

Comparison of CLABSI rates of hospitals using Clave™ and comparator hospitals with non-Clave needleless connectors utilizing Centers for Medicare and Medicaid Services and client databases

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Purpose

- The purpose of this study is to compare the risk of CLABSI between hospitals using Clave Needleless Connector (NC) Technologies and hospitals using non-Clave Needleless Connector Technologies.
- Further analysis evaluated the realized cost savings among Clave NC Technologies hospitals, Clave NC Technologies high-volume use hospitals and non-Clave NC Technologies hospitals.

Background

- CLABSI rates in the USA increased by 47% over the COVID-19 pandemic years¹.
- Standardized Infection Ratios (SIR) increased significantly during the first and third quarter of 2021 in comparison to pre-pandemic levels².
- Needleless connectors vary in configuration, design features, and materials.
- The effect of various design features on infection risk remains controversial.
- Technology assessment is encouraged to evaluate cost effective strategies for CLABSI risk reduction.

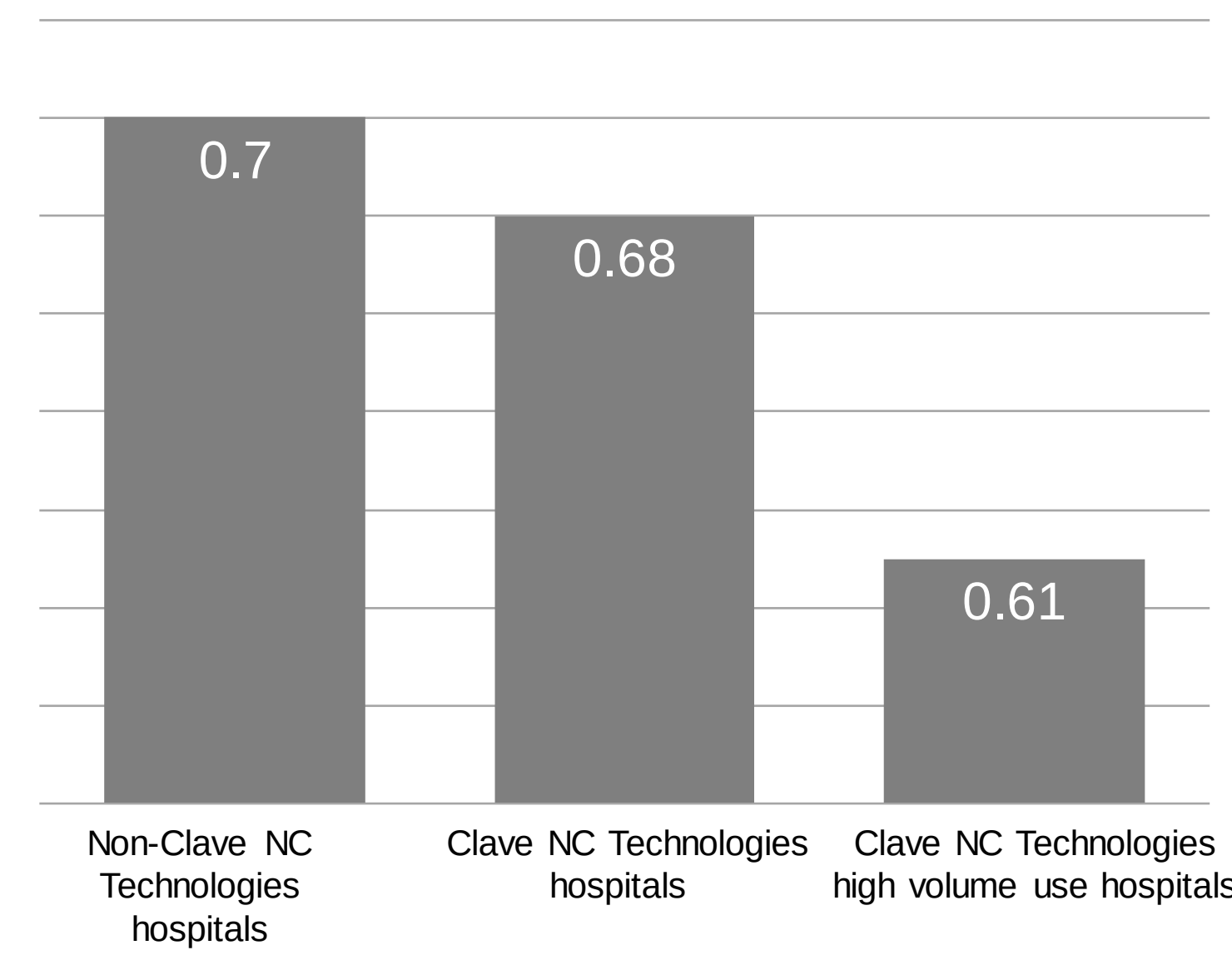
Methods

- A publicly available database³ was analyzed to calculate the CLABSI rate of Clave NC Technologies hospitals ^A, Clave NC Technologies high-volume use hospitals ^B, and comparator non-Clave NC Technologies hospitals for the year 2019.
- Clave NC Technologies included in the study NC hospital groups: Clave, MicroClave, MicroClave Clear, NanoClave, and Neutron.
- The standardized infection ratio (SIR) was calculated as the observed number of CLABSI divided by predicted number of CLABSI.
- The Relative Risk (RR) was calculated as a comparison of the SIRs and adjusted for heterogeneity among the hospitals.
- The realized cost savings was calculated utilizing the decrease in risk of CLABSI for Clave NC Technologies and Clave NC Technologies high-volume use hospital groups.

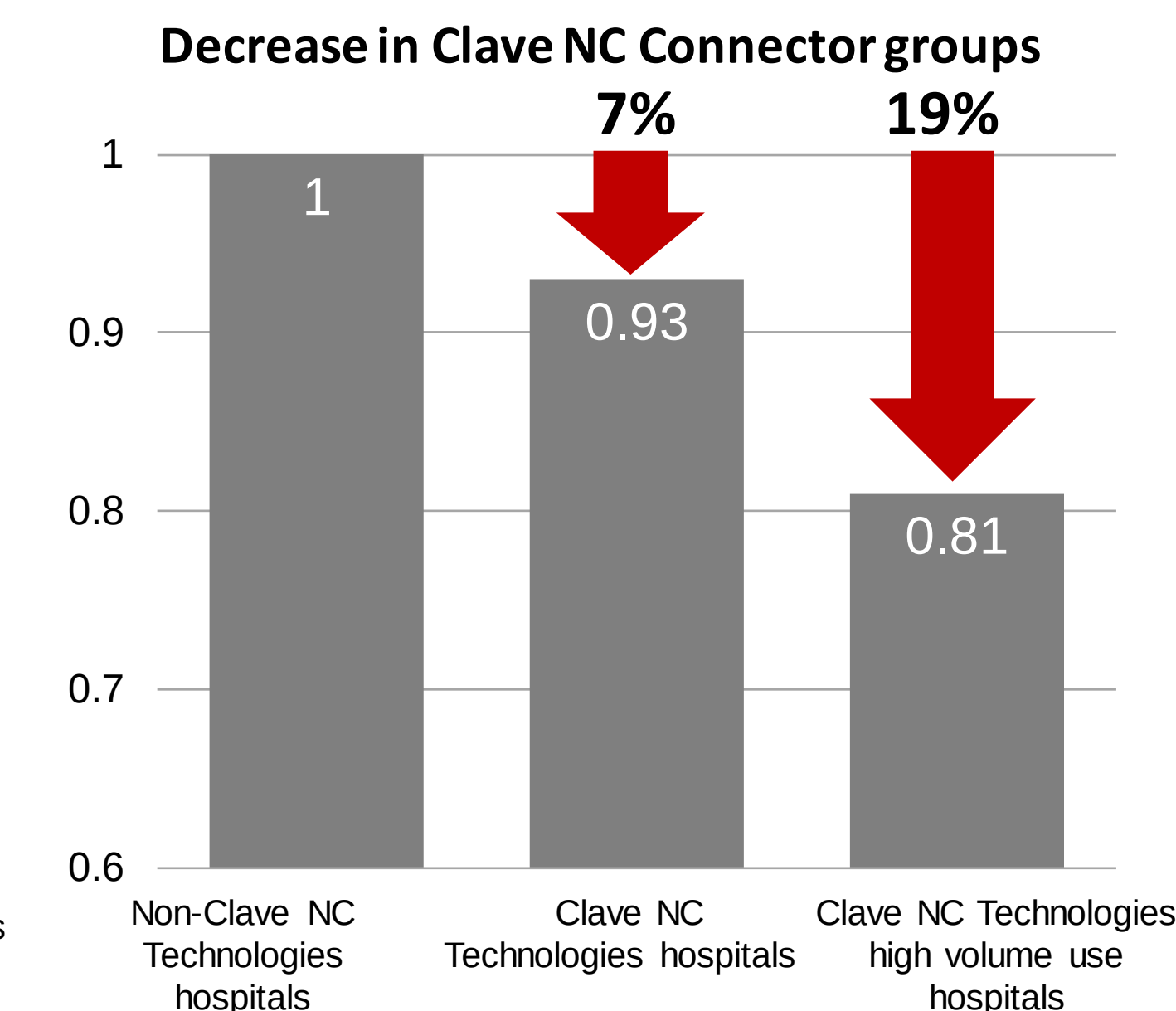
Clave Needleless Connector Technologies



Standardized Infection Ratio



Relative Risk of CLABSI



^A Clave NC Technologies hospital: facilities that ordered the study NCs during the comparison time frame (FY 2019) (excluding Clave NC Technologies high-volume use hospitals)
^B Clave NC Technologies high-volume use hospital: facilities that utilize Clave NC Technologies at high volume based upon their order to bed ratio

Variables	Central Line Days	Observed CLABSI, n	Observed CLABSI Rate /1000 Central Line Days	SIR (95% CI)* P-value;	Relative Risk (95% CI)	P Value – Relative Risk
Study NC (two Groups) vs Comparator Hospitals						
Comparator hospitals	6,858,662	4,537	0.66	0.70 (0.68, 0.72)	reference	
Clave NC Technologies hospitals ^A	10,108,038	6,983	0.69	0.68 (0.66, 0.69)	0.93 (0.87, 0.997)	0.0411
Clave NC Technologies high- volume use hospitals ^B	485,875	294	0.61	0.61 (0.54, 0.67)	0.81 (0.66, 0.99)	0.0412

*Comparator, Clave NC Technologies , and Clave NC Technologies high volume use hospitals all P<0.05. Reference standard for SIR = 1

Results – What Were the Findings?

- In this study, 17,452,575 central venous catheter line days and 11,814 CLABSI events were evaluated to determine associated risk of Clave NC Technologies to all others used in comparator hospitals.
- The SIR for non-Clave NC Technologies hospitals is 0.68 (95% CI 0.66-0.69) and for Clave NC Technologies high volume use hospitals, the SIR was 0.61 (95% CI 0.54-0.67). For the Clave NC Technologies hospitals, the RR of CLABSI was 0.93 (p=0.04), representing a 7% decrease. For Clave NC Technologies high-volume use hospitals, the RR of CLABSI was 0.81 (p=0.04), representing a 19% decrease in risk of CLABSI.
- In comparison, the non- Clave NC Technologies high volume hospitals’ SIR was 0.70 (95% CI 0.68-0.72).
- The realized cost savings for Clave NC Technologies high volume and Clave NC Technologies high-volume hospitals was determined to be \$23,738,671 and \$3,356,560, respectively⁴.

Conclusions

- The results indicate that the risk of CLABSI occurring in hospitals using Clave NC Technologies high volume is statistically significantly less than in non-Clave NC Technologies high volume hospitals.
- Implementation of Clave NC Technologies high volume may significantly decrease the risk of CLABSI.
- Implementation of Clave NC Technologies high volume may result in significant cost savings.
- While CLABSI prevention requires a combination of evidence-based strategies, this data demonstrates that the use of the Clave NC Technologies, in and of itself, is a critical component of reducing the risk of CLABSI.

References

- Weiner-Lastinger LM, Pattabiraman V, Konner RY, et. al. The impact of coronavirus disease 2019 (COVID-19) on healthcare-associated infections in 2020: A summary of data reported to the National Healthcare Safety Network. ICHE. 2022;43:12-25.
- Healthcare-Associated Infections national data, accessed via the Centers for Medicare and Medicaid Services database at: www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfPCD/classification.cfm?ID=FPA, Accessed on January 13th, 2022.
- Estimating the Additional Hospital Inpatient Cost and Mortality Associated With Selected Hospital-Acquired Conditions. Agency for Healthcare Research and Quality. AHRQ Publication No. 18-0011-EF November 2017.
- Lastinger LM, Alvarez CR, Kofman A, et. al.. Continued increases in the incidence of healthcare-associated infection (HAI) during the second year of the coronavirus disease 2019 (COVID-19) pandemic. Infect Control Hosp Epidemiol. 2022 May 20:1-5

Disclosures

- Marcia Ryder is receiving an honorarium from ICU Medical for this presentation.
- Xiaowu Sun is receiving an honorarium from ICU Medical for this presentation.
- Jason Battle is an employee of ICU Medical
- This work was funded by ICU Medical