

Actionable Changes and Outcomes from Rapid Phenotypic Antimicrobial Susceptibility Testing in Hospitalized Patients with Bloodstream Infection



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Background

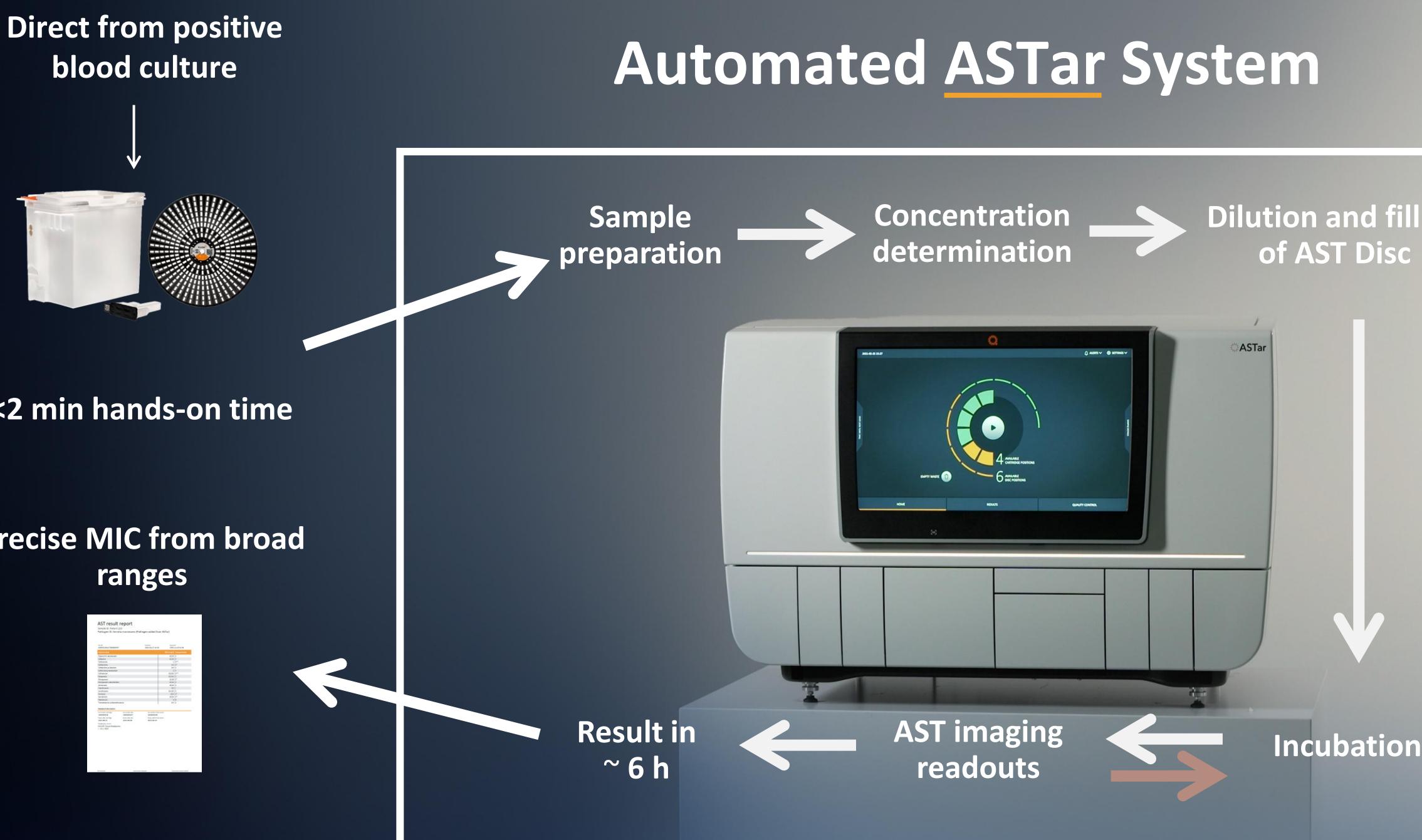
Bloodstream infections (BSI) are a leading cause of morbidity and mortality, particularly among critically ill hospitalized patients. Routine phenotypic antimicrobial susceptibility testing (pAST) relies on subculture from positive blood cultures (PBCs), which can delay actionable results by 48–72 hours. Performing antimicrobial susceptibility testing (AST) directly from positive blood culture (PBC) bottles enables earlier antimicrobial intervention, which may improve clinical outcomes by decreasing mortality, hospital stay duration, adverse drug events, and the emergence of antimicrobial resistance. Novel rapid pAST platforms, such as the Q-linea ASTar system, can perform pAST directly from Gram-negative (GN) PBCs and improve patient outcomes when combined with stewardship interventions. Rapid pAST platforms can also improve laboratory workflow and healthcare-related costs.

Methods

- Seventy-five PBCs (57 prospective, 18 spiked) were evaluated.
- AST results (using the Microscan Walkaway) generated from standard of care (SoC) PBC overnight subculture were compared to AST results generated from the Q-linea ASTar system.

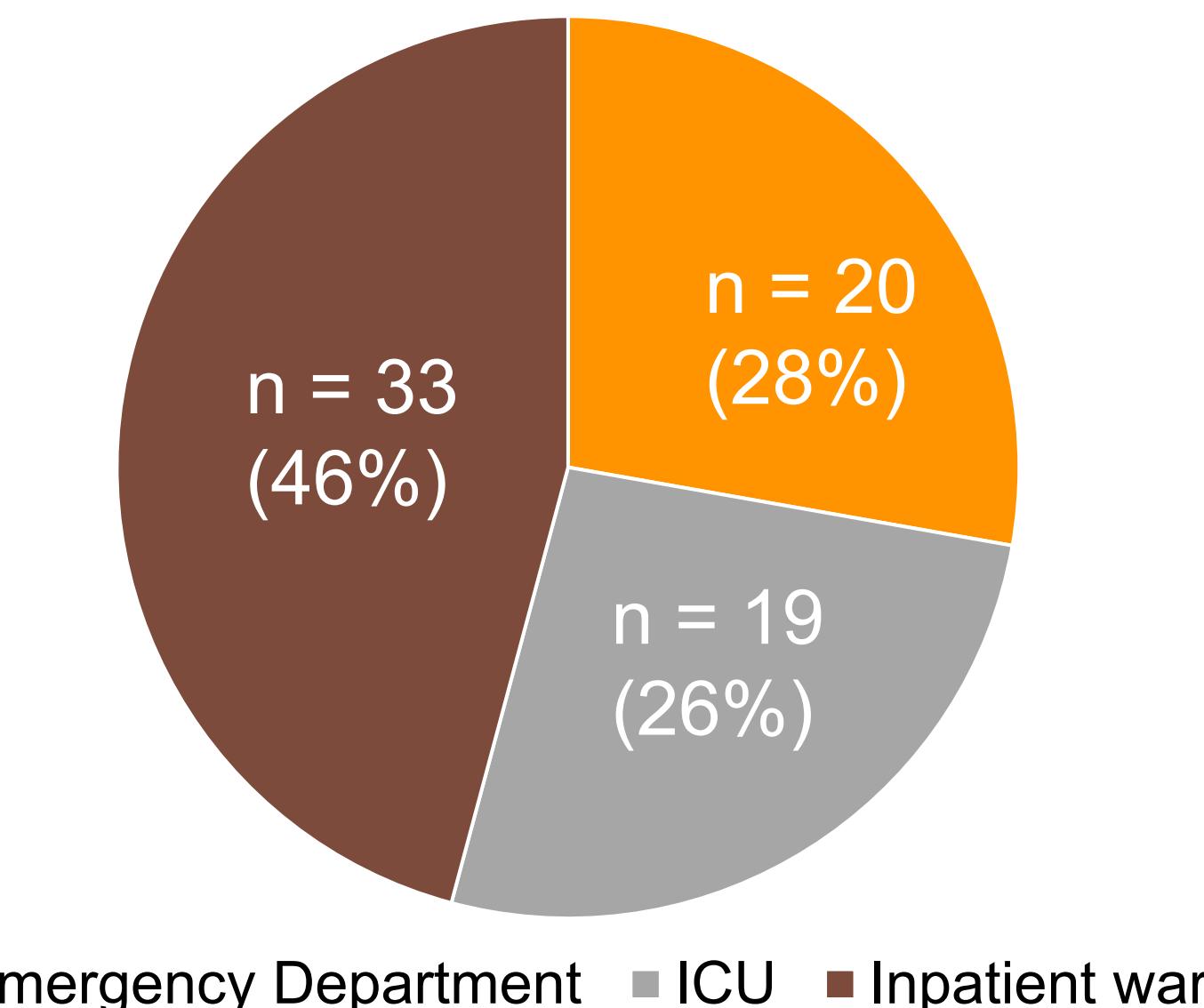
Assessment:

- Performance comparison
- Time to actionable results
- Hypothetical clinical decisions: treatment adjustment type (retrospective clinical chart review)
 - Focus on inpatients with monomicrobial infections



Characterization of Patient Population

A majority of our enrolled study cohort was from hospitalized patients (inpatient ward and ICU)



Patient Demographics and Clinical Presentation

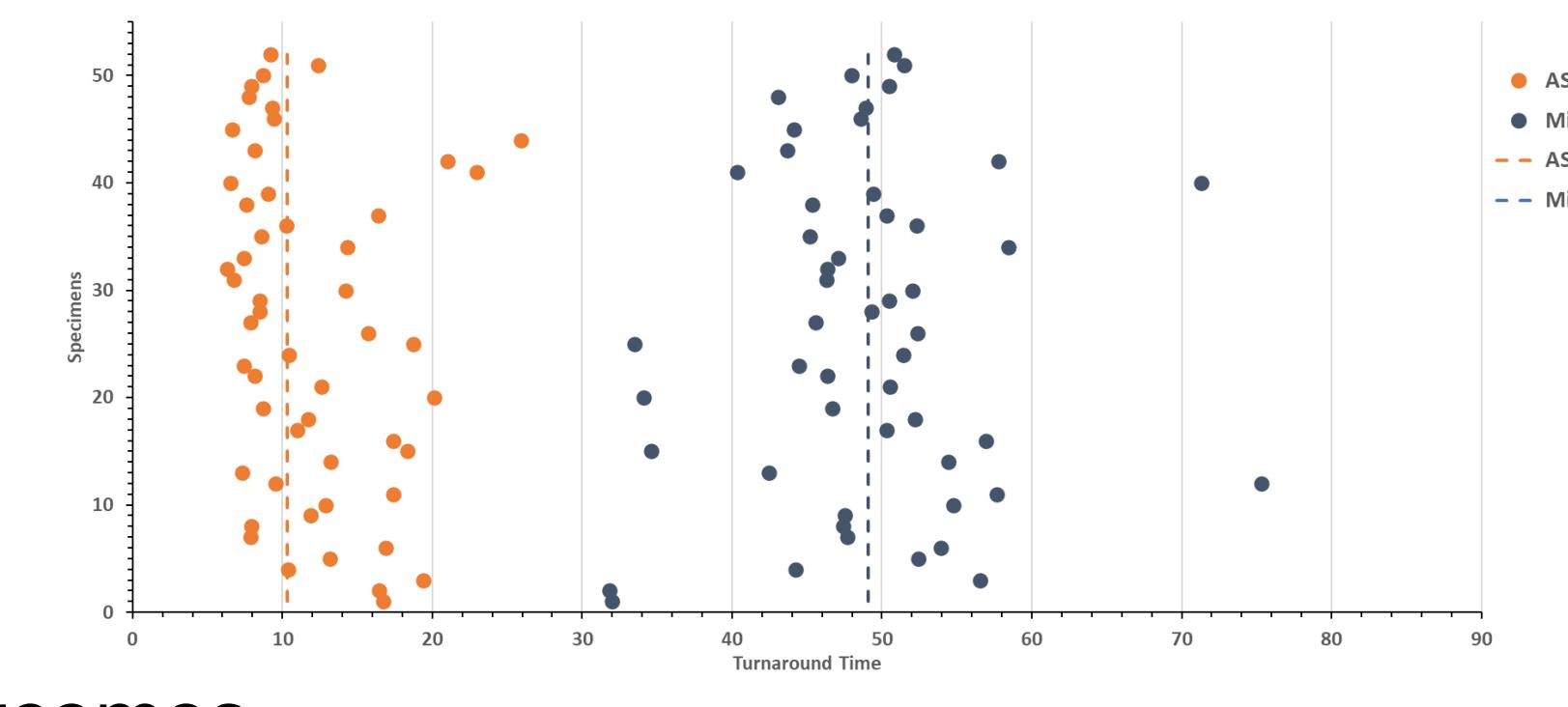
| Clinical characteristics | n, % | p-value |
|--|------------|---------|
| Male | 37/72, 52% | |
| Blood stream infection <i>with</i> known primary source | 42/72, 58% | |
| Blood stream infection <i>without</i> known primary source | 15/72, 21% | |
| Sepsis <i>with</i> septic shock | 19/72, 26% | |
| Sepsis <i>without</i> septic shock | 30/72, 42% | |
| Immunocompromised | 21/72, 29% | |
| • Hospitalized | 16/21, 76% | 0.778 |
| • ED | 5/21, 24% | |
| Sepsis associated complications (or acute kidney injury) | 38/72, 53% | |
| • Hospitalized | 25/38, 66% | 0.29 |
| • ED | 13/38, 34% | |
| WBC count (x 10 ³ /microliters) | 12.2 | |
| • Hospitalized | 10.8 | 0.04 |
| • ED | 16.7 | |
| SOFA scores | 3 | |
| • Hospitalized | 4.3 | <0.001 |
| • ED | 7 | |

Results

Clinical Outcomes Generated by ASTar

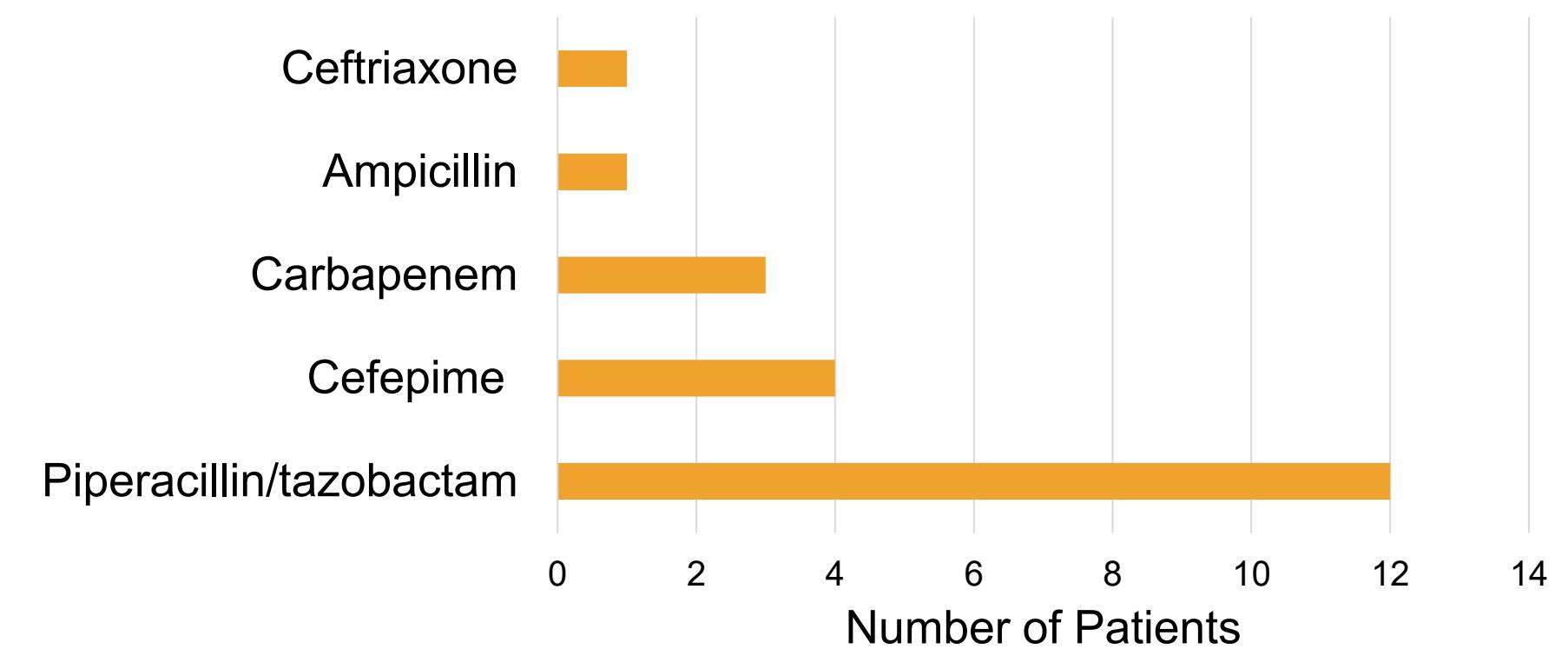
Laboratory Outcomes

- Decreased the time-to-phenotypic AST after initial positive Gram-stain result by >36 hours compared to the standard of care workflow ($p<0.00001$)
- Categorical agreement: 93.1% (1331/1429)
- Essential agreement: 96.7% (1384/1431)

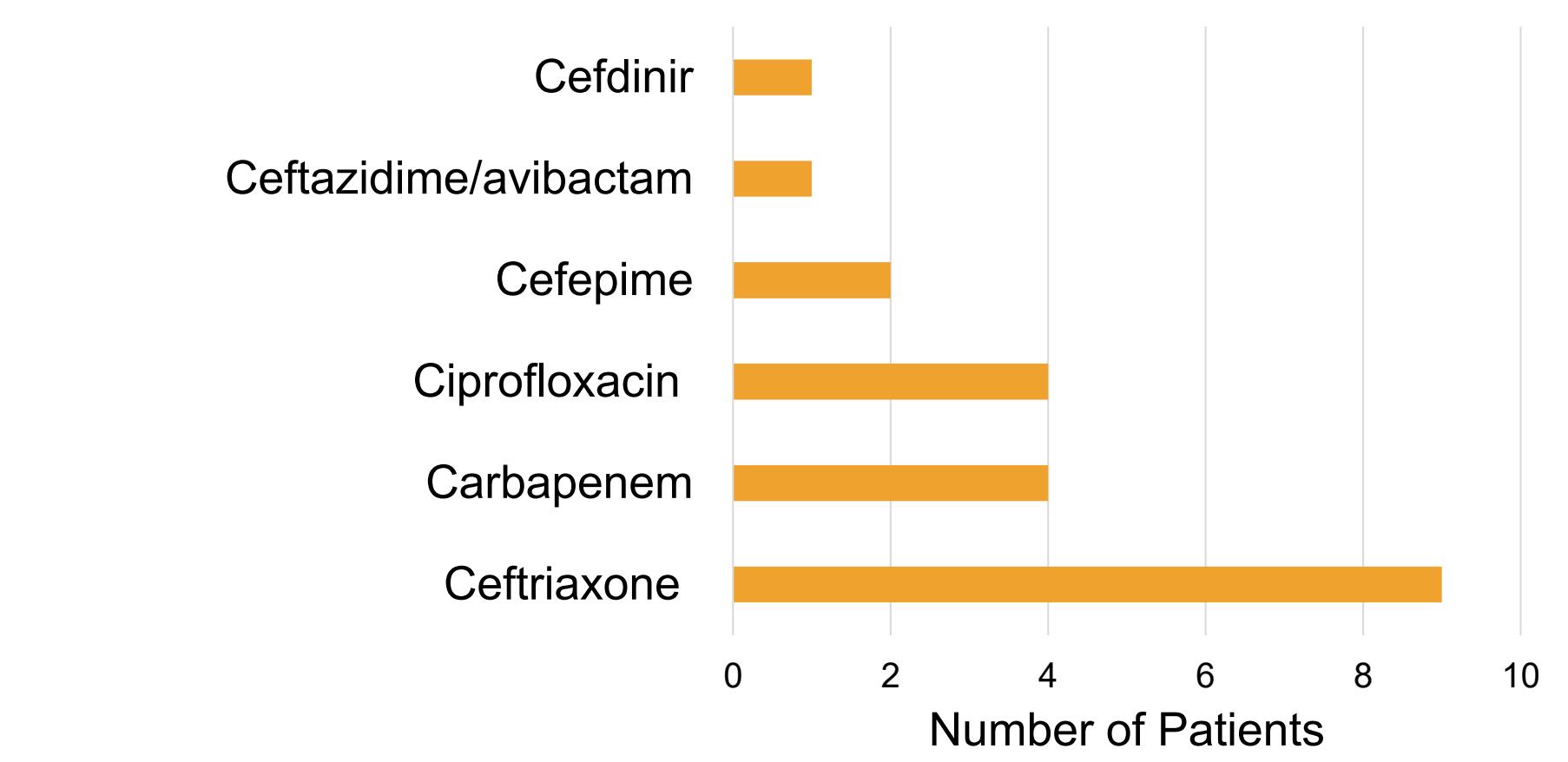


Changes to Clinical Outcomes

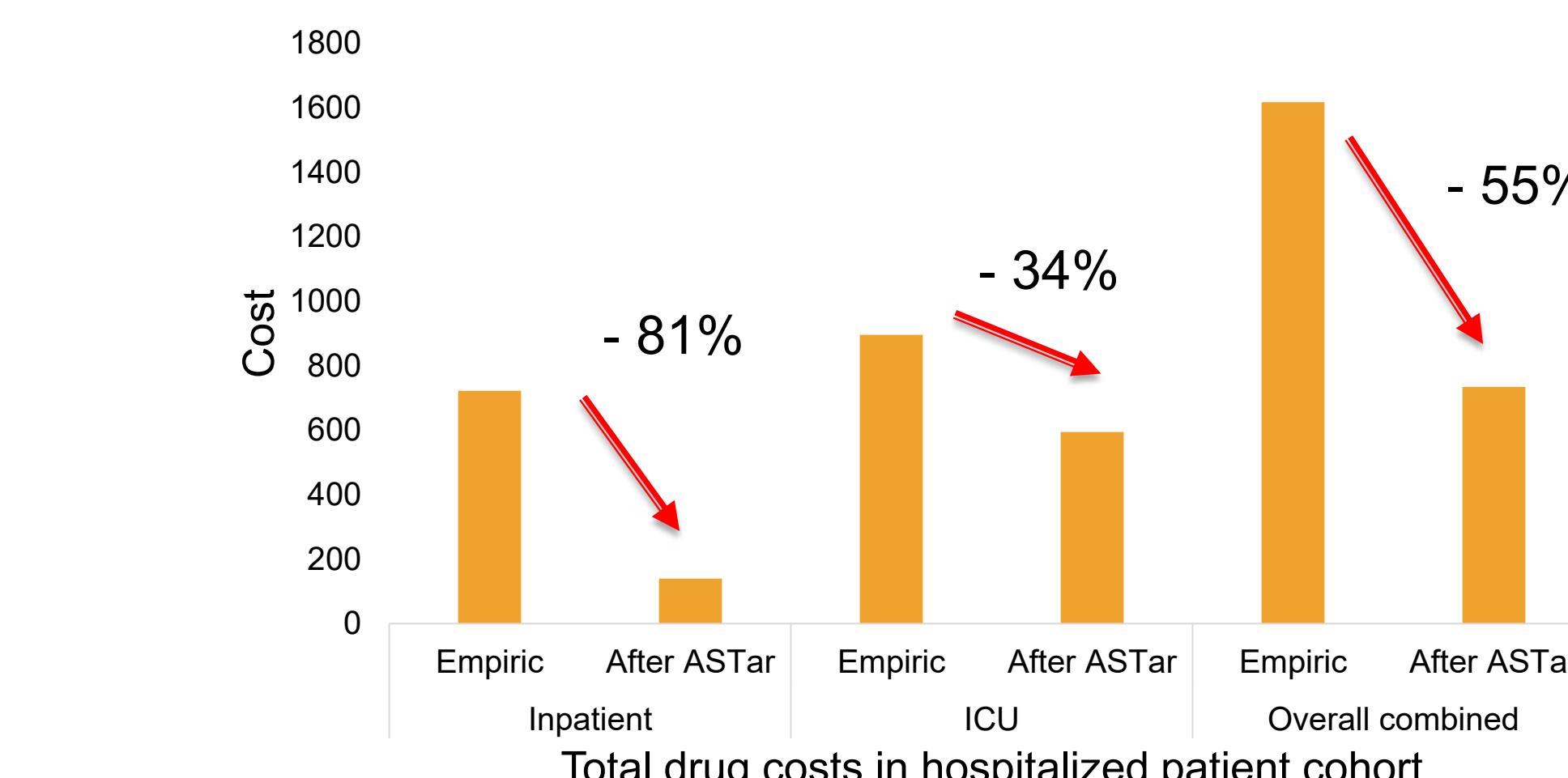
Most common empiric therapy was pip/tazo



Majority can be switched to ceftriaxone



Reduction in total drug costs in our hospitalized cohort



Conclusions

- The Q-linea ASTar produced results with high agreement to standard of care results but ~1.5 days earlier.
- At our institution, rapid phenotypic AST platforms may potentially lead to therapeutic changes for patients with Gram-negative bacteremia.
- AST profiles generated from rAST platforms can allow clinicians to choose treatment concordant with our standard of care treatment plans.
- Clinical outcomes such as antimicrobial optimization (de-escalation, route of administration) and overall drug costs can be downstream benefits of ASTar.
- Technologies accelerating AST results combined with hospital antimicrobial stewardship efforts continue to show promise in improving patient outcomes in our inpatient population cohort.

References

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- Messiaen AS et al. Impact of reporting rapid susceptibility results in Gram negative bloodstream infections: a real world prospective study. *Eur J Clin Microbiol Infect Dis*. 2025.
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Acknowledgments

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