

Health Advisory:

Identification of *Enterobacteriaceae* Isolates Carrying a Newly Described Resistance Mechanism, the New Delhi Metallo-Beta-Lactamase (NDM-1)

September 8, 2010

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Health Advisories provide important information for a specific incident or situation, including that impacting neighboring states; may not require immediate action.

Health Guidances contain comprehensive information pertaining to a particular disease or condition, and include recommendations, guidelines, etc. endorsed by DHSS.

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SUBJECT: Identification of *Enterobacteriaceae* Isolates Carrying a Newly Described Resistance Mechanism, the New Delhi Metallo-Beta-Lactamase (NDM-1)

This Health Advisory provides information on the identification of *Enterobacteriaceae* carrying a newly described resistance mechanism, the New Delhi metallo-beta-lactamase (NDM-1). Healthcare providers should be aware of the existence of this form of antibiotic resistance, monitor for its occurrence, use proper infection control guidelines to prevent further transmission, and use antibiotics appropriately to prevent further development of resistance.

On June 25, 2010, the Centers for Disease Control and Prevention (CDC) reported that during January-June 2010, three *Enterobacteriaceae* isolates carrying a newly described resistance mechanism, the New Delhi metallo-beta-lactamase (NDM-1), were identified from three states at the CDC antimicrobial susceptibility laboratory (*MMWR* 2010; 59[24]:750). This was the first report of NDM-1 in the U.S., and the first report of metallo-beta-lactamase (MBL) carriage among *Enterobacteriaceae* in the U.S.. These isolates, which include an *Escherichia coli*, *Klebsiella pneumoniae*, and *Enterobacter cloacae*, carry *bla*_{NDM-1}, which confers resistance to all beta-lactam agents except aztreonam (a monobactam antimicrobial); all three isolates were aztreonam resistant, presumably by a different mechanism.

Carbapenem resistance and carbapenemase production conferred by *bla*_{NDM-1} is detected reliably with phenotypic testing methods currently recommended by the Clinical and Laboratory Standards Institute, including disk diffusion testing and the modified Hodge test. Carbapenem resistance in all three of the NDM-1 isolates was detected in the course of routine testing.

In the United Kingdom, where these organisms are increasingly common, carriage of *Enterobacteriaceae* containing *bla*_{NDM-1} has been closely linked to receipt of medical care in India and Pakistan. All three U.S. isolates were from patients who received recent medical care in India.

(On September 2, 2010, CDC reported four additional MBL-producing strains of *Klebsiella* spp. from two states that contain non-NDM1 resistance genes.)

Like the *K. pneumoniae* carbapenemase (KPC)-producing strains of *Enterobacteriaceae* that are common in parts of the U.S., MBL-producing strains are usually resistant to most commonly used antimicrobials, including the carbapenems. Given the importance of *Enterobacteriaceae* in healthcare-associated infections and the extensive antimicrobial resistance found in these strains, carbapenem-resistant *Enterobacteriaceae* (CRE) are an important public health problem. In addition, as *Enterobacteriaceae* are a normal part of human flora, the potential for community-associated CRE infections also exists.

At the same time, it is important to keep in perspective the discovery of this small number of NDM-1 isolates in the U.S. Carbapenem resistance has been a problem in this country for about a decade, and NDM-1 is not the most common mechanism, only the newest. Certain other forms of antibiotic resistance, such as that associated with KPC-producing strains, are currently more problematic than that caused by NDM-1. Also, while resistance

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conferred by NDM-1 (or KPC) makes infections much harder to treat, it does not, by itself, make the infecting organisms more virulent or transmissible. And, very importantly, all forms of antimicrobial resistance should be controllable through proper infection prevention measures and the judicious use of antibiotics. It must always be stressed that the overuse and misuse of antibiotics will create an environment in which microorganisms become resistant.

Current infection control guidance has been issued by CDC and the Healthcare Infection Control Practices Advisory Committee (HICPAC) for CRE (including NDM-1-producing isolates, as well as isolates with a different mechanism of resistance). This guidance emphasizes the importance of recognizing CRE when cultured from clinical specimens, placing patients colonized or infected with these isolates in contact precautions, and in some circumstances, conducting point prevalence surveys or active-surveillance testing among other high-risk patients. Laboratory identification of the carbapenem-resistance mechanism is not necessary to guide treatment or infection control practices, but should instead be used for surveillance and epidemiologic purposes. The complete guidance is available at <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5810a4.htm>; healthcare facilities should ensure that these recommendations are properly implemented.

Clinicians should be aware of the possibility of NDM-1-producing *Enterobacteriaceae* in patients who have received medical care in India and Pakistan, and should specifically inquire about this risk factor when CRE are identified. CDC asks that carbapenem-resistant isolates from patients who have received medical care within 6 months in India or Pakistan be forwarded through state public health laboratories to CDC for further characterization.

Local public health officials should encourage healthcare facilities that identify CRE to follow the CDC/HICPAC guidance for the control of these organisms.

Questions can be directed to Eddie Hedrick at the Missouri Department of Health and Senior Services' Bureau of Communicable Disease Control at 573/882-9881.

General questions about CRE can also be sent by email to cdcinfo@cdc.gov. In addition, questions from public health officials about the appropriate assessment and public health response to CRE in a given jurisdiction, and infection prevention practices to prevent transmission of these organisms, can be sent to CDC's Division of Healthcare Quality Promotion at hip@cdc.gov.

Reference

CDC. Detection of *Enterobacteriaceae* isolates carrying metallo-beta-lactamase — United States, 2010. *MMWR* 2010; 59(24):750.