



HEALTH ADVISORY CARBAPENEM RESISTANT ENTEROBACTERIACEAE (CRE)

May 22, 2015

SITUATION:

Carbapenem-Resistant Enterobacteriaceae (CRE) are untreatable or difficult to treat multidrug-resistant organisms that have developed high levels of resistance to carbapenems, a class of antibiotics that includes doripenem, ertapenem, imipenem and meropenem. Risk factors for CRE colonization or infection include open wounds, presence of indwelling devices including endotracheal tubes, multiple co-morbidities, and high antimicrobial use. Long-term acute care (LTAC) hospitals have the greatest prevalence of patients with CRE-colonization or infection as a result of receiving and caring for patients who have many CRE risk factors and a history of lengthy hospitalizations.

Multiple clusters and outbreaks of CRE have been increasingly recognized in recent years in Northern California acute and long-term care facilities, including facilities in Alameda County. CRE are highly transmissible in healthcare settings and both infected and colonized patients can serve as reservoirs for transmission. **Early recognition and prompt implementation of infection control precautions are critical to control the spread of CRE in our region.**

ACTIONS REQUESTED OF CLINICIANS:

1. **CONSIDER TESTING for CRE colonization** on admission for patients with CRE risk factors, including admission from LTAC hospitals. Implement pre-emptive contact precautions until admission screening cultures return negative.
2. **When TESTING** for CRE colonization, collect a rectal swab for screening CRE culture.
3. **ISOLATE and implement standard and contact precautions** for persons with suspected or confirmed CRE infection or colonization based on patient CRE risk factors and/or antimicrobial susceptibility test results. If unable to place patient in a private room, call Alameda County Public Health Department (ACPHD) Acute Communicable Disease (ACD) at 510-267-3250 for guidance regarding cohorting.
4. **NOTIFY** your facility Infection Preventionist promptly of suspected or confirmed CRE cases, per facility protocols.
5. **ENSURE and EVALUATE** adherence to hand hygiene, contact precautions and environmental control measures.
6. **REPORT** CRE infection or colonization within 1 business day of identification to ACPHD. Fax documents requested below to ACD at (510) 268-2111.

COMMUNICATE CRE infection or colonization status for patients being discharged from your facility. Complete an inter-facility transfer form (<http://www.acphd.org/cre.aspx>); fax to the receiving facility and ACD (510-268-2111).

Clinical Presentation

CRE can cause a variety of infections in the bloodstream, urinary tract, abdomen, or surgical sites; they can also cause ventilator-associated pneumonia. Persons who are colonized with CRE may be asymptomatic but require infection control precautions in healthcare settings to prevent environmental contamination and spread to vulnerable patients.

CRE Transmission

Transmission occurs through direct contact with body fluids (especially stool) or tissues, or by skin contact. CRE is commonly spread by the hands of health care workers who have not performed adequate hand hygiene. Fomite transmission may occur if healthcare equipment and environmental surfaces are contaminated and not adequately cleaned.

Infection Control

Place CRE infected and colonized patients in private rooms with contact precautions. Ensure adherence to precautions and hand hygiene. Thorough, frequent cleaning of high-touch surfaces in the room (e.g., bed, bed rails, handles, tables, faucets) and both daily and terminal room cleaning should be performed using an EPA-approved disinfectant. Educate affected staff, visitors, and patients about CRE and notify pertinent clinician groups about the presence of CRE in the facility. Encourage treating clinicians to limit antibiotic exposure and the use of invasive devices. For detailed guidance, see:

- ACPHD CRE packet for long-term care facilities and home health agencies (<http://www.acphd.org/cre.aspx>)
- CDC 2012 CRE Toolkit (http://www.cdc.gov/hai/organisms/cre/cre-toolkit/index.html?s_cid=fb2214)



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- 2013 Oregon CRE Toolkit (http://public.health.oregon.gov/DiseasesConditions/DiseasesAZ/CRE/Documents/cre_toolkit.pdf)

Reference Laboratory Testing for CRE Cases

CRE that produce carbapenemases that directly inactivate carbapenem antibiotics have been largely responsible for the rapid global spread of CRE. These carbapenemase-producing CRE (CP-CRE) spread quickly because the genes encoding for carbapenemases can be exchanged within and between bacterial species. Globally significant carbapenemases include *Klebsiella pneumoniae* carbapenemase (KPC), New Delhi metallo- β -lactamase-type 1 (NDM-1), Verona integron encoded metallo- β -lactamase (VIM), imipenemase metallo- β -lactamase (IMP) and oxacillinase-48 (OXA-48). KPC is currently the most common carbapenemase in the US. Carbapenemase testing can guide patient management since CP-CRE patients require the most aggressive infection control measures. Some commercial labs offer PCR testing for CP-CRE genes, especially KPC and NDM-1. If a cluster or outbreak is detected, characterization by PCR testing for CP-CRE, as well as Pulsed-Field Gel Electrophoresis (PFGE) may be available from the Centers for Disease Control and Prevention (CDC), with public health consultation and approval.

Testing Contacts to CRE Patients

CRE patients who are not immediately recognized, isolated and placed in contact precautions may have exposed other patients. Examples of health care-associated exposures include sharing a room or bathroom with a CRE case, or sharing health care personnel with a CRE case before contact precautions were implemented. Consider performing surveillance screening cultures (from a rectal swab specimen) on patients who were exposed to CRE due to a delay or lapse in institution of infection prevention precautions (i.e. roommates, patients with shared healthcare personnel), or when multiple patients with previously unrecognized CRE are identified in a facility suggesting transmission has occurred. Please call ACPHD ACD for consultation at (510)267-3250.

Specimen Collection for Screening Cultures

Consult with your facility's clinical laboratory. In general, premoisten a sterile culture swab in bacterial culture media (such as Modified Cary Blair or Amies) in the accompanying culturette tube. Insert moistened tip of swab into the anal canal and turn 2-3 times. Replace swab in culturette tube and secure top. **Make sure to note the type of culture as "screening"**. Ideally, specimens should be plated within 4 hours of collection. If significant delay is anticipated, swabs may be stored at 4°C for up to 3 days.

Reporting

For ACPHD reporting, CRE is defined as:

- Any *Klebsiella* spp., *E. coli*, or *Enterobacter* spp. **resistant to any** of the carbapenems (minimum inhibitory concentrations of ≥ 4 mcg/ml for meropenem, imipenem, and doripenem or ≥ 2 mcg/ml for ertapenem) OR
- Any *Klebsiella* spp., *E. coli*, or *Enterobacter* spp. with demonstrated production of a carbapenemase (i.e., KPC, NDM, VIM, IMP, OXA-48) by a recognized test (e.g., PCR, metallo- β -lactamase test, modified-Hodge test, Carba-NP)

Health care providers and laboratories are asked to fax the following information to the ACPHD ACD at (510) 268-2111 **within 1 business day** of CRE identification:

- Confidential Morbidity Report (<http://www.acphd.org/media/127468/cdph110a.pdf>)
- Results of bacterial cultures, antimicrobial susceptibility testing, and carbapenemase mechanism testing (if done).

Inter-facility Communication

A California Department of Public Health (CDPH) inter-facility infection control transfer form should be completed and sent in advance to a facility that will be receiving a patient who is infected or colonized with CRE. The form is available at <http://www.cdph.ca.gov/programs/hai/Documents/InterfacilityTransferAcuteLTC091313V10.pdf>. Completed forms for CRE patients should be faxed to ACD at (510) 268-2111 prior to discharge.