU.

Problem Purpose and Goal

Quality improvement (QI): Implement and evaluate the utilization of a CVC maintenance bundle to decrease CLABSI and promote safety through early identification of CVC management needs.

Project Goal:
- Utilization of a CVC maintenance bundle offers promising solutions to minimize CLABSI risk in neonates.
- 80% adherence to CVC daily maintenance bundle documentation.
- The NICU will achieve 80% adherence to Aseptic Non-Touch Technique (ANTT).

Outcome Goal:
- Zero confirmed CLABSIs in infants with CVCs.

Methods

Setting: 52-bed Level IV NICU in an urban academic center
Population: All neonates with CVCs over a 15-week period (Dec-Sept 2023)
Implementation Strategies:
- Collaboration with the medical director, clinical educator, NICU senior clinical nurses, and nursing champions.

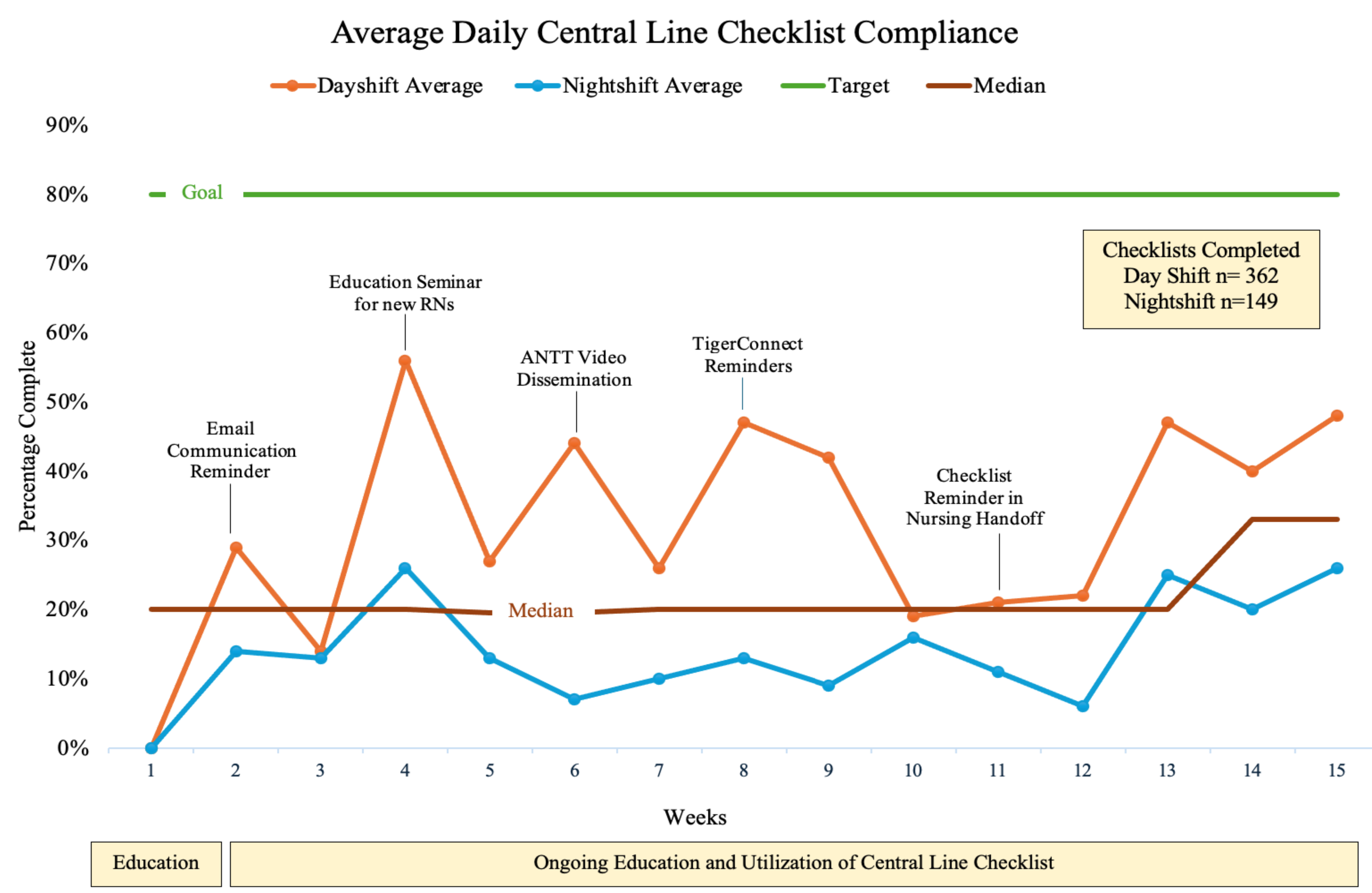
Education:
- CVC checklist and ANTT education disseminated via online modules and in-person skills sessions.
- Two NICU RNs volunteered as project champions

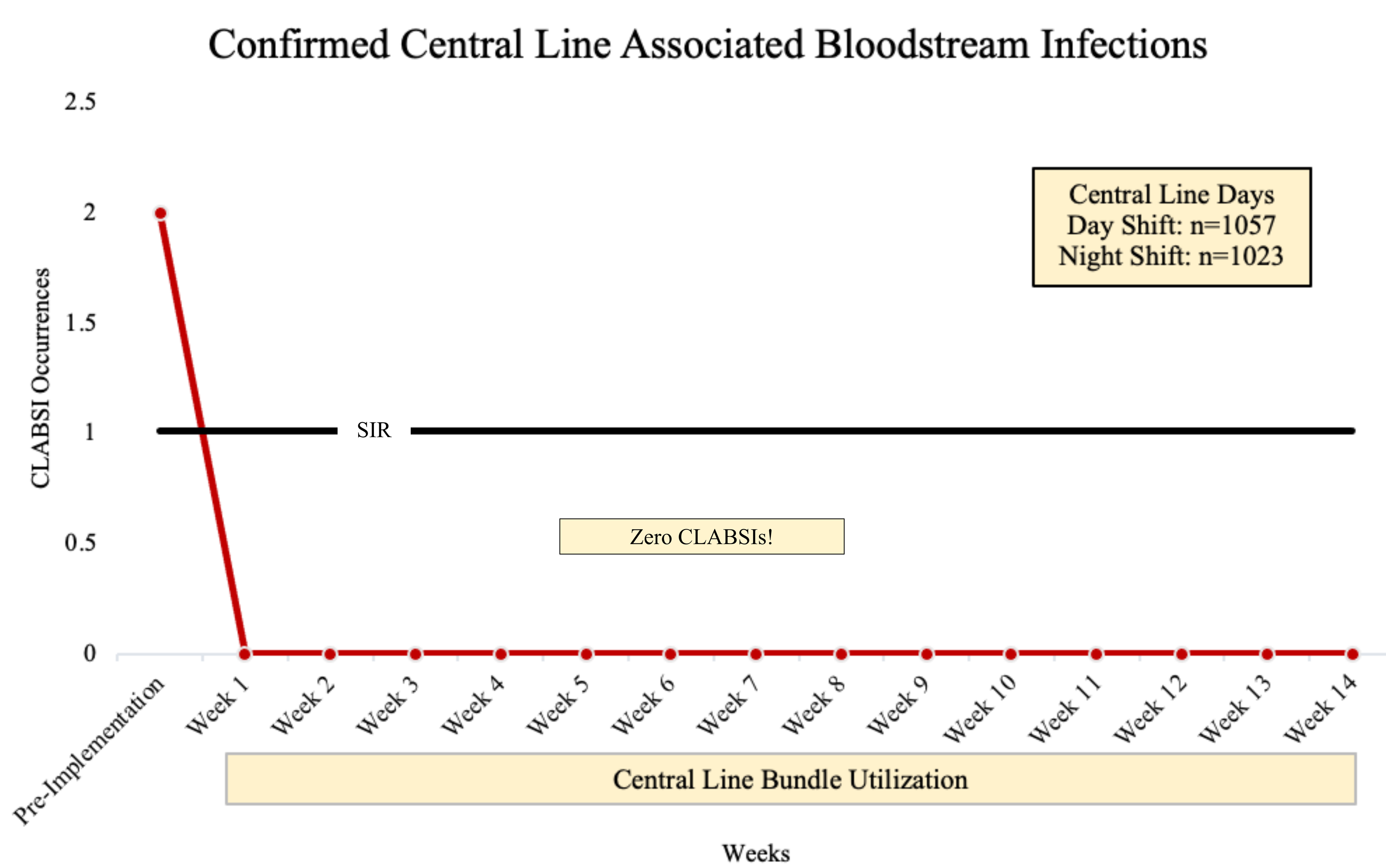
Intervention:
- Use of CVC maintenance checklist adapted from the Joint Commission central line checklist for the neonatal population by day and night shift bedside nurses.
- The checklist was integrated via a QR scan code located at all 25 nursing station computers located outside of patient care rooms.

Data Measurement:
- RNs submitted the CVC checklist via QR code through their personal phones for data collection.
- Daily electronic health record (EHR) audits were completed to identify eligible participants.
- Weekly review of completed CVC checklists.

CVC Daily Maintenance Checklist

Results





Impact:
- 85% of RNs completed the bundle and ANTT education
- Day shift: utilization and compliance with the CVC checklist was 34%.
- Night shift: utilization and compliance with the CVC checklist was 15%
- Zero reported CLABSIs during the 15-week implementation period

Discussion

Data Analysis:
- Consistent with the literature findings, the adoption of bundled approaches to improve CVC care is a feasible approach to decrease CLABSI risk among neonates.
- The goal of achieving 80% adherence to the CVC checklist was not achieved.
  - Utilization of the CVC checklist was **34%** during the day shift and **15%** during the night shift.
- Project findings indicate an increased use of the CVC checklist.
  - The intervention also yielded benefits such as a heightened understanding of aseptic techniques, improved interdisciplinary collaboration, and more effective care practices for CVCs.

Limitations:
- High patient acuity, the high prevalence of new graduate RNs, variations in documentation practices, challenges with data collection, and generating EHR reports.
- Difficulty in obtaining ANTT audits stemmed from challenges related to project champion availability, unit size, and the necessity for unit adoption of formal competencies.

Conclusion

The use of bundled interventions is an effective tool to increase compliance and decrease CLABSI risk.

Implications for Practice:
- Implementation of the CVC maintenance bundle enhances standardization in central line care, facilitating early recognition of CVC-related clinical needs and mitigating the risk of CLABSIs.
- Increased identification of QI opportunities to improve unit safety, culture, and patient outcomes.

Sustainability
- Incorporation of the CVC checklist and ANTT education into new graduate orientation.
- Integration of checklist components into a newly designed central line rounding QI initiative.

Next Steps:
- Include CVC maintenance education into yearly nurse competencies
- Integrate components of the CVC maintenance bundle into the unit's central line rounding protocol.
- Collaborate with the clinical educator to develop formal competencies and guidelines for Aseptic Non-Touch Technique (ANTT).

References and Acknowledgements

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Scan for a complete reference list