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## Caring for Patients with Carbapenem-resistant Enterobacteriaceae (CRE) in Long-Term Care Facilities COVER SHEET

Thank you for reporting the CRE case(s) at your facility. The recommendations in this packet should be implemented immediately for any patient with a current or past infection or colonization with Carbapenem-resistant Enterobacteriaceae (CRE). This guidance is being provided under the direction of the Alameda County Health Officer, as a supplement to recommendations made by the California State Department of Public Health (CDPH) and the Centers for Disease Control and Prevention (CDC).

To:  
Email:  
Fax:

Date:  
From:  
Email: [AcuteCD@acgov.org](mailto:AcuteCD@acgov.org)

Patient Name:  
Patient DOB:

### CRE organism species:

Is this a Carbapenemase producing CRE (CP-CRE):  Yes\*  No\*\*  Unknown

\*CP-CRE: Any *Enterobacteriaceae* that is resistant to Carbapenem antibiotics AND produces carbapenemase (or is suspected of producing carbapenemase). Assume any CRE *Klebsiella pneumoniae* is CP-CRE until proven otherwise by laboratory testing.  
\*\*non-CP-CRE: Any *Enterobacteriaceae* that is resistant to Carbapenem antibiotics and tests negative for the production of carbapenemases or the presence of carbapenemase genes.

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Note: Privacy Rule (HIPAA) permits covered entities to disclose PHI without authorization to public health authorities or other entities who are legally authorized to receive such reports for the purpose of preventing or controlling disease. This includes the reporting of disease, conducting public surveillance, investigations, or interventions.



Dear Infection Control Designee,

You are receiving this packet because you have reported:

- a patient with a positive admission screening culture for CRE, OR
- a patient newly identified with a positive surveillance screening or clinical culture for CRE during hospitalization, OR
- receipt of a patient with a previously identified CRE infection or colonization

Carbapenem-resistant Enterobacteriaceae (CRE) are a group of bacteria that are resistant to carbapenem antibiotics and nearly all available antibiotics. CRE are easily transmitted between infected or colonized patients via hands of health care workers and contaminated equipment or environments. CRE that produce carbapenemases, enzymes that rapidly destroy carbapenem antibiotics, are of special concern. The organisms, known as Carbapenemase-producing CRE (CP CRE), can rapidly spread their drug resistance genes in health care settings.

CRE has been increasingly recognized and detected in Alameda County and the San Francisco (SF) Bay Area, with cases, clusters, and outbreaks being reported in health care settings and the community. In effort to reduce the spread of CRE, on June 15<sup>th</sup>, 2017, the Alameda County Public Health Department (ACPHD) issued a health office order requiring health care providers and laboratories to report all CRE cases and positive laboratory results for CRE defined as *E. coli*, *Klebsiella* species, and *Enterobacter* species that are:

- resistant to any carbapenem antimicrobial, with a MIC of  $\geq 4$   $\mu\text{g/ml}$  for doripenem, imipenem, or meropenem; or  $\geq 2$   $\mu\text{g/ml}$  for ertapenem; OR
- documented to produce a carbapenemase, demonstrated using a CDC-accepted test (modified Hodge, Carba-NP, metallo- $\beta$ -lactamase); OR
- demonstrated to possess a carbapenemase gene (such as KPC, NDM, VIM, IMP, OXA-48-type) using a CDC-accepted test (PCR, Whole Genome Sequencing)

ACPHD is committed to providing guidance and recommendations, facilitating interfacility communications and supporting our healthcare partners to promote safe patient care.

Infection control designees can help reduce the spread of CRE by ensuring that their facility has policies and protocols in place to enable implementation of proper infection control measures, intra/inter-facility communications, and reporting of CRE cases ACPHD

In addition to ensuring that patient care practices are consistent with internal policies and protocols, ACPHD strongly urges Enter Facility Name to implement the recommendations contained in this packet.

Respectfully,

Acute Communicable Diseases Team  
Alameda County Public Health Department

Use the following **CRE Transmission Risk Assessment Questions** to assess the current risk factors of your patient with a current infection/colonization or history of infection/colonization with CRE. Factors that affect the risk of transmitting CRE to others can change frequently in the long-term care environment, therefore these questions/factors should be frequently reassessed. <sup>[a]</sup>

<b>CRE Transmission Risk Assessment Questions:</b>	<b>Reassess frequently [a]</b>	
Is this patient <b>ventilator dependent</b> ?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Is this patient <b>highly or totally dependent on staff for ADLs</b> ?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Is this patient <b>incontinent AND stool and/or urine cannot be reliably contained</b> ?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Does this patient have <b>indwelling medical devices</b> such as tracheostomy tube, urinary catheter, feeding tube, surgical drains, etc.?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Does this patient have <b>draining wounds or other secretions</b> that cannot be reliably contained?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Is this patient <b>cognitively unable to maintain personal hygiene</b> ?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
<b>If YES to ANY of the above, your patient is considered High Risk for spreading CRE to others</b>		

Based upon your patient’s current risk factors for transmission, and the type of CRE organism identified (CRE vs CP-CRE), implement the following infection control measures to prevent transmission of CRE at your facility. **There is an in-depth explanatory statement for each measure following the table.** Contact the Alameda County Acute Communicable Disease Section with any questions by emailing [AcuteCD@acgov.org](mailto:AcuteCD@acgov.org) or by calling 510-267-3250. **Please provide the patient’s name and DOB when calling.**

	<b>RISK FOR SPREADING CRE (based on questions above)</b>			
	<b>High Risk</b>		<b>Not High Risk</b>	
<b>Recommended Infection Control Measures</b>	<b>CP-CRE*</b>	<b>Non-CP-CRE**</b>	<b>CP-CRE*</b>	<b>Non-CP-CRE**</b>
Frequently reassess patients with a history of CRE using the CRE Transmission Risk Assessment Questions listed above <sup>[a]</sup>	Yes	Yes	Yes	Yes
Ensure hand hygiene <sup>[b]</sup>	Yes	Yes	Yes	Yes
Standard precautions <sup>[c]</sup>	Yes	Yes	Yes	Yes
Enhanced Standard Precautions <sup>[d]</sup>	N/A	N/A	Yes	Yes
Contact precautions <sup>[e]</sup>	Yes	Yes	N/A	N/A
Door signage <sup>[f]</sup>	Yes	Yes	Yes	Yes
Private room for patient <sup>[g]</sup>	Yes <sup>[g]</sup>	Yes, if possible <sup>[g]</sup>	Yes, if possible <sup>[g]</sup>	No <sup>[g]</sup>
If >1 patient and no private room available, cohort patient <sup>[h]</sup>	Always consult ACPHD and CDPH HAI Program before cohorting <sup>[h]</sup>		Consider <sup>[h]</sup>	Consider <sup>[h]</sup>
Restrict patient to room <sup>[i,d]</sup>	Consider <sup>[i]</sup>		See ESP guidance <sup>[i,d]</sup>	
If >1 patient, cohort staff <sup>[j]</sup>	Yes <sup>[j]</sup>	Yes <sup>[j]</sup>	Consider <sup>[j]</sup>	Consider <sup>[j]</sup>
Cluster care of CRE patients at end of shift if able to do so without compromising patient safety <sup>[k]</sup>	Yes	Yes	Yes	Yes
<b>Recommendations continue on the next page</b>				

Measures	RISK FOR SPREADING CRE			
	High Risk		Not High Risk	
	CP-CRE*	Non-CP-CRE**	CP-CRE*	Non-CP-CRE**
Enhanced environmental cleaning <sup>[l]</sup>	Yes	Yes	Yes	Yes
Terminally clean room at discharge <sup>[l]</sup>	Yes	Yes	Yes	Yes
Dedicated equipment for patient care items (e.g., glucometer, ventilator, thermometer, BP cuff, stethoscope) <sup>[m]</sup>	Yes	Yes	Yes	Yes
Disinfection between uses of any equipment that cannot be dedicated to CRE patient (e.g., PT parallel bars and gym mats, wheelchair, lift equipment) <sup>[m]</sup>	Yes	Yes	Yes	Yes
Frequently re-evaluate the need for and minimize the use of invasive/indwelling devices <sup>[n]</sup>	Yes	Yes	Yes	Yes
Chlorhexidine bathing of patient <sup>[o]</sup>	Yes	If transmission suspected <sup>[o]</sup>	If transmission suspected <sup>[o]</sup>	No
Repeat testing to determine if “clear” of CRE <sup>[p]</sup>	Not Recommended <sup>[p]</sup>			
Notify receiving facility or agency and the transport company of CRE/MDRO status prior to transferring patient <sup>[q]</sup>	Yes, send the Interfacility Infection Control Transfer Form*** and notify the facility/agency of MDRO status verbally			
Notify Alameda County Public Health when new cases of CRE are identified, and when transferring CRE patient to another facility or discharging to home with home health <sup>[r]</sup>	<b>For new cases:</b> Call (510-267-3250) and fax Confidential Morbidity Report (CMR) to (510) 273-3744 <b>For patient transfers:</b> Fax a copy of the Interfacility Infection Control Transfer Form*** to (510) 273-3744			
<b>Recommendations for visitors</b> <sup>[s]</sup>	See footnote [s]			

\*CP-CRE: Any *Enterobacteriaceae* that is resistant to Carbapenem antibiotics AND produces carbapenemase (or is suspected of producing carbapenemase). Assume any CRE *Klebsiella pneumoniae* is CP-CRE until proven otherwise by laboratory testing.

\*\*non-CP-CRE: Any *Enterobacteriaceae* that is resistant to Carbapenem antibiotics and tests negative for the production of carbapenemases or the presence of carbapenemase genes.

\*\*\*Interfacility Infection Control Transfer Form is available at <http://www.acphd.org/media/500766/acphd-infection-control-transfer-form.pdf>

**A brief explanation of each measure follows.  
If you have any questions, please call 510-267-3250.**

## Explanation of measures:

### a. **Assessing if your patient is High Risk for transmitting CRE to others:**

Patients with the following risk factors are considered higher risk for transmitting CRE to others: ventilator dependence, dependence on staff to perform all or most ADLs, incontinence of stool or urine that cannot be reliably contained, indwelling medical devices including tracheostomy tube, urinary catheter, feeding tube, surgical drains, etc., draining wounds that cannot be reliably contained, and/or cognitive impairment that prevents maintenance of personal hygiene.<sup>1, 3, 15</sup> These risk factors should be regularly reassessed by staff and the presence of risk factors should lead to the implementation of appropriate infection control measures. Patients should be frequently reassessed, using the CRE Transmission Risk Assessment Questions or a similar tool during their time in a facility and any time there is a significant change in the patient's health status.

### b. **Hand Hygiene:**

Proper hand hygiene ensured by ongoing monitoring of adherence remains the single most important measure for preventing CRE transmission.<sup>4-5</sup> Staff should always clean their hands before and after patient care, before donning and after doffing gloves.<sup>2,4</sup> Patients and visitors should also be taught to perform hand hygiene correctly to prevent the spread of infection in the care setting and at home. The CDC recommends the following techniques for effective hand hygiene<sup>2,6</sup>:

- i. **When cleaning your hands with soap and water:** wet your hands first with water, apply soap, and rub your hands together vigorously for at least 15 seconds, covering all surfaces of the hands and fingers. Rinse your hands with water and use disposable towels to dry. Use towel to turn off the faucet.
- ii. **When cleaning your hands with an alcohol-based sanitizer:** Put product on hands and rub hands together, covering all surfaces until hands feel dry. This process should take around 20 seconds.

### c. **Standard Precautions:**

Assume that an infectious agent could be present in any patient's blood or body fluids. Decisions about personal protective equipment (PPE) use are determined by the type of clinical interaction with the patient, the degree of blood and body fluid contact that can be reasonably anticipated and by whether the patient has been placed on isolation precautions.<sup>6</sup> The CDC recommends the following PPE guidelines for Standard Precautions<sup>2-3,6</sup>:

- i. **Gloves** – Use when touching blood, body fluids, secretions, excretions, contaminated items; for touching mucus membranes and non-intact skin
- ii. **Gowns** – Use during procedures and patient care activities when contact of clothing/ exposed skin with blood/body fluids, secretions, or excretions is anticipated
- iii. **Mask and goggles or a face shield** – Use during patient care activities likely to generate splashes or sprays of blood or other body fluids

### d. **Enhanced Standard Precautions:**

For some residents, the risk of transmission can be reduced by infection control measures that are less restrictive than contact precautions. Along with All Facilities Letter 19-22, the Enhanced Standard Precautions for Skilled Nursing Facilities, 2019<sup>15</sup> provides a practical, resident-centered and activity-based approach to implement measures to prevent MDRO transmission in SNFs. Recommendations for the use of gowns and gloves by health care providers should be based on the activities being performed by staff and an assessment of a resident's risk for being colonized and likelihood of transmitting an MDRO. The full guidance is available at <https://www.cdph.ca.gov/Programs/CHCQ/LCP/CDPH%20Document%20Library/Enhanced->

[Standard-Precautions.pdf](#). AFL 19-22 can be accessed at <https://www.calhospital.org/sites/default/files/file-attachments/afl-19-22.pdf>.

e. **Contact Precautions:**

In addition to Standard Precautions, use Contact Precautions when caring for patients known or suspected to have a serious illness easily transmitted by direct patient contact or by indirect contact with items in the patient’s environment. **Contact Precautions consist of wearing a gown and gloves for all patient contact and contact with environmental surfaces in the patient’s room.**<sup>2-3,6-7</sup> A surgical mask and goggles or face shield are also appropriate if contact with bodily fluids is anticipated. PPE should be readily available immediately outside the patient’s room.

f. **Door Signage:**

A noticeable, easy to read sign should be placed on the outer threshold of the door for a patient who is on contact or any other type of precaution. The sign should outline the appropriate Personal Protective Equipment (PPE) needed for healthcare providers and visitors.

g. **Private Rooms:**

Patients with CRE should be placed in private rooms, especially patients with CP-CRE and patients with non-CP CRE who are at high risk of transmitting this infection to others.<sup>8-9</sup> If the number of single patient rooms is limited, consult the “Patient Cohorting” section [h] below.

h. **Patient Cohorting:**

If private rooms are unavailable, it may be necessary to cohort patients based on the CRE organism of each patient, the presence or absence of carbapenemase genes (CP-CRE), any other MDRO infections, risk factors for transmitting CRE and other MDROs, risk factors for acquiring CRE or other MDROs, and the ability to cohort staff for patient care.<sup>1-3, 8-9</sup> **These decisions can be very complex and improper cohorting can put other patients at increased risk of infection with CRE.** Staff should confer with their ID physician and may consult with the CDPH HAI Program ([HAIProgram@cdph.ca.gov](mailto:HAIProgram@cdph.ca.gov) or 510-412-6060) whenever assistance is needed to make a cohorting decision.

i. **Restricting movement outside of rooms:**

Patients with a current assessment that they are at low risk for transmitting CRE to others (“no” to all **CRE Transmission Risk Assessment** questions), do not need to be confined to their rooms. However, patient care that is high risk for contaminating the environment or staff should be done in the patient’s room with appropriate PPE for the activity. Further guidance, including examples can be found in the Enhanced Standard Precautions for Skilled Nursing Facilities (SNF), 2019 document (see footnote [d]).

For patients with current risk factors that increase the likelihood of transmission (“yes” to *any* of the **CRE Transmission Risk Assessment** questions) the facility should strongly consider limiting patient movement outside of their room to limit these risks. In addition, it is *essential* that high risk activities such as wound care or manipulating devices, must be done in the patient’s room with strict implementation of standard and contact precautions.

Examples of minimizing the risk of CRE transmission include: dressing the patient in clean, freshly laundered clothing prior to leaving the room; ensuring the patient thoroughly washes their hands with soap and water prior to leaving the room and maintains hand hygiene while outside the room; promptly disinfecting surfaces that the patient comes in contact with (hand rails, wheel chairs, table tops, medical devices or equipment, etc.); containing body fluids (wounds, secretions, incontinence) while the patient is outside their

room; providing sitters to monitor patient behavior and to take corrective action to prevent transmission as needed. If your facility has questions regarding these recommendations after reading this packet, please email your inquiries to [AcuteCD@acgov.org](mailto:AcuteCD@acgov.org) and we can provide you with additional clarification.

j. **Staff Cohorting:**

Cohort nursing staff that care for patients with CP-CRE as resources allow.<sup>1-3, 9-8</sup> This is most important and more feasible in facilities with  $\geq 2$  patients with CP-CRE. Nursing ratios as low as 1:1 have been key to preventing further transmission in several outbreaks.<sup>8</sup>

k. **Clustered Care:**

Care by specialty staff such as Physical Therapy, Occupational Therapy, or Wound Care should be clustered at the end of the staff's shift whenever possible. This limits cross contamination if there is a breakdown in Contact Precautions or other infection control measures. Care should never be delayed or postponed if doing so will compromise patient safety or care.

l. **Environmental Cleaning:** Ensure that rooms of patients on Contact Precautions are prioritized for frequent cleaning and disinfection (e.g., multiple times per day and at least once per shift). Consideration should be given to providing and keeping disinfectant wipes in the room so that bedside staff can clean and disinfect when environmental service staff are not available.

- i. **Enhanced Environmental Cleaning:** Alert housekeeping and monitor environmental cleaning of the room of a patient with CRE. Encourage frequent thorough cleaning of high-touch surfaces (i.e. light switches, door handles, bed rails, overbed table, bedside commode, call button, fixtures and surfaces in patient's bathroom, cables/cords, etc.), particularly those near the patient, and common areas outside the room. Ensure housekeeping is properly using an EPA-registered disinfectant labeled for use in health care settings.<sup>8,10-12</sup>
- ii. **Terminal Cleaning:** Evaluate terminal cleaning using visual inspection plus quantitative strategies such as UV fluorescence marker or ATP monitor before placing another patient in that room. The CDC environmental cleaning monitoring tool is available at: <https://www.cdc.gov/hai/pdfs/toolkits/Environmental-Cleaning-Checklist-10-6-2010.pdf>
- iii. **Equipment Cleaning:** Transmission of many healthcare acquired pathogens (HAPs) is related to contamination of near-patient surfaces and equipment. Facilities are encouraged to develop programs to optimize the thoroughness of cleaning reusable medical equipment (e.g., infusion pumps, walkers, and call light buttons). Special consideration should be given to ensure all surfaces and reusable parts are sufficiently cleaned and disinfected with an approved cleaning solution/product.<sup>10-11</sup>

m. **Dedicated patient care items:**

Use patient-dedicated equipment for care of patients with CRE (e.g., glucometer, ventilator, thermometer, BP cuff, stethoscope). If common use of equipment for multiple patients is unavoidable, clean and disinfect such equipment before leaving the resident's room and before use on another patient (e.g., PT parallel bars and gym mats, wheelchair, lift equipment).<sup>2, 5-6,11</sup> Additionally, limit disposable supplies (i.e. gauze, tape, alcohol swabs, lancets) in the patient's room to essential items. Do not return unused supplies from a patient's room to community supplies/stockroom.<sup>12</sup>

n. **Minimizing the use of invasive devices:**

Invasive devices such as indwelling urinary catheters, central venous catheters, and endotracheal tubes pose a significant risk for the development of Healthcare-Associated Infections (HAIs). The need for these devices

should be assessed daily and discontinued as soon as possible. <sup>2, 8</sup>

**o. Chlorhexidine (CHG) Bathing:**

Chlorhexidine bathing with 2% Chlorhexidine or 2% Chlorhexidine impregnated wipes may be used to bathe patients daily while in high risk settings or when at high risk for transmission. Also, consider unit-wide CHG bathing, particularly if >1 CRE patient in a section/ward is identified. <sup>2,8</sup> CHG bathing reduces CRE skin contamination and has been a component of several successful CRE care bundles. <sup>8</sup>

**p. Repeat testing:**

Repeated bacterial cultures to demonstrate CRE clearance are not recommended. CRE can be shed intermittently and patients may be colonized with CRE for an indefinite amount of time. Efforts to “clear” CRE patients may lead to transmission in the future and are discouraged by ACPHD and CDPH. <sup>1</sup>

**q. Interfacility Transfers:**

Inform the receiving facility, transport vehicle personnel, and ACPHD in advance about patient’s CRE and contact precaution status. We recommend using the [Interfacility Infection Control Transfer Form](http://www.acphd.org/media/500766/acphd-infection-control-transfer-form.pdf) (<http://www.acphd.org/media/500766/acphd-infection-control-transfer-form.pdf>) and informing ACPHD Communicable Disease unit by phone at 510-267-3250 *prior* to transfer. <sup>1,8,13</sup> Document CRE status on the transfer form & ensure that the transporting agency and receiving facility are aware of the patient’s condition. Ensure wounds, stool, and urine are adequately contained, the patient performs hand hygiene prior to transport, and the patient is in freshly laundered clothes/gown that have not been stored in the patient’s room. <sup>2,8,12</sup>

**r. Public Health notification:**

CRE is a reportable condition in Alameda County. Cases *must* be reported to the Alameda County Public Health Department within **1 business day** of lab results. Notify the Acute Communicable Diseases Section of the Alameda County Public Health Department by phone at 510-267-3250 and fax lab reports to 510-273-3744. <sup>13</sup>

**s. Visitors:**

Visitors should adhere to all infection control procedures implemented by the facility, including donning PPE when indicated. Visitors should also wash their hands thoroughly after visiting the patient, avoid eating and drinking in the patient’s room and avoid visiting if they are feeling ill. <sup>14</sup> Please educate patients and their families about their role in protecting other patients from infection.

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## Links to Additional Resources

- Alameda County CRE Health Officer Order: <http://www.acphd.org/media/464182/health-officer-order-reporting-cre-20170613.pdf>
- CDC Hand Hygiene Resources: <http://www.cdc.gov/handhygiene/>
- Guideline for Disinfection and Sterilization in Healthcare Facilities, 2008: <https://www.cdc.gov/infectioncontrol/guidelines/disinfection/index.html>
- CDC Environmental Checklist for Monitoring Terminal Cleaning (CDC, 2010) <https://www.cdc.gov/hai/pdfs/toolkits/Environmental-Cleaning-Checklist-10-6-2010.pdf>
- Antimicrobial Stewardship Resources: <http://www.cdc.gov/getsmart/healthcare/pdfs/core-elements.pdf>
- CDPH Enhanced Standard Precautions Guidance (2019): <https://www.cdph.ca.gov/Programs/CHCQ/LCP/CDPH%20Document%20Library/Enhanced-Standard-Precautions.pdf>
- Contact Precaution Resources: <https://www.cdc.gov/mrsa/healthcare/clinicians/precautions.html>,
- CDC CRE in Healthcare Settings website: <http://www.cdc.gov/HAI/organisms/cre/index.html>
- CDC CRE Toolkit: <http://www.cdc.gov/hai/pdfs/cre/CRE-guidance-508.pdf>

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