Contributions of Porin Channel and Efflux System to Carbapenem Resistance in Clinical Isolates of *Pseudomonas aeruginosa* in Malaysia

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**ABSTRACT**

The contribution of mutation in gene encoded OprD, overexpression of MexAB-OprM and MexEF-OprN, as well as production of carbapenemases in 44 clinical isolates of imipenem-resistant *Pseudomonas aeruginosa* were studied. Forty-three of these strains had an overexpressed MexAB-OprM system which was resulted from several point mutations including a change resulting in the substitution of valine for glutamic acid at position 126 in the MexR protein sequence. 31 of all strains expressed the MexEF-OprN efflux system. Three strains showed the loss of OprD, and 31 strains showed decreased levels of OprD. Chromosomally encoded cephalosporinases as well as secondary β-lactamases such as OXA, IMP, and CMY were also detected. In conclusion, we found the synergy between the absent or decreased expression of OprD, the over expression of the efflux systems, and the production of β-lactamases contributed to carbapenem resistance in Malaysian clinical isolates of *P. aeruginosa*. (J Infect Dis Antimicrob Agents 2006;23:115-24.)

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Received for publication: March 29, 2006.

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**Keywords:** Carbapenem resistance, efflux pumps, *Pseudomonas aeruginosa*, porin channel