

CRE Carbapenem-resistant Enterobacterales

An Urgent Public Health Threat 

Information for Facilities

Carbapenem-Resistant Enterobacterales (CRE)

Enterobacterales is an order of gram-negative bacteria that includes some organisms commonly identified in clinical microbiology laboratories, like *Escherichia coli* and *Klebsiella pneumoniae*.

Carbapenems are last-line antibiotics used to treat serious multidrug-resistant infections. In the United States, about 2-3% of Enterobacterales associated with healthcare-associated infections are resistant to carbapenems.

CRE infections **don't respond to common antibiotics** and invasive infections are associated with high mortality rates. Some CRE are resistant to all available antibiotics.

Carbapenemase-Producing CRE

A subset of CRE, called **carbapenemase-producing CRE**, are primarily responsible for the rapid global spread of CRE, including in U.S. healthcare settings. Carbapenemases are enzymes that inactivate carbapenems and other β -lactam antibiotics. Carbapenemase-producing CRE can share the genetic code for carbapenemases with other bacteria, rapidly spreading resistance.

COMMON ENTEROBACTEREALES SPECIES:

- *Escherichia coli*
- *Klebsiella pneumoniae*
- *Enterobacter cloacae*
- *Citrobacter freundii*
- *Serratia marcescens*

CARBAPENEMASES MOST COMMONLY IDENTIFIED U.S. CRE

- KPC
- OXA-48-type
- NDM
- IMP
- VIM



How is CRE Transmitted?

CRE spreads through direct or indirect contact with patients infected or colonized with CRE or contaminated environment and surfaces. In healthcare, transmission is usually person to person, and CRE is often carried on the hands of health care personnel or on contaminated shared medical equipment (e.g., portable X-ray machines). Some environmental sources, such as sink drains and toilets, can be important reservoirs contributing to CRE transmission.

Who is at risk?

Hospital patients and long-term care facility residents, especially those who

- Receive complex medical care, including intensive care unit admission or having invasive devices
- Have taken certain antibiotics
- Need help with activities like toileting, bathing, and dressing

Anyone who had medical procedures or was admitted to a hospital outside the United States in the past 6 months.



Colonization

Colonization means that an organism is found in or on the body, but it is not causing any symptoms or disease. CRE primarily colonizes the digestive tract, but can also colonize other body sites. Patients may remain colonized with CRE for months to years.

Why is colonization important?

Infections represent only a fraction of the burden of CRE. Many more patients are colonized. Patients colonized with CRE can be a source of spread to other patients. They are also at higher risk of developing CRE infection than patients who are not colonized. Because patients colonized with CRE don't have signs or symptoms of illness, CRE colonization can go undetected and contribute to silent spread of resistant bacteria.

How can we identify colonized patients to stop spread?

Screening tests identify patients colonized with carbapenemase-producing CRE to prevent transmission to other patients through targeted interventions, like Transmission-Based Precautions. **Screening tests for patients and residents at risk of CRE colonization are available at no cost through CDC's Antimicrobial Resistance (AR) Lab Network.**

How Your Facility Can Prevent the Spread of CRE



Timely and Accurate Identification of Patients with CRE

- Ensure your clinical laboratory can identify CRE.
- Ask your health department about the availability of specialized testing through CDC's AR Lab Network to identify carbapenemase-producing CRE from clinical cultures and to screen for CRE colonization.
- Follow public health recommendations for CRE colonization screening.
- When transferring a patient colonized or infected with CRE, notify accepting facilities and units of the patient's CRE history.
- Work with your health department to understand local CRE epidemiology.



Perform Hand Hygiene

- Clean your hands immediately before touching a patient, before performing an aseptic task (e.g., placing an indwelling device), before handling invasive medical devices, and before moving from work on a soiled body site to a clean body site on the same patient.
- Clean your hands after touching a patient or the patient's immediate environment; after contact with blood, body fluids, or contaminated surfaces; and immediately after glove removal.

Did you know?

Alcohol-based hand sanitizers are the preferred method for cleaning your hands in most clinical situations.

Wash your hands with soap and water whenever they are visibly dirty, before eating, and after using the restroom.



Wear Gown & Gloves When Caring for Patients with CRE

CRE can contaminate your hands and clothes while you care for a patient with CRE or work in their environment. This puts the patients who you care for afterward at risk of getting CRE.

- Protect your patients by wearing a gown and gloves for patient care according to the guidelines for your setting (i.e., Contact Precautions in acute care, Enhanced Barrier Precautions in long-term care).
- Don and doff your personal protective equipment (PPE) in the right order and take care not to self-contaminate during doffing.
- Always change your PPE between patients or residents.



Clean and Disinfect the Patient Environment and Medical Equipment

- Follow your facility's cleaning and disinfection protocols.
- Ensure high-touch surfaces (e.g., bed rails, light switches, call buttons) are cleaned frequently.
- Dedicate non-critical medical equipment (e.g., stethoscopes, blood pressure cuffs) to CRE patients whenever possible and always clean and disinfect between patients.
- Ensure shared medical equipment (e.g., portable X-ray machine) is cleaned and disinfected between each patient.



Prevent Transmission from Sinks, Toilets, and Other Wastewater Plumbing

CRE can contaminate wastewater plumbing, especially sink drains, toilets, and hoppers. Splashes from these sources are associated with outbreaks of carbapenemase-producing organisms.

- Clean and disinfect countertops, handles, faucets, and sink basins at least daily.
- Keep patient care items at least three feet away from sinks, toilets, and hoppers.
- Do not discard patient waste in sinks.
- Avoid discarding beverages or other sources of nutrients in sinks or toilets.

Resources

Learn more about CRE: www.cdc.gov/hai/organisms/cre/index.html

Contact your HAI Prevention Program: www.cdc.gov/hai/state-based/index.html

Preventing water-associated infections: www.cdc.gov/hai/prevent/environment/water.html

About CDC's AR Lab Network: www.cdc.gov/drugresistance/ar-lab-networks/domestic.html

Track carbapenemase-producing CRE: <https://arpsp.cdc.gov/profile/arln/cre>



**U.S. Department of
Health and Human Services**
Centers for Disease
Control and Prevention