

ORAL ABSTRACTS

608. Can Rapid Molecular Diagnostics Assist in the Choice of b-Lactam Antibiotics? An Analysis of Data from PRIMERS-II of the Antibiotic Resistance Leadership Group (ARLG)

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Background. In PRIMERS-I, the ARLG assessed the performance characteristics of PCR/ESI-MS, molecular beacons (MB), microarrays, and ion torrent sequencing (IT) to detect b-lactam (b-L) resistance in highly drug resistant *Escherichia coli* (*Ec*) and *Klebsiella pneumoniae* (*Kp*). In PRIMERS-II, PCR/ESI-MS and MB tested in a blinded fashion a heterogeneous collection of *Ec* and *Kp* and asked how well these 2 platforms predicted b-L susceptibility (S) or resistance (R).

Methods. S/R to 14 b-Ls were determined (CLSI) using 196 *Ec* and *Kp* isolates.

The probabilities of identifying genetic markers of b-L susceptibility/non-susceptibility based on the absence/presence of *bla* genes (vs. MIC phenotype as the standard) were estimated using 95% confidence intervals (CIs) for each b-L for each platform. The performance of each platform was compared.

Results. Select estimated probabilities of detecting genotypic susceptibility/non-susceptibility MIC-defined phenotypes are summarized (table). In a community that has a prevalence of 15% ceftazidime resistance and 5% carbapenem resistance, the susceptibility predictive values (SPV) of PLEX-ID and MB are 100%, and 96% for ceftazidime; 100%, and 99% for imipenem. The non-susceptibility predictive values (nSPV) of PLEX-ID and MB are 69%, and 73% for ceftazidime; 41%, and 50% for imipenem.

Estimated probabilities (95% CIs) of detecting genotypic non-susceptibility (i.e., presence of *bla* genes)

| Antibiotic | PCR/ESI-MS | MB |
|-------------------------|-------------------|-------------------|
| ceftriaxone | 1.00 (0.96, 1.00) | 0.77 (0.66, 0.85) |
| ceftazidime | 1.00 (0.96, 1.00) | 0.77 (0.66, 0.85) |
| cefepime | 1.00 (0.96, 1.00) | 0.77 (0.66, 0.85) |
| piperacillin/tazobactam | 0.82 (0.71, 0.91) | 0.68 (0.55, 0.78) |
| imipenem | 0.93 (0.84, 0.98) | 0.75 (0.62, 0.85) |

Estimated probabilities (95% CIs) of detecting genotypic susceptibility (i.e., absence of *bla* genes)

| Antibiotic | PCR/ESI-MS | MB |
|-------------------------|-------------------|-------------------|
| ceftazidime | 0.92 (0.85, 0.96) | 0.95 (0.90, 0.99) |
| piperacillin/tazobactam | 0.88 (0.80, 0.93) | 0.95 (0.90, 0.98) |
| imipenem | 0.93 (0.88, 0.97) | 0.96 (0.91, 0.98) |

Conclusion. Advancing the findings of PRIMERS-I, detecting R/S genotypes in *Ec* and *Kp* predicts the probability of a corresponding phenotype identified by susceptibility testing. Informed decisions regarding the choice of b-L therapy depends upon the geographic prevalence of *bla* resistance genes

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