Rapid susceptibility testing of Gram-negative bloodstream infections using the QuickMIC system

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Ultra-rapid testing of antibiotic resistance

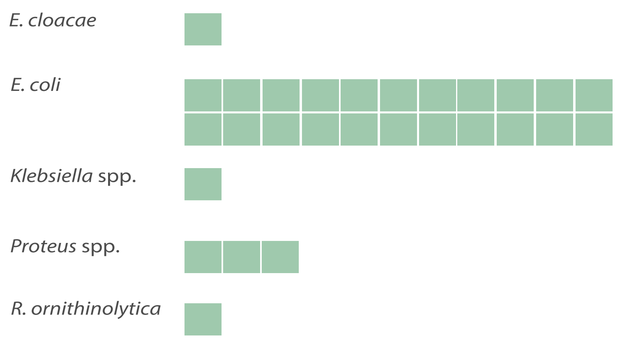
Rapid antibiotic susceptibility testing (rAST) methods have the potential to significantly improve the management of bloodstream infections by enabling clinicians to quickly select appropriate antibiotic therapy, leading to improved outcomes and reduced healthcare costs. Here we present preliminary data of the QuickMIC® rapid AST system from an ongoing study of the speed, accuracy and sample turnaround time in comparison to legacy AST methods.

So far in the study, 28 clinical blood cultures (*Figure 1A*) have been tested with the QuickMIC system Gram-negative panel and compared with VITEK® 2 (Figure 1). The essential, categorical agreement and the turnaround time was compared between the methods, as well as with broth microdilution (BMD) reference testing.

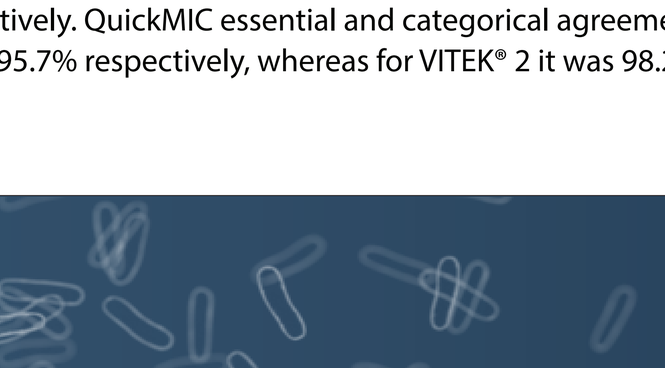
The QuickMIC® system gives precise MIC values in 2-4 hours directly from positive blood cultures.



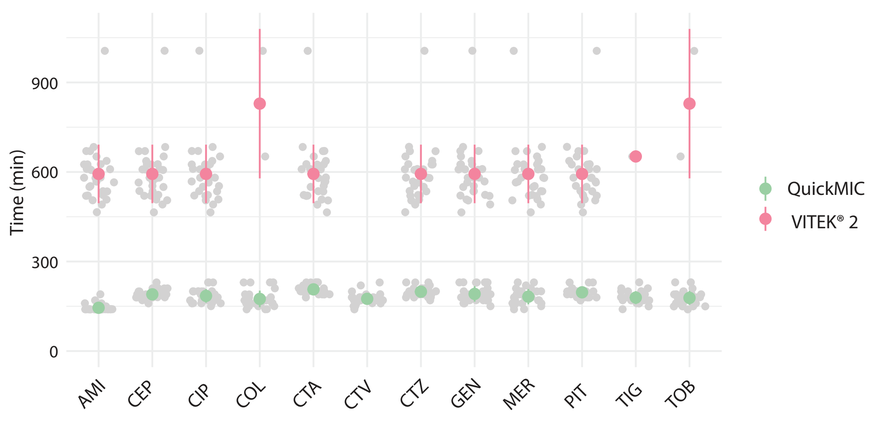
A) Number of bacterial species



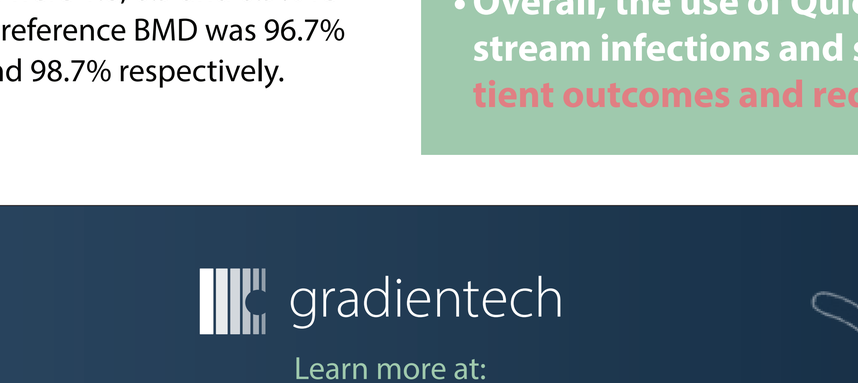
B) Distribution of resistant and wildtype strains



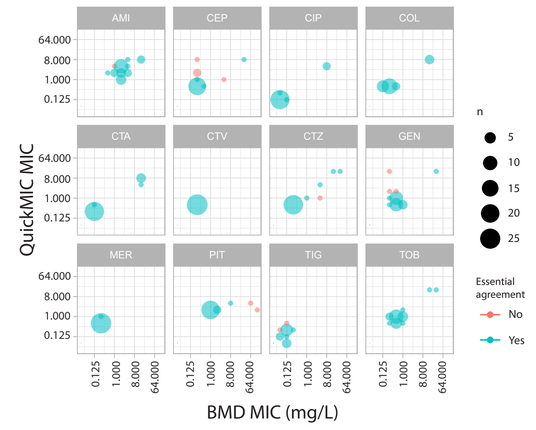
C) Time to AST result using QuickMIC and VITEK® 2



D) Total turnaround time using QuickMIC and VITEK® 2



E) Concordance between QuickMIC AST results and BMD



F) Concordance between QuickMIC and VITEK® 2 AST results

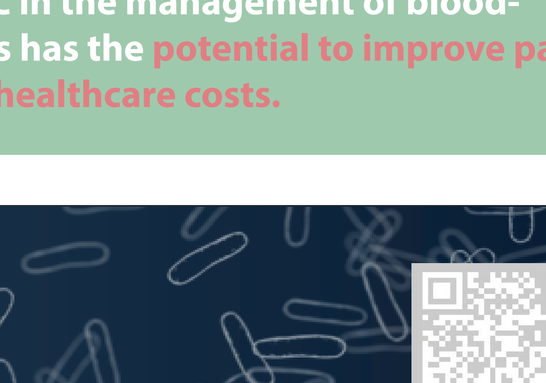


Figure 1: A) Distribution of bacterial species used in the study obtained from positive blood cultures. B) Distribution of wildtype strains (WT), resistant strains (RES), multidrug-resistant strains (MDR) and pandrug-resistant strains (PDR) used in the study. C) Time to AST results for each antibiotic in the QuickMIC GN panel comparing QuickMIC and VITEK® 2. D) Total turnaround time from positive blood culture to AST results comparing QuickMIC and VITEK® 2. E) Essential agreement between QuickMIC AST results and the reference method BMD for each antibiotic in the QuickMIC GN panel. F) Essential agreement between QuickMIC and VITEK® 2 AST results.

Results

Of the collected strains, 75.0% were wildtype to all antibiotics on the QuickMIC panel, 25.0% resistant to at least one antibiotic and 10.7% resistant to at least 3 antibiotic classes (MDR). The median QuickMIC turnaround time (time from blood culture positivity to MIC result) was 12.5h vs. 25.9h for the legacy method and the mean in-instrument analysis time overall was 3h 3min (SD: 25.3 min). In comparison, the mean analysis time for the legacy method was 9h 58 min (SD: 1h 43 min). The overall essential agreement and categorical agreement between QuickMIC and the legacy method were 96.4% and 96.0% respectively, and VMD, MD and mD rates for QuickMIC were 1.8, 0.9 and 0.9% respectively. QuickMIC essential and categorical agreement to reference BMD was 96.7% and 95.7% respectively, whereas for VITEK® 2 it was 98.2% and 98.7% respectively.

Conclusions

- **A high degree of concordance was found between QuickMIC and the legacy method VITEK® 2.**
- **QuickMIC provided susceptibility results in as little as 2 hours, compared to the ~10 hours required by the legacy method.**
- **Overall, the use of QuickMIC in the management of bloodstream infections and sepsis has the potential to improve patient outcomes and reduce healthcare costs.**

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