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### Evaluation of Cepheid Xpert-Carba-R assay for the detection of carbapenemase-producing organisms

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**Background & Aim:** Infections with carbapenem resistant microorganisms are associated with a high morbidity and mortality. Carbapenem resistance makes empirical and targeted treatment of infections challenging. Carbapenem resistance can arise by several mechanisms with the greatest emphasis on those bacteria that have acquired transferable carbapenemase genes such as *KPC*, *OXA 48*, *IMP-1*, *VIM* and *NDM*. The goal of this study was to compare the performance of the Cepheid Xpert-Carba-R assay to modify Hodge test (MHT) and carbapenem inactivation method (CIM).

**Method:** MHT, CIM and Carba-R were performed on a panel of 24 isolates that included *Acinetobacter baumannii* (7), *Klebsiella pneumoniae* (9), *Klebsiella oxytoca* (1) *Citrobacter freundii* (1), *E. coli* (3), *Morganella morganii* (1) and *Pseudomonas aeruginosa* (2) as well as 18 carbapenem resistant organisms isolated from patients at Hartford Hospital [ *E. coli* (11), *K. oxytoca* (3), *K. pneumoniae* (7), *P. aeruginosa* (1) and *Serratia marcescens* (1)]. Antimicrobial susceptibility of the panel isolates revealed that all except for one *A. baumannii*, one *E. coli* and one *K. pneumoniae* were resistant or intermediate to one or more carbapenems. Similarly, antimicrobial susceptibility of the clinical isolates revealed that all isolates were resistant or intermediate to one or more carbapenems except for *S. marcescens*.

**Results:** Of the 42 isolates, 21 isolates tested negative and 15 isolates tested positive for carbapenemase by all three tests. Two isolates (*Acinetobacter baumannii*) tested were positive by MHT, negative by CIM and CarbaR PCR and; one isolate (*Pseudomonas aeruginosa*) was tested positive by CIM, negative by MHT and CarbaR PCR. One isolate (*Acinetobacter baumannii*) tested positive by MHT and CIM, tested negative by CarbaR PCR and; one isolate (*Acinetobacter baumannii*) tested positive by CarbaR PCR (NDM) and MHT tested negative by CIM. One isolate (*Klebsiella oxytoca*) tested positive by CarbaR (NDM), tested negative by MHT and CIM. This was considered as a true positive missed by MHT and CIM.

**Conclusions:** CarbaR detected all isolates with *KPC*, *OXA 48*, *IMP-1*, *VIM* and *NDM* carbapenemases. Both MHT and CIM were associated with false positive and false negative results. The turn-around time for CarbaR was less than 90 minutes compared to 24 hours for MHT and CIM.

#### Biography

Jaber Aslanzadeh has completed his PhD at American Board of Medical Microbiology (ABMM). He is the Director of Clinical Microbiology at Hartford Hospital, USA. Currently, he is an Associate Professor of Laboratory Medicine at University of Connecticut School of Medicine, Farmington, USA.

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