

# Leveraging the Use of the PCR-based Methicillin-Resistant *Staphylococcus aureus* (MRSA) Nasal Swab in the Emergency Department to Optimize Vancomycin Use in the Inpatient Setting

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## Background

- Overuse of vancomycin is common in the inpatient setting making it an important target for antimicrobial stewardship teams (AST). Furthermore, overuse of vancomycin has been associated with increased length of stay and increased risk of acute kidney injury.<sup>1</sup>
- Multiple studies have demonstrated that the MRSA nasal swab has a high negative predictive value for MRSA infections.<sup>2,3</sup>
- Given the high negative predictive value, the MRSA nasal swab can be utilized as a tool to quickly stop empiric vancomycin therapy.<sup>2,3</sup>
- While the emergency department (ED) could potentially be an optimal place for stewardship efforts, it is often challenging given clinical, laboratory and microbiologic data are not yet available.
- Therefore, in order to engage the ED in stewardship efforts, we linked an order for the MRSA nasal PCR swab with the order in the electronic medical record (EMR) for vancomycin therapy in the ED.
- This study sought to evaluate this intervention's effect on vancomycin usage before (pre-cohort) and after (post-cohort) implementation.

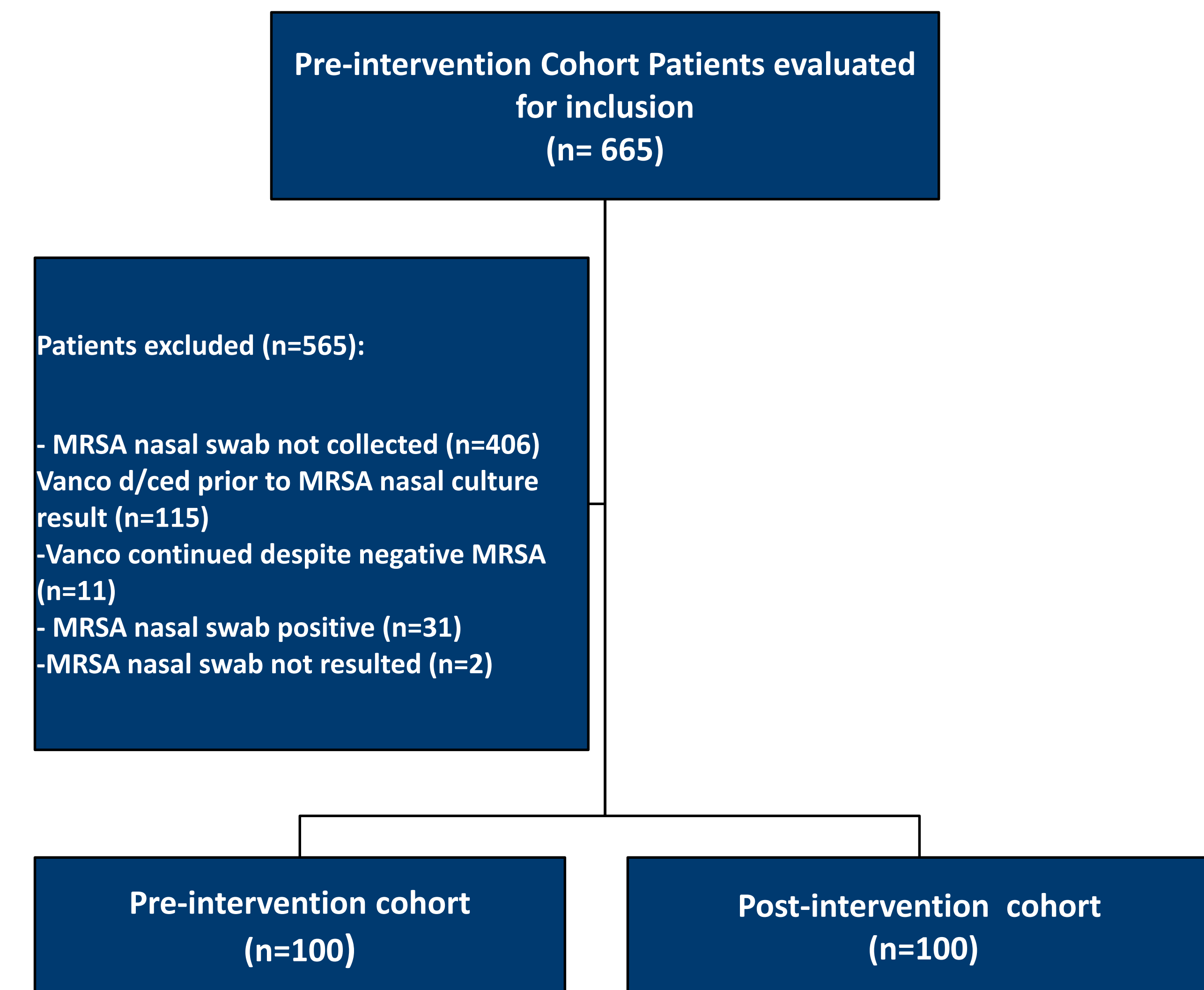
## Objectives

- Primary outcome:** Comparison of time from ED visit to empiric vancomycin discontinuation in patients with a negative MRSA nasal swab in the pre-intervention cohort compared to the post-intervention cohort.
- Secondary outcomes:**
  - Time from ED visit to MRSA nasal swab collection and result in the pre- and post- intervention cohort.
  - Time from MRSA nasal swab result to vancomycin discontinuation in patients with a negative MRSA swab in the pre- and post- intervention cohort.
  - Assess the impact of this intervention on overall vancomycin usage.

## Methods

- Retrospective chart review conducted at Yale New Haven Hospital (YNHH) from September 2018 through October 2018 for the pre-intervention cohort and June through July 2019 in the post-intervention cohort.
- Inclusion criteria:** All patients  $\geq 18$  admitted to the hospital, administered vancomycin in the ED and in whom a PCR MRSA nasal swab was obtained.
- All end points were statistically analyzed for significance by utilizing a student pair t-test assuming unequal variances with an alpha value of 0.05 considered to be significant.

## Results

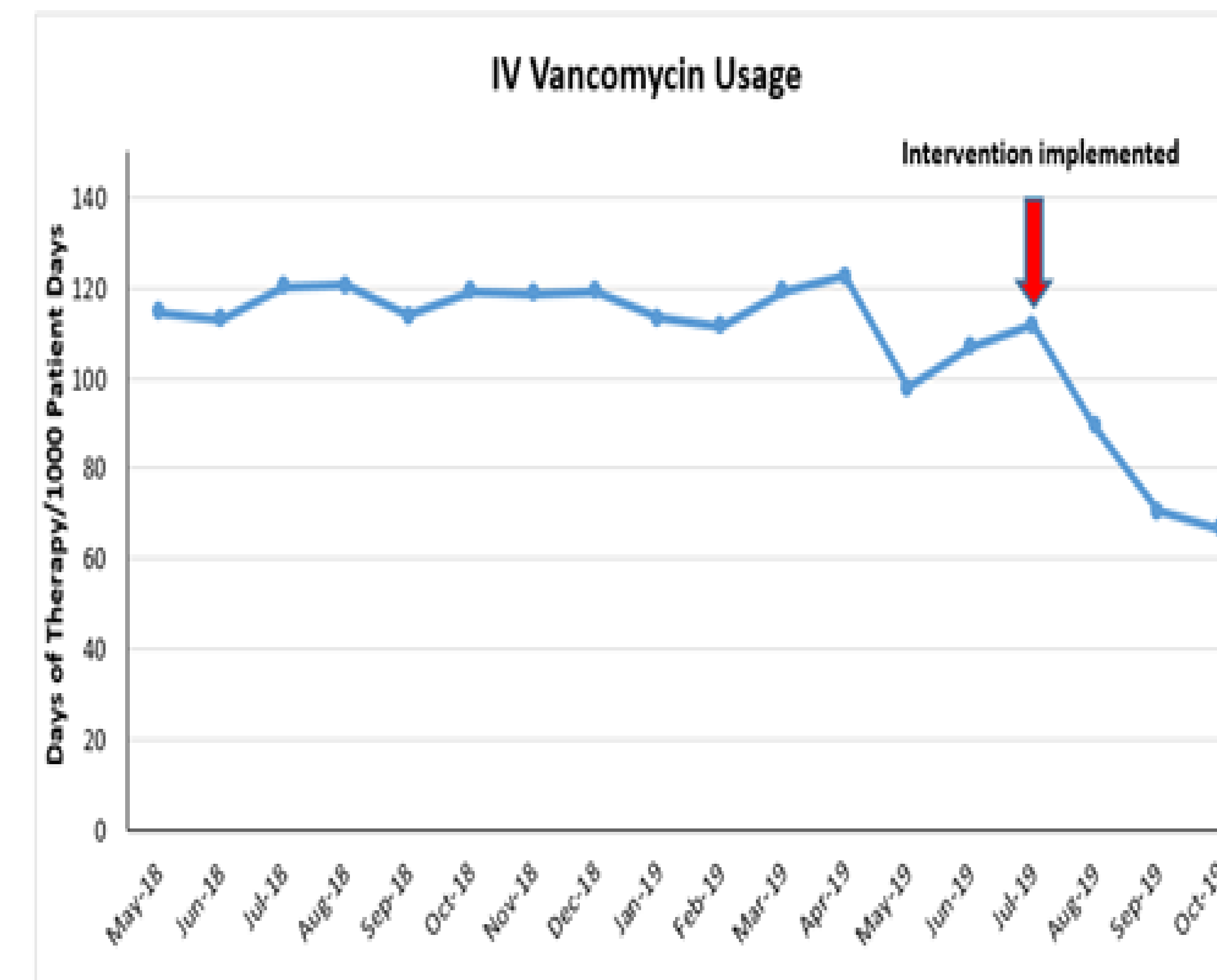


Baseline Demographics	Pre-intervention (n=100)	Post-intervention (n=100)
Age, median (range)	67 (25-94)	68 (26-99)
Male Sex, n (%)	60 (60)	34 (34)
Unit of Admission, n (%)		
• Medicine	59 (59)	67 (67)
• ICU/Step Down	37 (37)	20 (20)
• Oncology	4 (4)	11 (11)
History of MRSA in the past 3 years, n (%)		
• No	92 (92)	93 (93)
• Yes	8 (8)	7 (7)
Indication for empiric vancomycin usage, n (%)		
• Pneumonia	38 (38)	30 (30)
• Suspected Infection not otherwise specified	32 (32)	45 (45)
• Skin and Skin/soft tissue infection	27 (28)	22 (22)
• Neutropenic fever	3 (3)	3 (3)

Table 1. Outcomes

Results	Pre-intervention Cohort (n=50)	Post-intervention Cohort (n=50)	P-value
Time from ED visit to vancomycin discontinuation (hrs)	61	34	p<0.001
Time from ED visit to nasal swab collection (hrs)	16	5	p<0.0001
Time from ED visit to nasal swab result (hrs)	46	8.5	p<0.0001
Time from nasal swab result to vancomycin discontinuation (hrs)	14	8.5	p=0.003

Figure 1. Overall Vancomycin Usage



## Discussion

- There was a statistically significantly shorter time to discontinuation of vancomycin in the post-intervention cohort.
- Secondary endpoints of time from ED visit to MRSA nasal swab collection, result and time from nasal swab to vancomycin discontinuation were also all significantly shorter in the post-intervention group.
- Patients were admitted to a variety of different units throughout the hospital including the ICU with most patients receiving vancomycin for treatment of pneumonia.
- Limitations to this study include the retrospective review. In addition, our institution routinely discontinues vancomycin when a MRSA nasal swab is negative and therefore our results may not be as applicable to institutions in which this is not common practice.

## Conclusions

- Optimizing the EMR by pairing the MRSA nasal swab order with the order for vancomycin lead to a faster time to results and a faster time to discontinuation of vancomycin.
- Utilizing the EMR in this fashion allowed us to create an easy and seamless process to help engage the ED in stewardship efforts.
- Given this process is built into the EMR, it is likely to be more sustainable over time compared to interventions that require repeated training and education.

## References

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Disclosure: The authors of this presentation have the following to disclose concerning possible financial or personal relationships with commercial entities that may have a direct or indirect interest in the subject matter of this presentation: All Authors: Nothing to disclose.