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## **New Carbapenem-Resistant Enterobacteriaceae Warrant Additional Action by Healthcare Providers**

### **Summary**

Carbapenem-resistant Enterobacteriaceae (CRE) are untreatable or difficult-to-treat multidrug-resistant organisms that are emerging in the United States. Because of increased reports of these multidrug-resistant organisms, CDC is alerting clinicians about the need for additional prevention steps regarding CRE. Key points include:

- While still uncommon, reports of unusual forms of CRE (e.g., New Delhi Metallo- $\beta$ -lactamase and Verona Integron-mediated Metallo- $\beta$ -lactamase) in the United States are increasing. Of the 37 unusual forms of CRE that have been reported in the United States, the last 15 have been reported since July, 2012.
- This increase highlights the need for U.S. healthcare providers to act aggressively to prevent the emergence and spread of these unusual CRE organisms.
- Current [CDC guidance](#) includes key elements of CRE prevention (e.g., use of Contact Precautions) in healthcare settings.
- Because the vast majority of these unusual organisms were isolated from patients who received overnight medical treatment outside of the United States, additional measures described in this HAN advisory are now recommended to be taken when such patients are hospitalized in the United States.

### **Background**

*Klebsiella* species and *Escherichia coli* are examples of Enterobacteriaceae, a family of bacteria that normally live in water, soil, and the human gut. CRE are Enterobacteriaceae that have developed high levels of resistance to antibiotics, including last-resort antibiotics called carbapenems. CRE infections most commonly occur among patients who are receiving antibiotics and significant medical treatment for other conditions.

Although there are a large number of mechanisms that can lead to carbapenem resistance among Enterobacteriaceae, the production of an enzyme that breaks down broad-spectrum carbapenem antibiotics (carbapenemases) has emerged as an important mechanism in the United States over the last decade. Most carbapenemase-producing CRE in the United States produce a carbapenemase called *Klebsiella pneumoniae* carbapenemase, or KPC, which was first reported in 2001 and has been found in many different types of Gram-negative bacteria.

KPC-producing Enterobacteriaceae appear to have spread throughout the United States since 2001 but still remain relatively uncommon in most hospitals. Enterobacteriaceae producing other carbapenemases, such as New Delhi Metallo- $\beta$ -lactamase (NDM) and the Verona Integron-mediated Metallo- $\beta$ -lactamase (VIM), have been very uncommon in the United States but are more common in other parts of the world. Many countries may not be actively looking for CRE; therefore, it is unclear which countries have experienced unusual carbapenemases (e.g., NDM, VIM) and it is difficult to know their overall incidence

at any given time. The vast majority of CRE producing non-KPC carbapenemases reported to CDC were isolated from patients with a history of an overnight stay in a healthcare facility outside the United States.

## Recommendations

CDC continues to recommend that facilities follow the CDC guidance for preventing the spread of CRE in healthcare settings (<http://www.cdc.gov/hai/organisms/cre/cre-toolkit/index.html>). Facilities should:

- Ensure that the patient is on [Contact Precautions](#).
- Reinforce and evaluate adherence to hand hygiene and Contact Precautions for healthcare personnel who come into contact with the patient (e.g., enter the patient's room).
- Since clinical cultures will identify only a minority of patients with CRE, screen epidemiologically linked patient contacts for CRE colonization with stool, rectal, or perirectal cultures. At a minimum, this should include persons with whom the CRE patient shared a room but could also include patients who were treated by the same healthcare personnel. A laboratory-based screening protocol is available here: ([http://www.cdc.gov/HAI/pdfs/labSettings/Klebsiella\\_or\\_Ecoli.pdf](http://www.cdc.gov/HAI/pdfs/labSettings/Klebsiella_or_Ecoli.pdf)).
- Should the patient be transferred to another healthcare facility, ensure that the presence of CRE colonization or infection is communicated to the accepting facility. An example transfer form is available here (<http://www.cdc.gov/HAI/toolkits/InterfacilityTransferCommunicationForm11-2010.pdf>).
- Dedicate rooms and staff to CRE patients when possible. It is preferred that staff caring for CRE patients do not also care for non-CRE patients.
- Remove temporary medical devices as soon as they are no longer needed.

In addition to that guidance, CDC now also recommends the following:

- When a CRE is identified in a patient (infection or colonization) with a history of an overnight stay in a healthcare facility (within the last 6 months) outside the United States, send the isolate to a reference laboratory for confirmatory susceptibility testing and test to determine the carbapenem resistance mechanism; at a minimum, this should include evaluation for KPC and NDM carbapenemases.
- For patients admitted to healthcare facilities in the United States after recently being hospitalized (within the last 6 months) in countries outside the United States, consider each of the following:
  - Perform rectal screening cultures to detect CRE colonization.
  - Place patients on [Contact Precautions](#) while awaiting the results of these screening cultures.

Further information about the prevention of CRE transmission is available in CDC's [CRE toolkit](#) (<http://www.cdc.gov/hai/organisms/cre/cre-toolkit/index.html>).

## DEPARTMENT OF HEALTH AND HUMAN SERVICES

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