



# Implementation of an Evidence-Based Wound Care Process at a Regional Burn Center Reduces Hospital Acquired Infections



Sydney Mullins, RN, BSN; David Greenhalgh, MD, FACS; Tina Palmieri, MD, FACS, FCCM; Soman Sen, MD, FACS; Kathleen Romanowski, MD, FACS; Alura Barsun, RN, MSN, FNP-C; Leonard Sterling, MBA, RN, NEA-BC; Sarah Bernardy, RN, BSN, CCRN; Marianne MacLachlan, RN, BSN, CCRN; Maureen Evans, RN; Anna Olszewski, RN, MS, CCRN; Alessandra Renteria-Turley, RN, BSN; Sarah Mattison, RN, BSN, CCRN; Kara Kidd, RN, BSN, WCC; Angela Maroon, RN, BSN

## Disclosure

- We have no actual or potential conflicts of interest in relation to this program/presentation.

## Background

- Burn patients are particularly vulnerable to infection due to:
  - The nature of their injury
  - Prolonged hospitalizations
  - Hypermetabolic and hypercatabolic conditions
  - Inhalation injuries
  - Frequent use of invasive devices<sup>3</sup>
- Despite national efforts to reduce CLABSI rates, burn patients have higher CLABSI rates than general ICU patients.<sup>2</sup>
- CLABSIs are associated with increased mortality, prolonged hospitalization, and increased cost.<sup>1</sup>
- Improved wound infection control in burn patients may reduce the rate of CLABSI.<sup>1</sup>
- Research showed a reduction of surgical site infections (SSI) when gowns, gloves and equipment were exchanged at critical points during surgical procedures.<sup>4,5</sup>

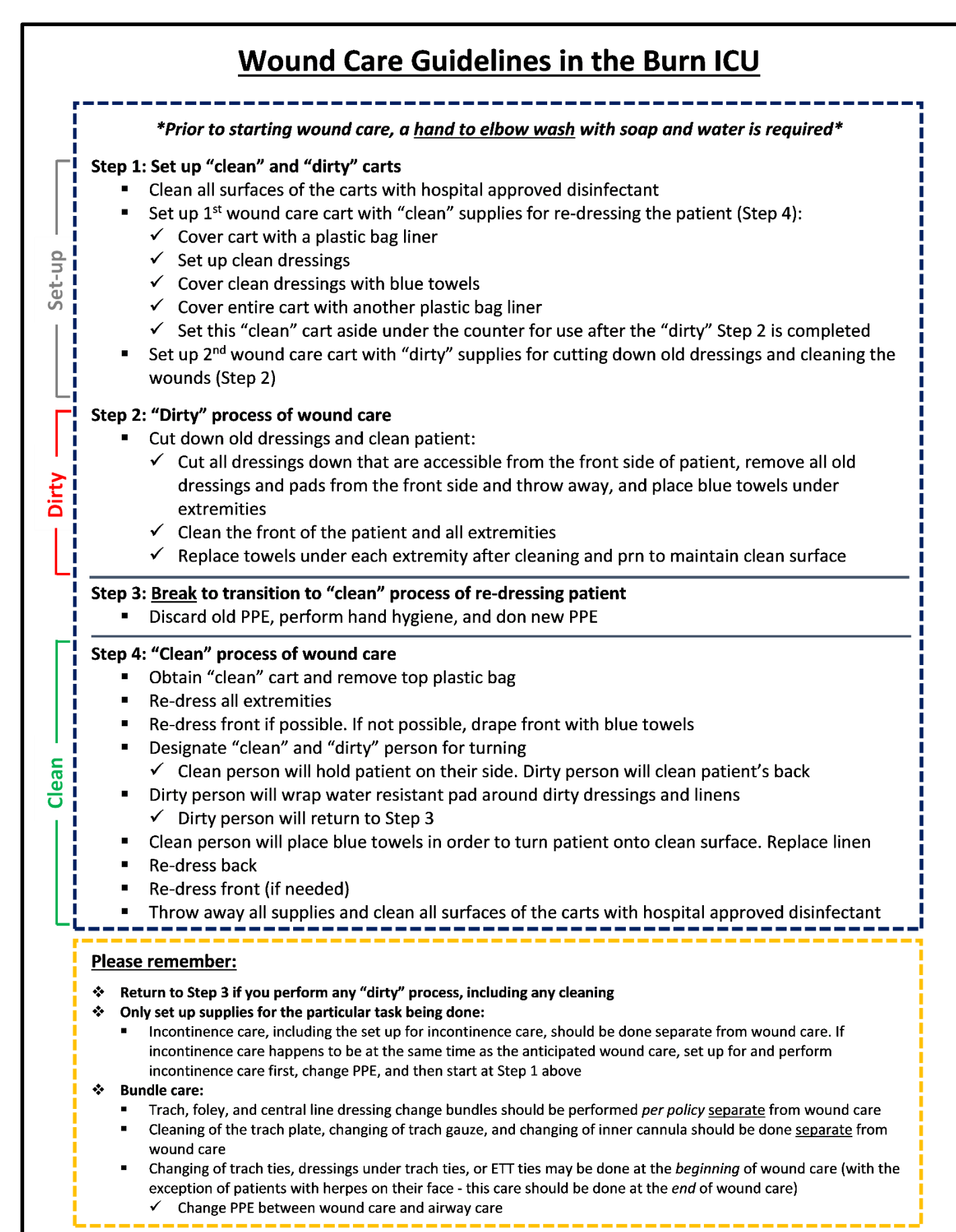
## Purpose

- To determine if implementation of an evidence-based process for wound care and central line management reduce infections.

## Design & Methods

- Workgroup (Quality and Safety Champion, Nurse Manager, Assistant Nurse Managers, and Clinical Nurse Educators) met from October 2017 – January 2018 to develop guidelines for wound care.
- Wound care guidelines restructured with the following:
  - Hand to elbow wash prior to wound care
  - Separating clean and dirty steps of the wound care process
  - Changing protective gear when going from dirty to clean
  - Performing the Hospital Acquired Infections (HAI) bundle elements separate from wound care, termed "Bundling the Bundles"

## Implementation Plan



## Development

- Resources include:
  - Colorectal surgical care bundles
  - University of Utah Burn Center wound care practices, as discussed with the Nurse Manager and Clinical Nurse Coordinator
- Feedback from Burn ICU staff evaluated and incorporated into guidelines.

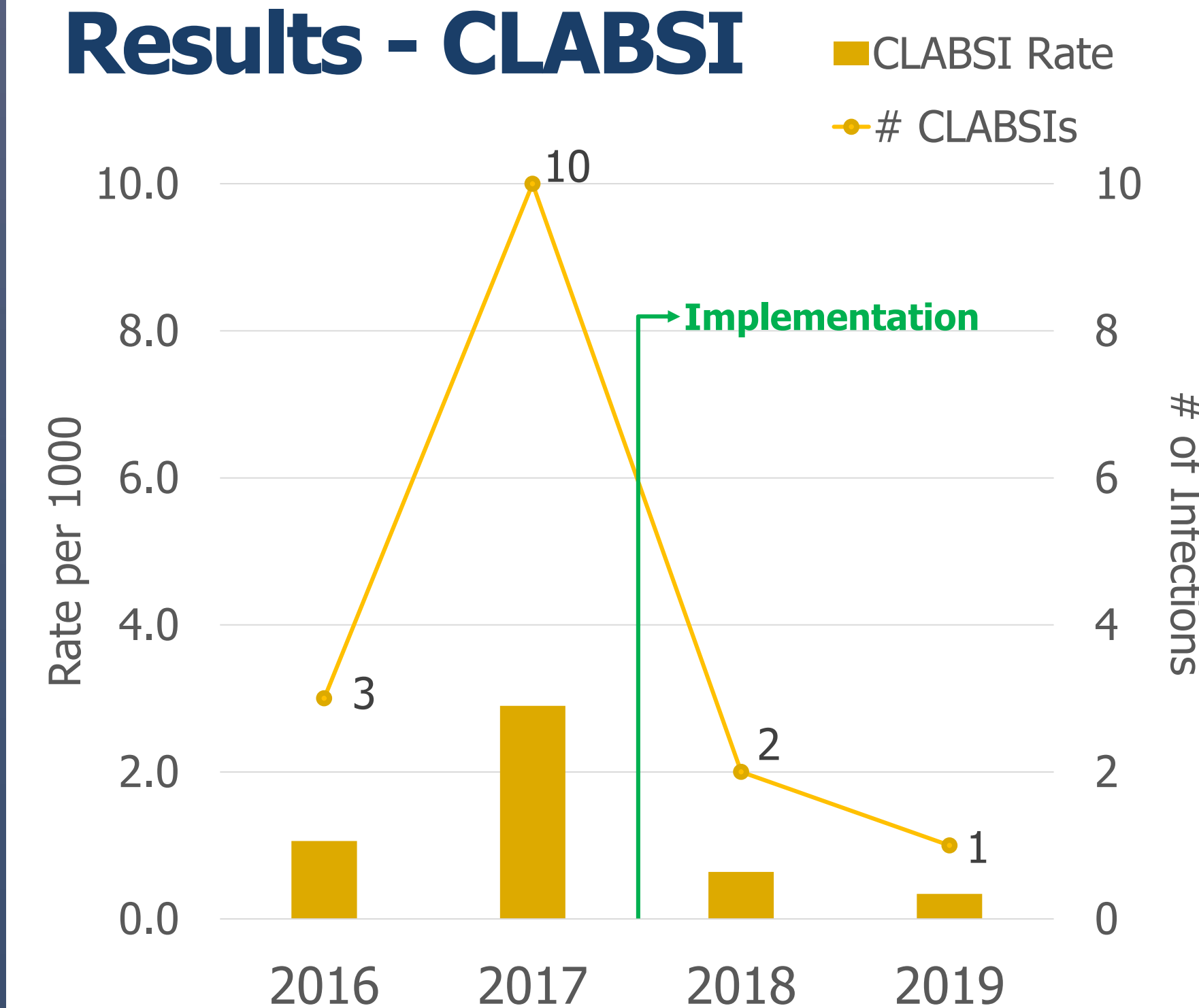
## Education

- Multiple modes of education were used to introduce the new guidelines to the staff:
  - Nurse Manager update via e-mail
  - PowerPoint presentations at staff meetings
  - Guidelines laminated and posted in each patient room for reference
  - Addition of guidelines to current policy

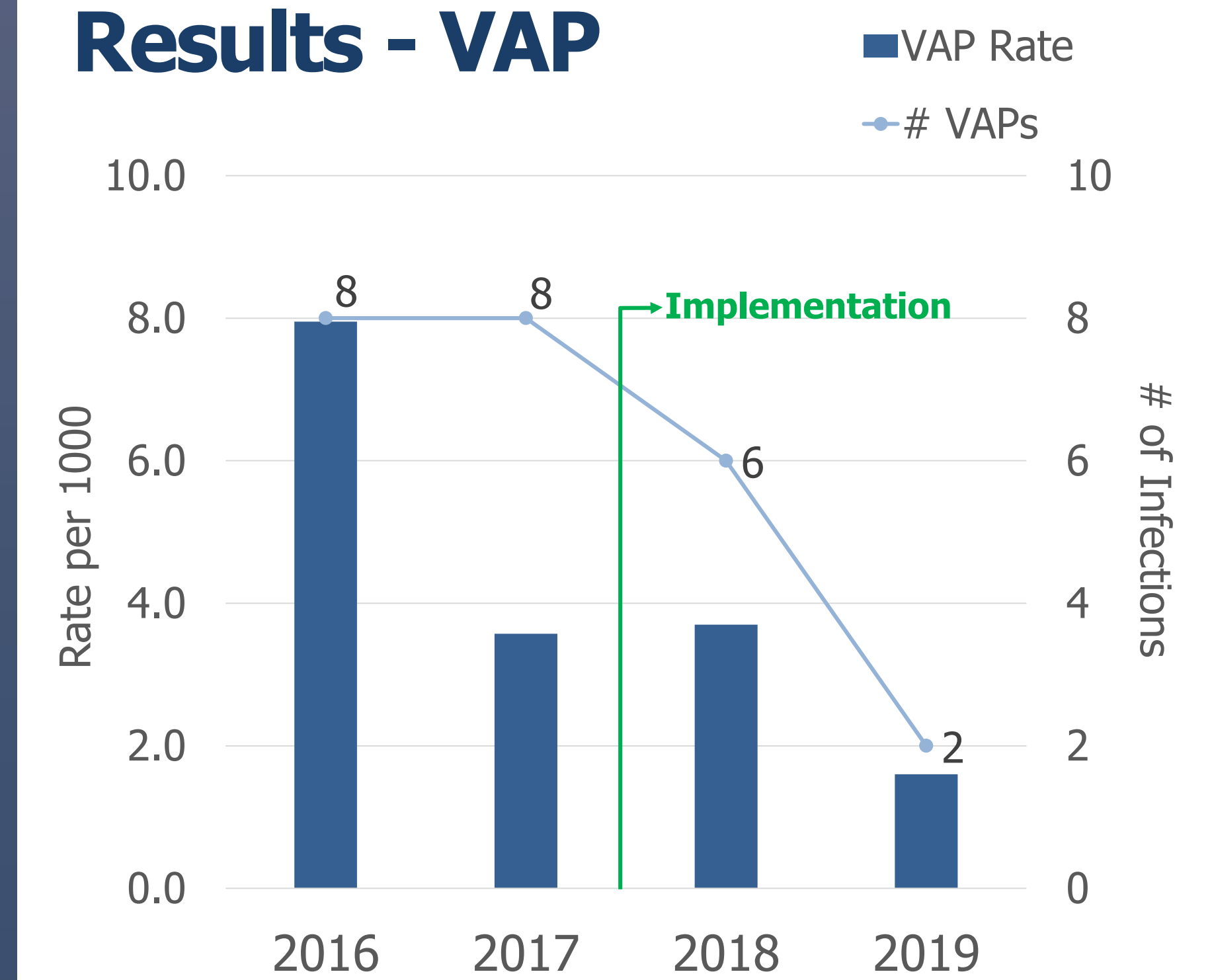
## Performance Data

- HAI rates compared pre- and post-implementation using a Rate Ratio.
- The number of CLABSIs declined from 3 in 2016 & 10 in 2017 to 2 in 2018 & 1 in 2019.
- Post-implementation, there was a 76% decrease in the CLABSI rate [RR=0.24, 95%CI (0.07-0.84), p=0.0262].
- The proportion of positive blood cultures decreased by over 50% after implementation.
- There was no statistical difference in central line device days between groups.
- The number of VAPs declined from 8 in 2016 & 8 in 2017 to 6 in 2018 & 2 in 2019.
- Post-implementation, there was a 43% decrease in the VAP rate [RR=0.57, 95%CI (0.24-1.33), p=0.1914].

## Results - CLABSI



## Results - VAP



## Conclusions

- Creating a wound care process that clearly defines and separates clean and dirty steps, similar to colorectal surgical bundles in the reduction of SSIs, reduced infection rates in a clinically and statistically significant way.
- Implementation of an evidenced-based standardized process for wound care improved infection rates at one regional burn center.

## Further Study

- It would be beneficial for this process to be replicated at other centers to further test correlation with infection reduction.

## References

1. Roham, Maryam, et al. "Epidemiologic Analysis of Central Vein Catheter Infection in Burn Patients." Iranian Journal of Microbiology, vol. 9, no. 5, Oct. 2017, pp. 271-276., ijm.tubs.ac.ir
2. Sood, Geeta, et al. "Use of Implementation Science for a Sustained Reduction of Central-Line-Associated Bloodstream Infections in a High-Volume, Regional Burn Unit." vol. 38, no. 11, 2017, pp. 1306-1311., doi:10.1017/ice.2017.191
3. Strassle, Paula, et al. "Risk Factors for Healthcare-Associated Infections in Adult Burn Patients." Infect Control Hosp Epidemiol., vol. 38, Dec. 2017, pp. 1441-1448., doi:10.1017/ice.2017.220
4. Keenan, Jeffrey E., et al. "The Preventive Surgical Site Infection Bundle in Colorectal Surgery." JAMA Surgery, vol. 149, no. 10, Oct. 2014, pp. 1045-1052., doi:10.1001/jamasurg.2014.346
5. Ward, William G., et al. "Glove and Gown Effects on Intraoperative Bacterial Contamination." Annals of Surgery, vol. 259, no. 3, Mar. 2014, pp. 591-597., doi:10.1097/sla.0b013e3182a6f2d9

## Acknowledgements

- Firefighters Burn Institute Regional Burn Center, University of California, Davis.
- Heather Martin MPH, UCDH Epidemiologist.
- University of Utah Burn Center.