

# Carbapenem-Resistant *Enterobacteriaceae* (CRE) Provider FAQ



## What are CRE?

CRE stands for “carbapenem-resistant *Enterobacteriaceae*”. *Enterobacteriaceae* are a family of bacteria found in the gastrointestinal tract that can cause infections both in community and healthcare settings. By definition, CRE are nonsusceptible to at least one carbapenem antibiotic and/or produce an enzyme (carbapenemase) that confers resistance to carbapenems. CRE were uncommon in the United States before 1992, but have spread rapidly throughout the United States since that time.

## How do *Enterobacteriaceae* become resistant to carbapenems?

In 2001, a *K. pneumoniae* isolate that possessed a novel plasmid-mediated carbapenemase called KPC was recognized in the United States. KPC-producing bacteria have spread widely across the United States. In addition to KPC, there are a number of other plasmid-mediated carbapenemases. All these plasmid-mediated carbapenemases can be rapidly transmitted when introduced into a health facility or community, compromising the utility of standard antibiotic therapy. These carbapenemases are more common outside the United States but have been identified rarely in patients with exposure to healthcare in endemic countries.

## Why are CRE medically important?

- First, CRE are often resistant to multiple classes of antimicrobials substantially limiting treatment options.
- CRE infections are associated with high mortality rates, up to 50% in some studies.
- Many CRE possess carbapenemases which can be transmitted from one *Enterobacteriaceae* to another potentially facilitating transmission of resistance.
- *Enterobacteriaceae* are a common cause of infections in both community and healthcare settings.

CRE can have far-reaching impact when endemic transmission is established in a facility or community.

## What is the difference between CRE colonization and infection?

When found in a clinical culture, CRE can represent either infection or colonization. Colonization means that the organism can be found on the body but it is not causing any symptoms or disease. Colonizing CRE strains can progress to cause infections if they gain access to usually sterile sites like the bladder, the lungs, or the bloodstream. Infections are usually associated with site-specific signs and symptoms (e.g., fever, cough and pneumonia in the lungs; fever and dysuria in the bladder; fever and chills in the bloodstream; etc.). CRE colonization does NOT require antibiotic therapy, but CRE-colonized patients can still spread infection. Both CRE-colonized and CRE-infected patients should be isolated using contact precautions when they are admitted to hospital.

## Division of Infectious Disease Epidemiology

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## **Which patients are at increased risk for CRE acquisition?**

The main risk factors for CRE acquisition in the United States include exposure to healthcare and exposure to antimicrobials. Poor functional status, residence in long term care, intensive care unit admission, and mechanical ventilation are all risk factors for CRE. Antimicrobials associated with CRE acquisition include carbapenems, cephalosporins, fluoroquinolones, and vancomycin.

## **What can clinicians do to prevent CRE transmission?**

You can help by recognizing cases and notifying your infection preventionist; modeling compliance with Contact Precautions for patients colonized or infected with CRE, and using medical devices and antimicrobials wisely. Specific detailed recommendations on preventing CRE transmission in healthcare settings can be found in the [2012 CRE Toolkit](#). Hospital and LTCF recommendations are summarized here: <http://www.cdc.gov/hai/organisms/cre/cre-toolkit/f-level-prevention-supmeasures.html#facility-summary> while outpatient setting recommendations can be found here: [http://www.cdc.gov/hai/pdfs/guidelines/Ambulatory-Care+Checklist\\_508\\_11\\_2015.pdf](http://www.cdc.gov/hai/pdfs/guidelines/Ambulatory-Care+Checklist_508_11_2015.pdf)

## **What infections do CRE cause?**

Most commonly, urinary tract infections, bloodstream infections, ventilator-associated pneumonia, and intra-abdominal abscesses. The case fatality rate from CRE bloodstream infections is roughly 50%.

## **How are CRE transmitted?**

In healthcare settings, CRE are transmitted from person to person often via the hands of healthcare personnel or via contaminated medical equipment. Ensuring the use of personal protective equipment during and good hand hygiene following exposure to the patient's immediate environment, especially when cleaning up stool or changing wound dressings, is very important. The role of transmission directly from the environment to patients is controversial and requires further investigation.

## **When can Contact Precautions be discontinued for patients colonized or infected with CRE?**

Patients can be colonized for long periods of time (e.g., months). Hospitals and other healthcare facilities should establish written policies based on CDC guidelines and enforce those policies for all health personnel who work in the facility.

References: <http://www.cdc.gov/hai/organisms/cre/cre-clinicianFAQ.html>

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