P0332
Poster Session I
Rapid antimicrobial susceptibility testing

NEXT GENERATION AUTOMATED PHENOTYPIC ANTIBIOTIC SUSCEPTIBILITY TESTING UTILIZING AUTOMATED MICROSCOPY ANALYSIS OF BACTERIAL CELLS

A. Shamsheyeva[1], **S. Metzger**[1], C.S. Price[2], B. Turng[1], D. Howson[1]

[1]Assay Development, Accelerate Diagnostics Inc., Tucson, USA ; [2]Division of Infectious Diseases Medicine, Denver Health Medical Center, Denver, USA

Objectives: We tested whether growth measurement of sample populations of bacterial cells in the presence of a single challenge antibiotic using automated microscopy could adequately characterize the ensemble response of the population and correspond with standard culture testing using MIC.

Methods: A total of 61 clinical *Pseudomonas aeruginosa* isolates were evaluated in this study. A 0.5 McFarland aliquot of each isolate was diluted 200-fold then introduced into independent flowcells of a disposable multichannel cassette. Electro-kinetic concentration immobilized cells on the transparent lower surface of each flowcell channel (5 min). Immobilized cells were challenged with a single concentration of ciprofloxacin (2 µg/mL) prepared in cation-adjusted Mueller Hinton broth with 0.85% agar. Automated microscopy with image analysis software scanned and analyzed growth rates from changes in the mass of each progenitor cell as it grew into a clone of daughter cells (4.5 h). A computer algorithm converted bacterial growth inhibition in the presence of antibiotic to a minimum inhibitory concentration (MIC). A growth control was also performed. Frozen broth micro-dilution (BMD) testing, per CLSI standards, was performed in parallel. Automated microscopy MICs were compared to BMD MICs to determine essential and categorical agreement.

Results: Bacterial cell population response profiles corresponded with isolate MICs as shown in Figure 1. An algorithm was developed to report an MIC for each bacterial isolate tested, and reported an MIC in < 4.5 h. The essential agreement (± 1 dilution) of the microscopy method with BMD testing was 100% (n = 61).

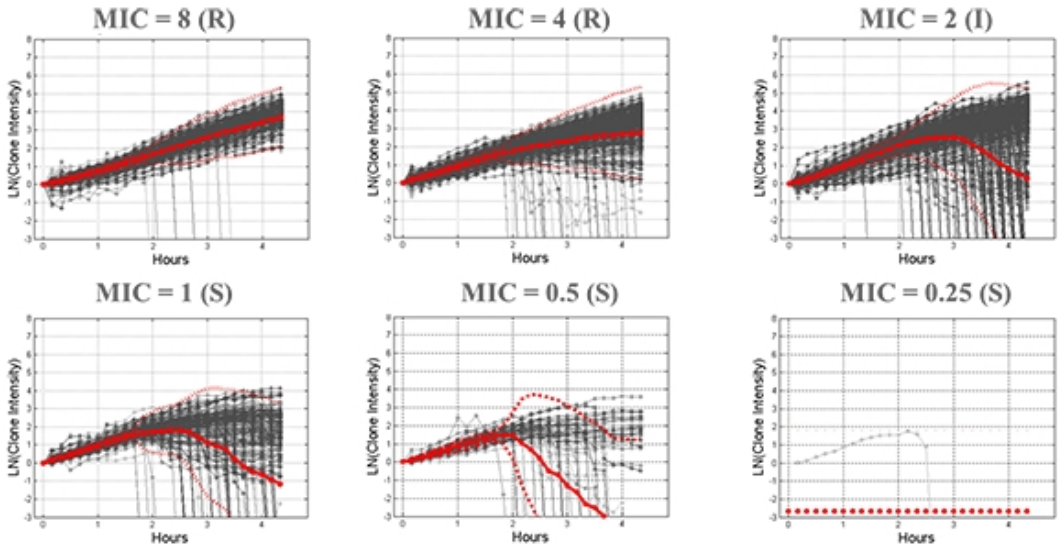

Figure 1: Bacterial cell population response profiles for isolates with MICs ranging from 0.25 to 8 µg/mL.

Conclusion: Characterization of isolate MICs using algorithms based on microscopic growth measurement of bacterial cell populations challenged with a single concentration of antibiotic was feasible. Additional challenge isolate testing will be required across classes of antibiotics and other bacterial species.