Recommendations for CRE Infection Prevention and Control in Short and Long-term Acute Care Hospital Settings

***What is Carbapenem-resistant Enterobacteriaceae [ent-ə-rō-ˌbak-ˌtir-ē-ˈā-sē-ˌā] (CRE)?*** CDC has provided the following surveillance definition for CRE. CRE are defined as Enterobacteriaceae that are:

* **Non-susceptible** (i.e., intermediate or resistant)to one of the following carbapenems:doripenem, meropenem, or imipenem AND
* **Resistant** to all of the following third-generation cephalosporins that were tested: ceftriaxone, cefotaxime, and ceftazadime.
* *Klebsiella species, E. coli,* and *Enterobacter species* that meet the CRE definition are a priority for detection and containment in all settings.
* This CRE surveillance definition is based upon the current (M100-S22 2012) Clinical and Laboratory Standards Institute (CLSI) interpretative criteria (breakpoints) for carbapenem susceptibility among Enterobacteriaceae (Appendix A); if the older CLSI breakpoints (pre-dating M100-S20 U) are being used to determine carbapenem susceptibility, consideration should be given to including ertapenem in the CRE definition to increase sensitivity.

**General Measures:**

1. **Educate the clinical staff about CRE**: Consider giving an in-service to staff about CRE and other multidrug-resistant Gram-negative organisms. A sample CRE presentation can be downloaded from the SPICE website (<http://spice.unc.edu> ).
2. **Review you facility’s CRE surveillance definition to determine any differences with the CDC definition above**. Become familiar with the CLSI criteria your microbiology department uses to detect and report CRE, and verify with the laboratory that this method is adequate.
3. **Ensure adequate processes are in place to facilitate rapid notification of clinical and infection prevention staff when CRE is identified in the microbiology laboratory.** (E.g. lab personnel call IP and unit, etc.)
4. **Review microbiology records for the last 12 months** (or since latest review) to identify any previously unrecognized cases of CRE.
5. **If possible, perform screening cultures on unit/ward where CRE positive patients are housed.** Screening is used to identify unrecognized CRE colonization among all patients, or among epidemiologically-linked contacts CRE colonized or infected patients. Generally, this screening ~~has~~ involves stool, rectal, or peri-rectal cultures and sometimes cultures of wounds or urine (if a urinary catheter is present). Patients identified as positive by this surveillance testing should be treated as colonized (i.e., placed on Contact Precautions, etc.)
6. **Promote hand hygiene and monitor hand hygiene adherence.** Hand hygiene is a primary part of preventing multidrug-resistant organism (MDRO) transmission. Facilities should ensure that healthcare personnel are familiar with proper hand hygiene technique as well as its rationale. Efforts should be made to promote staff ownership of hand hygiene using techniques like developing local (e.g., unit) hand hygiene champions. It is not enough to have policies that require hand hygiene; hand hygiene adherence should be monitored and adherence rates should be fed directly back to front line staff. Immediate feedback should be provided to staff that miss opportunities for hand hygiene. In addition, facilities should ensure access to adequate hand hygiene stations (i.e., clean sinks and/or alcohol-based hand rubs) and ensure they are well stocked with supplies (e.g. towels, soap, etc.) and clear of clutter.
7. **Place CRE colonized or infected patients in Contact Precautions.** Empower the nursing (and other) staff to monitor and enforce contact precautions.

* Continue contact precautions for the duration of hospitalization.[[1]](#footnote-1)
* “Flag” the charts of CRE positive patients so that they can be identified and placed in contact precautions immediately if re-admitted.

1. **Place CRE colonized or infection patients in private rooms.** When available, patients colonized or infected with CRE should be housed in single patient rooms and if not available these patients should be cohorted together. In addition, consideration should be given to cohorting patients with CRE in specific areas (e.g., units or wards), even if in single patient rooms, and to using dedicated staff to care for them. Preference for single rooms should be given to patients at highest risk for transmission such as patients with incontinence, medical devices, or wounds with uncontrolled drainage.

Also, **consider cohorting of staff.** This is most important when multiple CRE positive patients are present on the ward/unit at the same time. Cohorting, even down to 1:1, has been successfully employed as part of a comprehensive control strategy in several reports.

1. **Limit the use of devices.** Use of devices (e.g., central venous catheters, endotracheal tubes, urinary catheters) puts patients at risk for device–associated infections and minimizing device use is an important part of the effort to decrease the incidence of all MDRO infections, including CRE. Device use should be reviewed regularly to ensure they are still required and devices should be discontinued promptly when no longer needed.
2. **Antimicrobial Stewardship** is another primary part of MDRO control. As part of an antimicrobial stewardship program designed to minimize transmission of MDROs, facilities should work to ensure that 1) antimicrobials are used for appropriate indications and duration and 2) that the narrowest spectrum antimicrobial that is appropriate for the specific clinical scenario is used.
3. **Optimize environmental cleaning.** Alert Environmental Services or equivalent department to the room number of any CRE-infected or CRE-colonized patient. Encourage thorough cleaning of frequently contacted surfaces in the room, particularly near the patient (e.g., bed, bed rails, table), and outside the room in common areas. Ensure daily and terminal room cleaning is performed using an EPA-registered disinfectant. When resources are available, monitor the thoroughness of the terminal clean (e.g., UV fluorescence marker, ATP bioluminescence monitor) and feedback results to environmental services.
4. **Notify clinicians providing care for CRE colonized or infected patient and any other pertinent clinician groups (i.e., Infectious Diseases, Critical Care, Pharmacy, etc.).** The presence of CRE in the facility may impact empiric antibiotic treatment
5. **Communicate CRE infection or colonization status on transfer to another facility.** Patients colonized or infected with CRE may seek medical care in more than one hospital and serve as a reservoir that can facilitate the spread of CRE from one facility to another. To reduce inter-facility transmission of all MDROs, all facilities should be encouraged to either routinely complete inter-facility transfer forms or call the admitting facility’s Infection Prevention staff whenever a patient is transferred to another facility. This communication should indicate whether the patient has ever been colonized and/or infected with CRE and other MDROs (if available, the dates and results of any relevant clinical and/or surveillance cultures should be provided) and whether the patient has any open wounds and/or indwelling devices. In addition, if the patient is currently being given antimicrobials, information should be included describing why the patient is receiving them and how much longer treatment is required.
6. **Educate CRE colonized or infected patients, family members and visitors about CRE.** CRE are generally not a health risk to well persons; however, patients, family members and visitors can help prevent spread within a facility.

References:

1. CDC Toolkit and website on CRE: <http://www.cdc.gov/hai/organisms/cre/>
2. Oregon state CRE toolkit: <http://public.health.oregon.gov/DiseasesConditions/DiseasesAZ/CRE/Documents/cre_toolkit.pdf>
3. CRE webinar presented by Dr. Catherine Passaretti on July 17, 2013: http://www.spice.unc.edu

1. There is not enough information for a firm recommendation about when to discontinue Contact Precautions among infected patients; however, CRE colonization in some patients identified during CDC investigations has been prolonged (> 6 months). [↑](#footnote-ref-1)