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Shikha Chaudhary, Noah Henry, Paula Binsol, Monish Sheth, Sangeetha Ranganath, Tiffany LaDow, Ryan Beaver, Lauren Sisco, John Midturi and Manohar Mutnal
Baylor Scott and White Research Institute

Shikha Chaudhary,
Baylor Scott and White Research Institute,
Email: shikha.chaudhary@bswhealth.org

Advancing Antimicrobial Therapy: Evaluating the ASTar (Q-linea) System for Rapid AST in Gram-Negative Bloodstream Infections

Introduction

- Bloodstream infections (BSI) and sepsis require immediate and effective antimicrobial intervention.
- Prompt and accurate antimicrobial therapy is crucial for improved clinical outcomes and reducing mortality.
- Traditional AST methods can delay treatment optimization due to long turnaround times.
- This study utilized the ASTar System with an Investigational Use Only panel (23 antimicrobials) directly from positive blood culture to assess its performance and clinical impact in comparison to the standard-of-care (SoC) MicroScan WalkAway system.

Methods

Inclusion Criteria

- 72 patient derived clinical isolates collected from Baylor Scott & White Health System and 35 antibiotic-resistant (AR) bank isolates were evaluated (107 total isolates, Figure 1) across 23 antimicrobials.
- Blood culture specimens were tested on ASTar within 16 hours of positivity.

Data Analysis

- MIC values interpreted per FDA-approved STIC breakpoints.
- Concordance metrics calculated for ASTar results compared with SoC for: (a) Patient derived clinical isolates, (b) AR bank isolates
- Metrics included: Essential Agreement (EA), Categorical Agreement (CA), Very Major Error (VME), Major Error (ME).
- Turnaround time: measured from positive blood culture to final results on ASTar as well as the SoC.
- Potential clinical impact and outcomes of ASTar compared to SoC were evaluated retrospectively by electronic chart review by an ID clinical pharmacist, ID physician, and a hospitalist (Figures 3 and 4).

Results

- The ASTar System demonstrated agreements and error rates as follows:

	EA	CA	VME	ME
Clinical isolates (72)	98.3%	99.1%	0.7%	0.4%
AR bank isolates (35)	93.7%	95.7%	1.6%	3.0%

- The turn around times for 67 clinical isolates for ASTar observed an average (SD) of 13.3 hours as compared to SoC method average (SD) 50.4 hours, $p < 0.0001$, Figure 2.

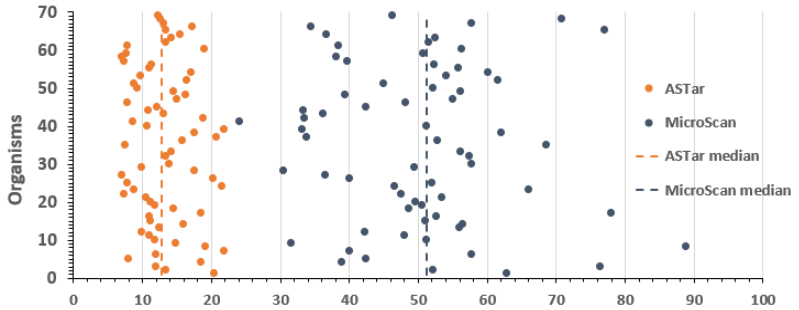
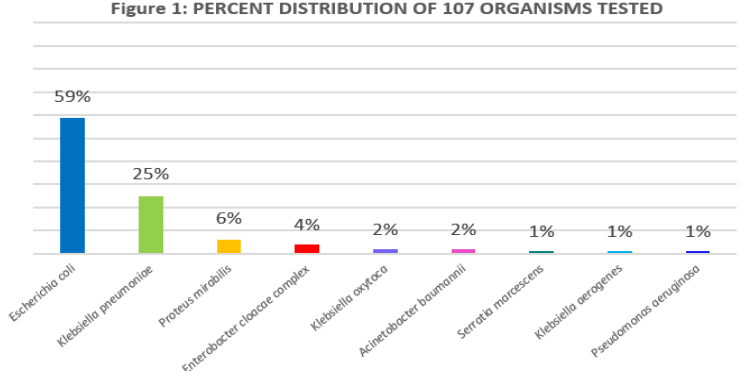


Figure 2: Turn-around-time

- Clinician led chart review suggest that earlier ASTar results could result in exposure to fewer antibiotics (23%) and associated adverse antibiotic sides effects (27%, Figure 4).

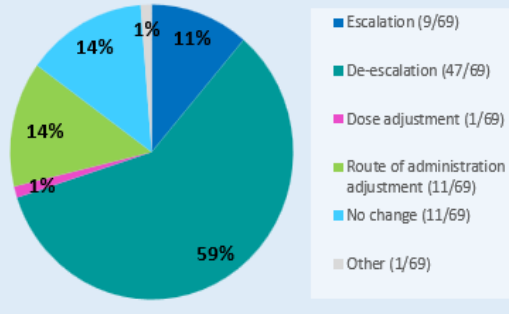
Figure 1: PERCENT DISTRIBUTION OF 107 ORGANISMS TESTED



Conclusion

- **ASTar System** demonstrates agreement with SoC with reduced turn around times.
- Rapid MIC reporting may lead to:
  - Earlier de-escalation or escalation of therapy.
  - Early therapy optimisation.
  - Improved patient outcomes.
- ASTar system can potentially impact clinical decisions and support optimized targeted therapy.

Figure 3: POTENTIAL CLINICAL IMPACT ON CHANGE TO THERAPY (n=69)



Clinical Impact (potential)

ASTar could have prompted earlier **de-escalation in 59%** of patients, **escalation in 11%** of cases and confirmation of empirical treatment in **14%** of cases.

Figure 4: OUTCOMES THAT CAN BE POTENTIALLY IMPACTED BY ASTAR-GUIDED THERAPEUTIC ADJUSTMENTS (n=69)