Assessing the clinical impact of rapid pathogen identification and antimicrobial susceptibility testing provided by the Accelerate Pheno™ System at Hampshire Hospitals NHS Trust

Stephen P Kidd, Stephen Poole, Nathan Moore, Christina Petridou, Kordo Saeed, Claire Thomas, Nick Cortes and Nicki Hutchinson

Background

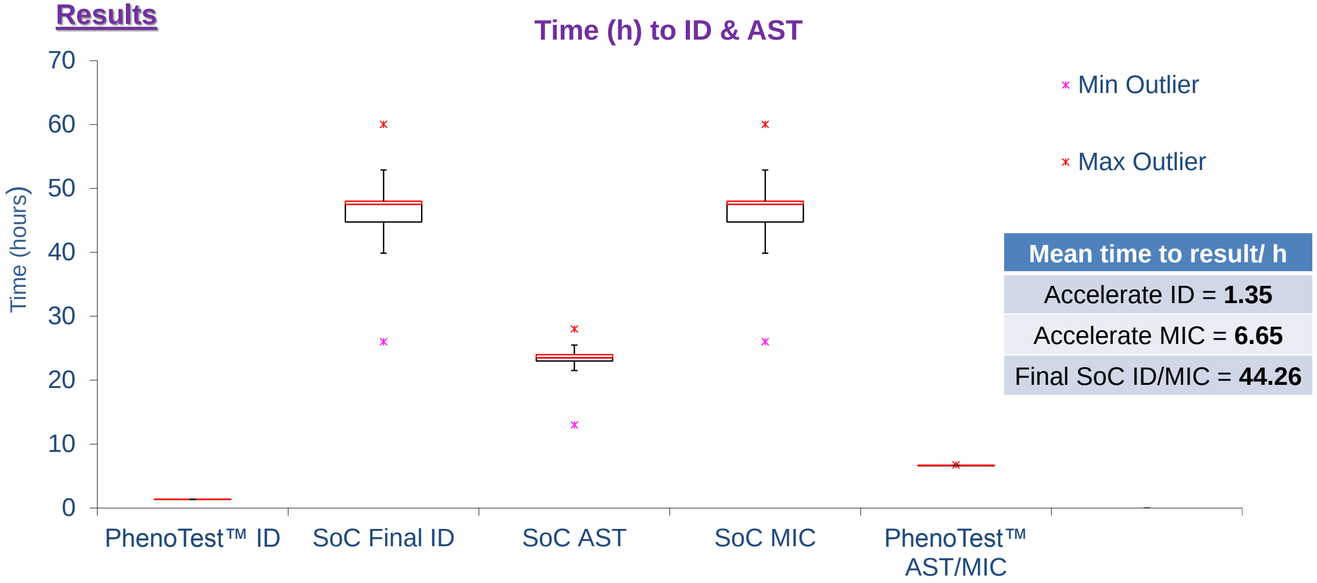
Rapid identification (ID) and antimicrobial susceptibility testing (AST) of microorganisms cultured from blood is essential for optimising management of patients with sepsis. Clinical outcomes are influenced by timeliness of appropriate antimicrobials and investigations for source control. Timely de-escalation and targeted therapy are a vital component of antimicrobial stewardship

Materials/Methods

A prospective study was designed to investigate the clinical impact of the rapid ID and AST generated by the Accelerate Pheno™ System versus our standard of care (SoC) of direct disc susceptibility and VITEK2. We processed signal positive blood cultures from **172** septic patients in ITU and on admission to ED and determined the clinical impact of these early interventions. **170** eligible assays were reported totalling **179** isolates (**9** dual infections). AST testing from both the US and European panels PhenoTest™ were performed, only the more relevant new European panel is reported here.

stephen.kidd@hhft.nhs.uk

Results



Mean time to result/ h
Accelerate ID = **1.35**
Accelerate MIC = **6.65**
Final SoC ID/MIC = **44.26**

Performance vs SoC (n=179)

	Gram-negative	Gram-positive	Yeast	Overall
Sensitivity	**96.3%** [93.1-99.5%]	**87.2%** [76.7-97.7%]	**100%** [100-100%]	**94.3%** [90.8-97.7%]
Specificity	**99.8%** [99.6-100%]	**99.9%** [99.7-100%]	**100%** [100-100%]	**99.9%** [99.8-100%]

[95% CI]

PhenoTest™ BC (European Abx Panel) performance vs SoC (n= 55)

Essential Agreement (MIC)	Categorical Agreement (S, I, R)	Very Major Error (VME)*	Major Error (ME)	Minor Error (MiE)
97% [95.5-98.6%]	**95.4%** [93.5-97.3%]	**5.3%**	**1.1%**	**2.3%**

[95% CI]

- Clinical action **1.57** days earlier than SoC.
- Lower sensitivity for Gram-positives reported due to favouring Gram-negatives in this study meaning less were assayed.
- VME* due to Meropenem, 2x Tobramycin and 2x Cefuroxime (*4x E. coli* and *P. aeruginosa*.

Clinical Impact	*106 blood cultures (BCs)
Optimisation of treatment	**31**
Reduction of overall antibiotic use	**19**
Narrowing of antibiotic spectrum	**16**
IV to oral switch	**9**
Infection control	**12**

*analysis on-going

Hampshire Hospitals NHS Foundation Trust

Annualised projections for our Trust based on 106 signal positive BCs
~5,500 doses saved/annum of Tazocin
~2,500 doses saved/annum of total antibiotic usage
1278 patient exposure days to multidrug resistant organisms saved
Clinical actions a mean of **1.57 days** earlier compared to SoC

Conclusion

The Accelerate Pheno™ System represents an exciting innovative platform with potential for significantly decreasing the interval to antimicrobial optimisation in blood stream infection. The potential clinical impact is greatest in pathogens with unpredictable anti-biograms like those we encounter locally in our Gram-negatives.

These demonstrable rapid clinical interventions can deliver significant benefits for individual patients and healthcare organisations in terms of quality of care, patient safety, antimicrobial stewardship and infection prevention measures, notwithstanding the potential associated financial savings.

ACCELERATE DIAGNOSTICS™