



# A Collaborative Antimicrobial Stewardship Initiative Requiring Mandatory Approval of Peripherally Inserted Central Venous Catheters



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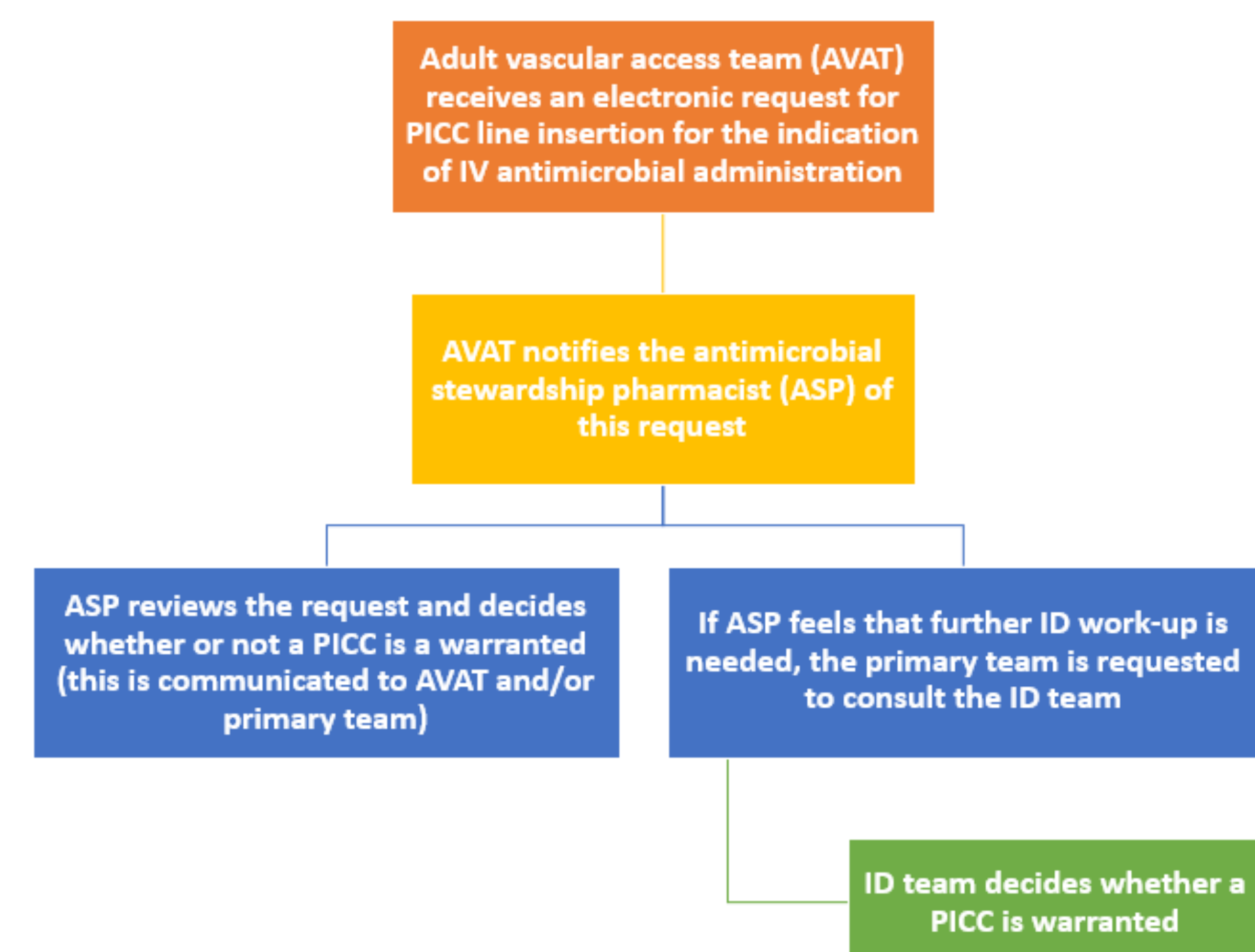
## Background

- Peripherally inserted central venous catheters (PICCs) are often used in patients that require prolonged intravenous (IV) antimicrobial administration
- Despite the benefits of PICCs, they are associated with complications, such as catheter occlusion or rupture, venous thrombosis and central line-associated bloodstream infections (CLABSIs)<sup>1</sup>
- At Augusta University Health (AUH), it was observed that ~50% of PICCs that were placed for administration of IV antimicrobials were unnecessary
- A novel initiative was implemented, which required antimicrobial stewardship/infectious diseases (ID) approval for PICC insertion if the indication was for IV antimicrobial administration only
- The objectives of this study were to describe the interventions, clinical outcomes and financial outcomes associated with requiring antimicrobial stewardship/infectious diseases approval for PICC insertion for IV antimicrobial administration

## Methods

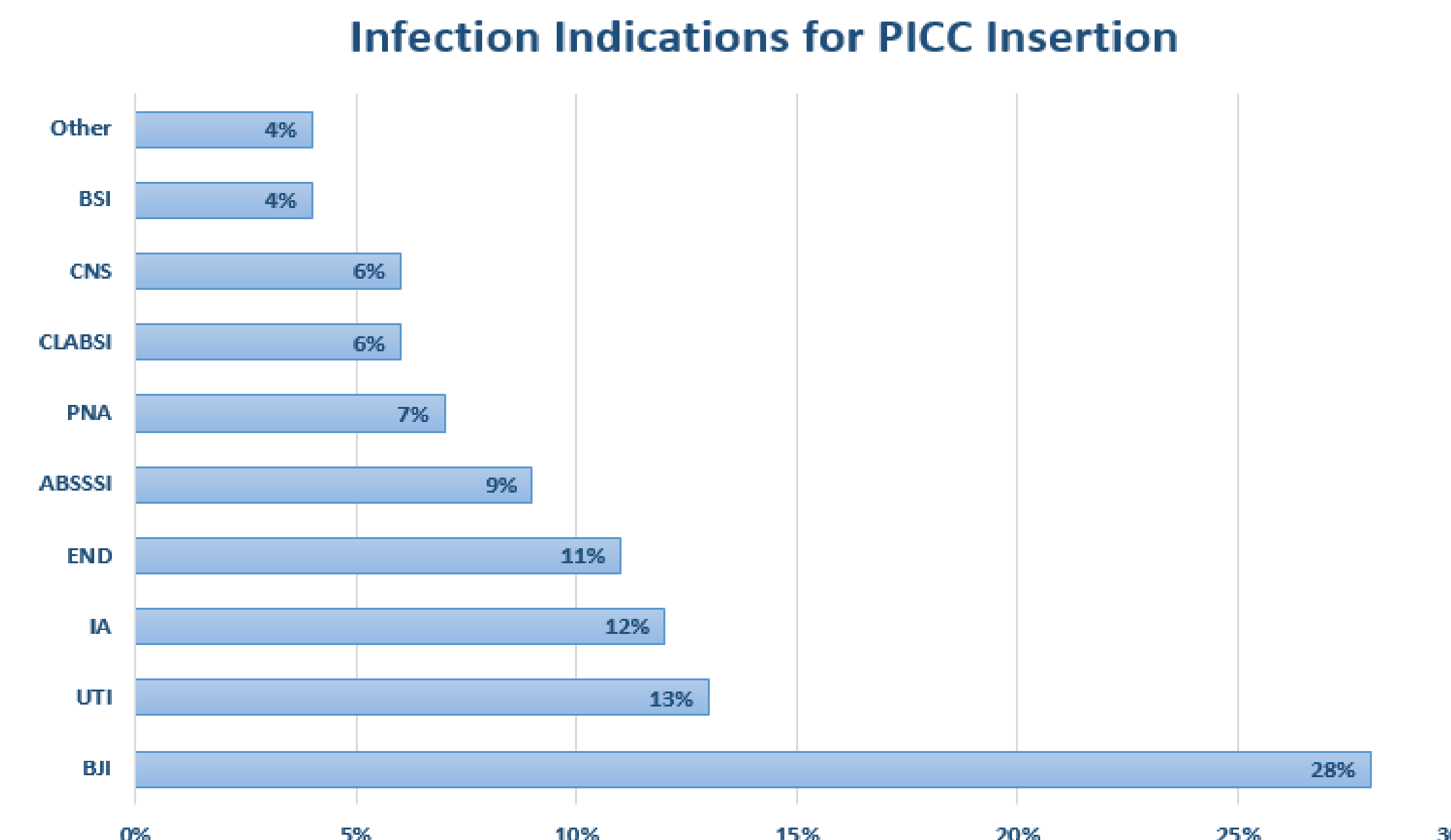
- A retrospective observational study was conducted at AUH, a 520-bed tertiary care institution
- As part of the Antimicrobial Stewardship Program, the Medical Executive Committee approved a mandate that included requiring approval of PICC line insertions by the Antimicrobial Stewardship Program
- This study was approved by the AUH Institutional Review Board
- All adult patients with a PICC line insertion order for IV antimicrobial administration, between December 2017 and May 2019, were included
- The variables collected were: infection indications for PICC insertion, infectious diseases consultation, reason for PICC denial and 30-day PICC-related complications

### PICC Approval Workflow:



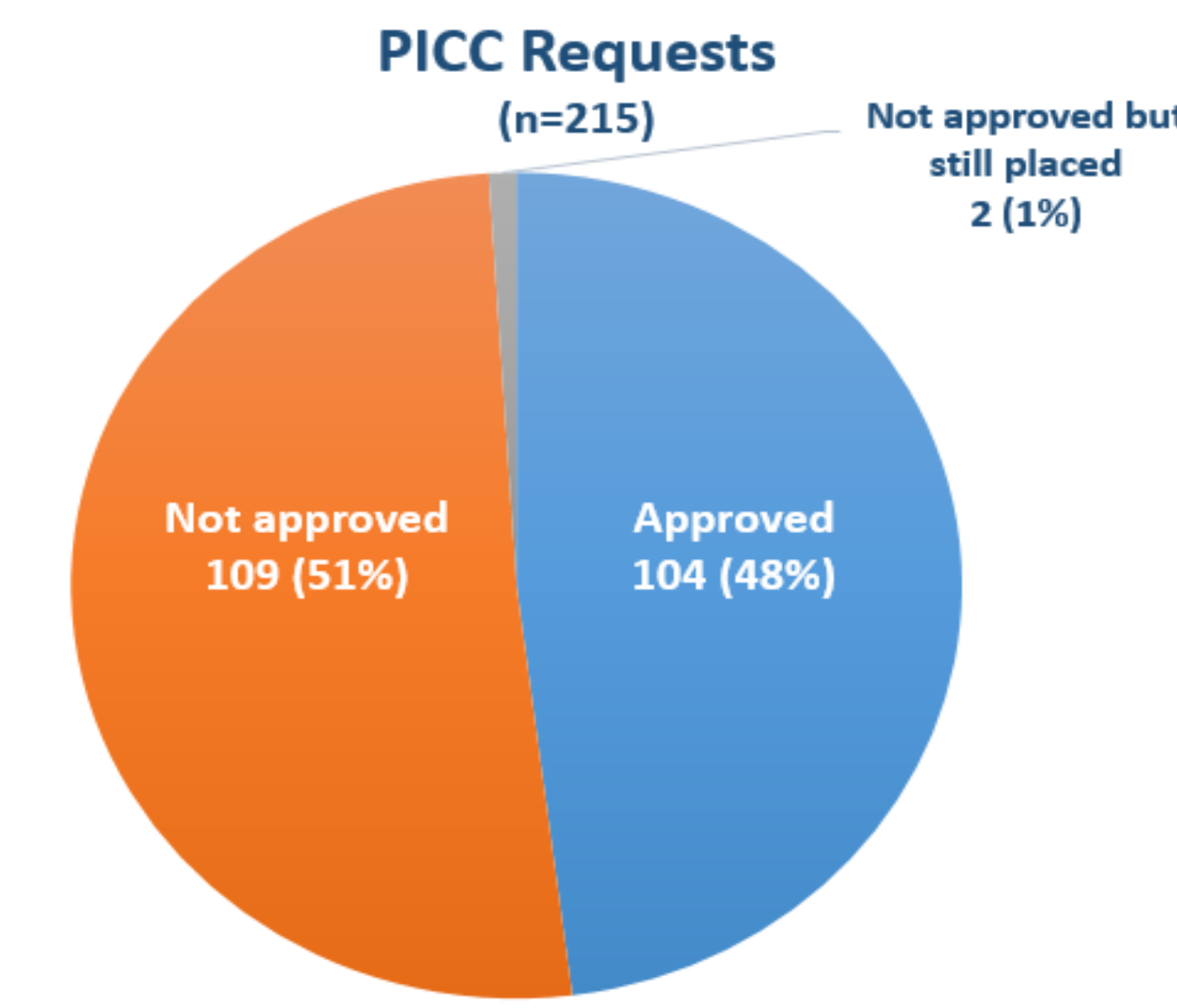
## Results

### Patient Characteristics



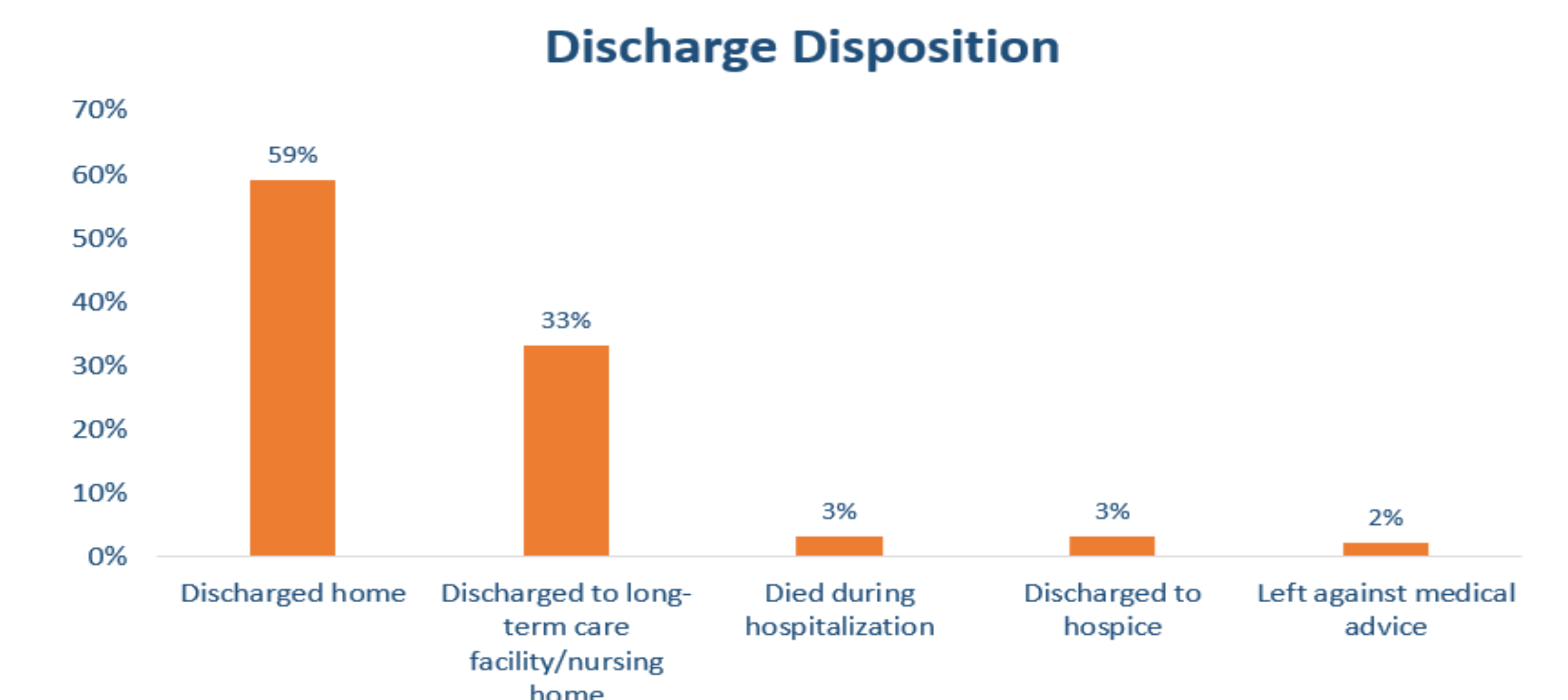
Abbreviations: BJI = bone and joint infection, UTI = urinary tract infection, IA = intra-abdominal infection, END = endocarditis/endovascular infection, ABSSSI = acute bacterial skin and skin structure infection, PNA = pneumonia, CLABSI = central line-associated bloodstream infection, CNS = central nervous system infection, BSI = bloodstream infection

### Intervention



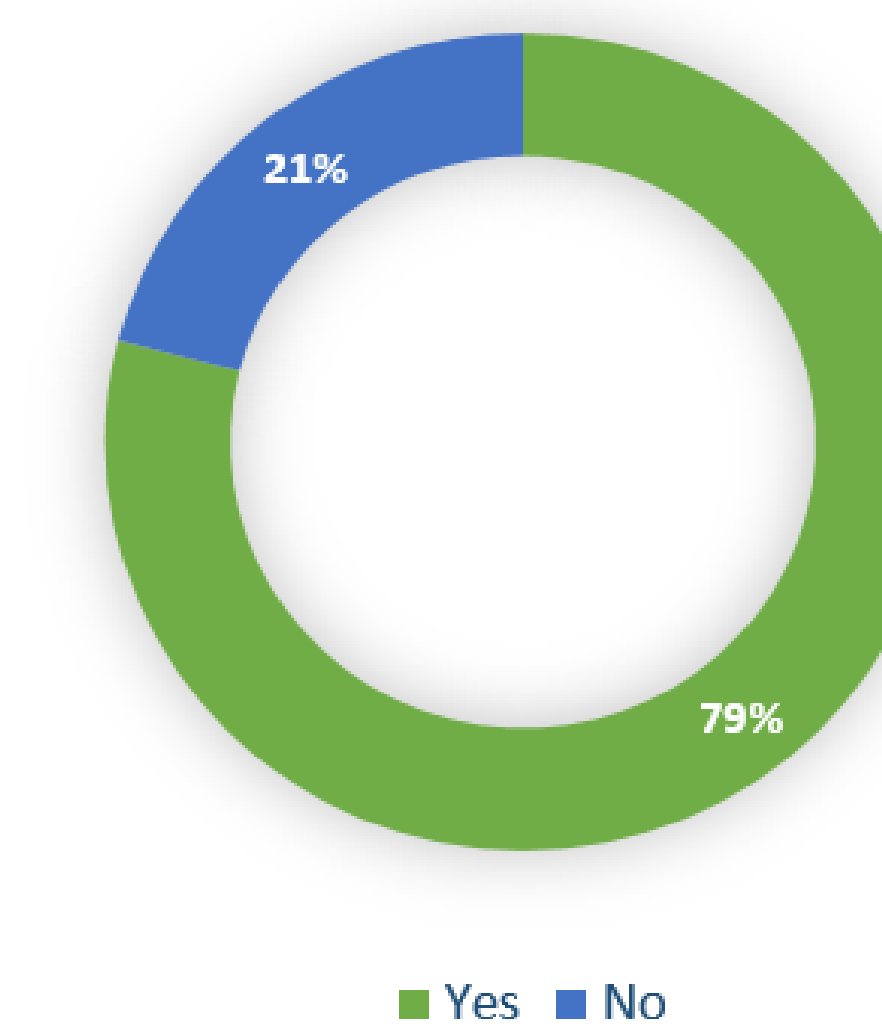
Reason	n (%)
Midline catheter preferred	56 (50%)
Switched to oral antibiotics	40 (36%)
Further work-up required	3 (3%)
No antibiotics warranted	8 (7%)
Other	4 (4%)

### Outcomes



Complication	n (%)
Problems associated with PICC itself (i.e. occlusion, leaking, etc.)	5 (5%)
Thrombosis	3 (3%)
Re-insertion of PICC	1 (1%)
Infection at PICC insertion site	1 (1%)

### Infectious Diseases Team Consulted



### Cost Savings

	# Avoided	Cost per Occurrence	Cost Savings
PICC insertion	109	\$2,580	\$281,220
CLABSI <sup>2</sup>	2	\$63,000	\$126,000
Deep vein thrombosis <sup>2,3</sup>	8	\$5,040	\$40,320
<b>Total cost savings</b>			<b>\$447,540</b>

## Summary

- Of the 215 PICC requests that were placed, 51% were not approved
- The most common reason for denial was preference for a midline catheter, due to the duration of antimicrobial being less than 28 days
- Treatment of bone and joint infections were the most common infection
- Of the 104 patients that received a PICC, 10 patients experienced a PICC-associated complication
- Avoiding 109 PICC insertions resulted in a cost savings of \$447,540
- This study shows the benefit of implementing an antimicrobial stewardship/infectious diseases approval process of PICC line insertions in hospitalized patients or in patients being considered for outpatient parenteral antimicrobial therapy
- This method not only decreased the adverse events associated with PICC lines, but it also helped save a significant amount of money

## References

- Conant MM, Erdman SM, Osterholzer. Mandatory infectious diseases approval of outpatient parenteral antimicrobial therapy (OPAT): clinical and economic outcomes of averted cases. *J Antimicrob Chemother.* 2014; 69:1695-1700.
- Krein, SL, Saint S, Trautner BW, et al. Patient-reported complications related to peripherally inserted central catheters: a multicenter prospective cohort study. *BMJ Qual Saf.* 2019. 28(7):574-581.
- Fernandez MM, Hogue S, Preblick R, et al. Review of the cost of venous thromboembolism. *Clinicoecon Outcomes Res.* 2015; 7:451-462.

## Disclosures

The authors of this presentation have nothing 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.