## BACKGROUND

Importance of early appropriate antimicrobial therapy for patients with suspected bloodstream infections is well established. Until recently, FDA approved methods for susceptibility testing required the preparation of an inoculum from an isolate, thus requiring sufficient incubation time of the bacterial culture in approximately 7 hours. While the CA for direct disk diffusion was above 90%, the VME rate was above the 3% cut-off established by the EUCAST guideline. Direct disk diffusion is more labor-intensive and requires use of a rapid identification method. In this data set, direct disk diffusion resulted in inter-operator variability between two independent reads of 16.8% of the time.

## METHODS

**42 Enterobacteriaceae isolates were tested (21 Klebsiella pneumoniae 2 Klebsiella oxytoca, 3 Citrobacter freundii, 3 Proteus mirabilis, 1 Enterobacter cloacae)**

Antimicrobial agents tested with the following disk content: amikacin 30 µg, ampicillin 10 µg, ampicillin/sulbactam 10/10 µg, aztreonam 30 µg, cefazolin 30 µg, cefepime 30 µg, ceftazidime 30 µg, ciprofloxacin 5 µg, imipenem 10 µg, meropenem 10 µg, peracillin/tazobactam 100/10 µg, sulfamethoxazole/trimethoprim 23.75/1.25 µg, tobramycin 10 µg.

- **Direct Disk Diffusion Method:** broth in a subculture vial was plated on a 150 mm Mueller Hinton agar (MH) plate and swabbed to create a bacterial lawn. Antimicrobial susceptibility disks were placed on the plate and incubated at 35 ± 2 °C in ambient air and read after 8 hours of incubation with two independent reads performed.

The objective of this study was to compare the performance of two rapid AST methods, direct disk diffusion and the Accelerate Pheno™ system as compared to the reference method of BMD. Only the Pheno™ system was FDA cleared for susceptibility testing of Enterobacteriaceae, while the automated disk diffusion method was not. This study was performed to determine the accuracy and consistency of the new method in comparison to the reference method of disk diffusion and the commercial automated disk diffusion method.

### RESULTS

- **The Pheno™ system yielded CA results above 90% for 13 out of 15 antimicrobials evaluated, with all antimicrobials performing above 80%. 12 out of 15 antimicrobials tested via direct disk diffusion had CA above 90%.**

- **Ampicillin/sulbactam and cefazolin posed to be the most challenging across both methods, with CA of 78.6% and 69.0% for direct disk diffusion and BMD, respectively.**

### CONCLUSIONS

- **The Pheno™ system provided a comprehensive solution to clinical laboratories as an automated platform with an integrated ID method and a more automated system, reducing operator variability occurring in ≥10 isolates.**

- **Direct disk diffusion resulted in acceptable performance but necessitates the use of manual interpretation and reading in most clinical laboratories, subjecting the results to more variability and potentially error. Additionally, due to the manual nature and specific incubation time requirements of the method, it is likely that batching for most clinical laboratories is not feasible.**

- **Currently, direct disk diffusion is not a recognized method of susceptibility testing by CLSI. EUCAST recently published guidance, however for non-gram negative organisms it is limited to E. coli, Klebsiella pneumoniae. Pseudomonas aeruginosa with breakpoint guidance limited to the following antimicrobials piperacillin/tazobactam, ceftazidime, cefotaxime, meropenem, imipenem, ciprofloxacin, amikacin, gentamicin, and tobramycin.**

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**REFERENCES**