Question of the Week

What is the New Delhi (NDM-1) carbapenemase and will it impact your institution?

The New Delhi metallo-β-lactamase (NDM-1) was first characterized in 2009 from *Klebsiella pneumoniae* and *Escherichia coli* isolated from a patient in Sweden who had received medical care in New Delhi, India. Further studies have shown broad dissemination of this β-lactamase gene ($bla_{\text{NDM-1}}$) in India, Pakistan, Bangladesh, and the United Kingdom. The gene has also been identified in other organisms as well, including *Acinetobacter baumannii* and *Pseudomonas aeruginosa*.

In gram-negative bacteria, 2 types of β-lactamases are responsible for resistance to carbapenems: those that use serine as the active site amino acid to inactivate the carbapenem ("serine carbapenemases"), and those that use a Zn^{2+} ion ("metallo β-lactamases" or MBLs). NDM-1 shares very little identity with other metallo-β-lactamases. NDM-1 is particularly problematic because the gene encoding this MBL is located in a very mobile genetic element and the pattern of spread is proving to be more complex and unpredictable than other carbapenemase-producing genes (such as *Klebsiella pneumoniae* carbapenemase (KPC) that is the predominant carbapenemase in the United States). The NDM-1 gene has rapidly moved from India and Pakistan to other countries in Asia as well as Europe, Africa, North America, and Australia.

The presence of NDM-1 in the United States was reported in June 2010[1] and it may only be a matter of time until US hospitals face an outbreak. The challenge is detecting these carbapenemase-producing isolates in the clinical microbiology laboratory as the assays can be complex and time-consuming. Therefore, clinicians must remain vigilant to the possibility of these isolates being present in their institutions, particularly for patients who may have traveled or received medical care in areas with a high prevalence of NDM-1-producing isolates. If an isolate is identified or suspected, appropriate infection control interventions should be implemented.

1. Centers for Disease Control and Prevention. Detection of Enterobacteriaceae isolates carrying metallo-β-lactamase - United States, 2010. *MMWR Morb Mortal Wkly Rep.* 2010;59:750. Full text available at: http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5924a5.htm