

## Carbapenem-Resistant Enterobacteriaceae (CRE): Information for Long-Term Care Facilities

Prepared by the North Carolina Division of Public Health and the North Carolina Statewide Program for Infection Control and Epidemiology

CRE stands for carbapenem-resistant Enterobacteriaceae. Enterobacteriaceae are a normal part of the gut bacteria; *Klebsiella* species and *Escherichia coli* (*E. coli*) are two common examples. Over the past decade, Enterobacteriaceae that are resistant to carbapenems and many other antibiotics have emerged and spread throughout the United States and globally. This is a very dangerous development, since carbapenem antibiotics (ertapenem, imipenem, meropenem, and doripenem) are often used as the last line of treatment for infections caused by highly resistant bacteria, including those in the Enterobacteriaceae family.

Fortunately, healthy people do not usually get CRE infections. CRE infections most commonly occur in people with exposure to healthcare settings, e.g., hospitals or long-term care facilities.

In North Carolina, CRE are an emerging threat in healthcare facilities across the spectrum (e.g., acute care, long-term acute care, and nursing homes). CRE can spread rapidly within and between these facilities through contact with infected or colonized people, particularly contact with wounds or stool. Individuals at highest risk for acquiring a CRE infection are residents whose care requires devices such as ventilators, urinary catheters, intravenous catheters, or who are on long courses of certain antibiotics.

Infections with CRE are difficult to treat and can be fatal. Unfortunately, some CRE bacteria have become resistant to all available antibiotics. Because of this, early detection and aggressive implementation of infection prevention and control strategies are necessary when CRE are identified among residents in your facility.

The good news is that transmission of CRE can be stopped by careful adherence to basic infection prevention measures. Measures used to control CRE are similar to measures used to control other multi-drug resistant organisms (MDROs), such as methicillin-resistant *Staphylococcus aureus* (MRSA) and vancomycin-resistant enterococci (VRE). The strategies recommended here are intended to protect residents without adversely affecting their quality of life or posing an undue burden for your staff. These recommendations can be adapted for use in any setting; therefore, we strongly discourage facilities from refusing admission to residents solely based on CRE-positive status.

In addition to your facility's infection control policy for management of MDROs, the following infection prevention and control strategies should be considered for the management of residents colonized or infected with CRE. Compliance with the MDRO policy among staff providing care for CRE-positive residents and/or their environment is essential. This policy should include guidance regarding isolation precautions, donning and removing of appropriate PPE, hand hygiene, and environmental cleaning/disinfection.

- 1. Educate the clinical staff about CRE.** Give an in-service to staff about CRE and other multidrug-resistant organisms. A sample CRE presentation can be downloaded from the SPICE website (<http://spice.unc.edu>).
- 2. Ask for laboratory notification of positive CRE results.** Consider a positive CRE result a critical lab value. Ensure adequate processes are in place to facilitate rapid notification of clinical and infection prevention staff when CRE and other MDROs are identified in the microbiology laboratory (e.g., lab personnel call IP and unit, etc.).
- 3. As appropriate, perform screening cultures on units/wards where CRE positive residents are housed.** Screening is useful to identify unrecognized CRE colonization among all residents or among epidemiologically-linked contacts to CRE colonized or infected residents (e.g. roommates or other close contacts). Generally, this screening involves collecting rectal swabs for testing.
- 4. Place CRE colonized or infected residents in private rooms.** When available, residents colonized or infected with CRE should be placed in private rooms. If private rooms are not available, these residents should be cohorted together if possible. Appropriate roommates are those who:
  - Are colonized/infected with CRE (and the same additional MDRO, if present)
  - OR-
  - CRE/MDRO negative
  - Have no invasive devices (indwelling urinary catheters, lines, tracheostomies, or drainage devices)
  - Are not significantly immunocompromised
  - Are continent of urine and feces
  - Have no open wounds (surgical, pressure ulcers, etc.)
- 5. Promote hand hygiene and monitor hand hygiene adherence.** Hand hygiene is a primary intervention for preventing transmission of CRE and other MDROs. Facilities should ensure that healthcare personnel are familiar with proper hand hygiene technique and its rationale. Staff should perform hand hygiene before entering and after leaving the resident's room, regardless of the anticipated resident contact, using

alcohol-based hand rubs (if hands are not visibly soiled) or soap and water. Immediate feedback should be provided to staff that miss opportunities for hand hygiene.

**6. Place CRE colonized or infected residents who are at higher risk for CRE transmission on Contact Precautions<sup>1</sup>.** Components of contact precautions in long-term care settings are not well defined, but at a minimum these should include use of gown and gloves by staff and other individuals when providing direct care in the resident's room. Examples of higher-risk residents include:

- i. Post-acute care residents still debilitated by recent hospitalization.
- ii. Residents who are totally dependent on assistance for activities of daily living (ADLs)
- iii. Ventilator-dependent residents
- iv. Residents with uncontained incontinence of stool
- v. Residents with uncontained incontinence of urine (if site of CRE is urinary)
- vi. Residents with wound drainage that is difficult to control.

**7. Discontinue Contact Precautions** when either of the following criteria are met:

- Resident becomes lower-risk for CRE transmission. Examples of lower-risk residents include<sup>2</sup>:
    - i. Residents who are able to perform hand hygiene, continent of stool, less dependent on staff for ADLs, and without draining wounds
    - ii. Residents whose incontinence or draining wounds can be contained.
- OR-
- Resident has three stool, rectal, or perirectal cultures negative for CRE obtained at least one week apart, with the first obtained  $\geq 3$  months after the most recently documented positive CRE culture.

Note: Colonization with CRE may be prolonged. There are no definitive data regarding the number or timing of negative tests needed to prove that someone is no longer colonized. Decolonization therapy is not generally recommended.

**8. Occupational and physical therapy:** For residents with uncontrolled secretion/excretions (including incontinent residents), all therapy and other rehabilitation treatments should be provided in the resident's room if feasible, and if resident safety and wellbeing is not jeopardized. Therapists and other personnel

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<sup>1</sup> Consult with the person responsible for overseeing your facility's infection control plan and/or SPICE for individual case recommendations when the need for Contact Precautions is uncertain.

<sup>2</sup> Lower-risk residents should continue to be managed with Standard Precautions, including the use of gowns and gloves when contact with colonized/infected sites or body fluids is possible.

providing these services must follow infection prevention measures when in the resident's room, including:

- Performing hand hygiene before and after providing care
- Wearing gowns and gloves
- Using resident-dedicated or single-use non-critical equipment, instruments and devices when possible
- Cleaning devices and equipment following use with an EPA-registered disinfectant.

If therapy cannot be performed in the resident's room, implement the following additional measures:

- Schedule CRE-positive resident for the last therapy session of the day
- Prior to transport, notify therapy staff that resident is on Contact Precautions
- Ensure containment of urine, feces, and wound drainage
- Have resident wear clean clothes (or gown) and perform hand hygiene prior to leaving room
- Have therapist perform hand hygiene immediately before and after providing care

For continent residents and those whose secretions/excretions can be controlled and can reliably perform hand hygiene, therapy and rehabilitation treatments can occur in routine locations. To reduce the risk of transmission to others:

- Have therapists perform hand hygiene immediately before and after providing care
- Have resident wear clean cloths (or gown) and perform hand hygiene prior to leaving room
- Use resident-dedicated or single-use equipment non-critical equipment, instruments, and devices when possible
- Clean devices and equipment immediately after use with an EPA-registered disinfectant

**9. Take reasonable precautions to limit opportunities for transmission in common areas.**

Decisions about participation in social activities and other activities in common areas need to balance the risk of transmission against the potential adverse psychological impact of non-participation. These decisions should be individualized and use the least restrictive approach possible that adequately protects the resident and others. In general, CRE-colonized or -infected residents may use common areas if their secretions/excretions can be controlled. To reduce opportunities for transmission:

- Immediately clean and disinfect any environmental surface or item contaminated with body fluids using an EPA-registered disinfectant.
- Residents should wear clean clothing/gown and perform hand hygiene prior to leaving room
- Residents' wheelchairs or other equipment should be disinfected prior to leaving the room using an EPA-registered disinfectant

**10. Limit the use of devices.** Use of devices (e.g., central venous catheters, endotracheal tubes, urinary catheters) puts residents at risk for device-associated infections. Minimizing device use is important to decrease the incidence of all MDRO infections, including CRE. Device use should be reviewed regularly to ensure use is still justified. Devices should be discontinued promptly when no longer needed.

**11. Develop an antimicrobial stewardship plan.** Antimicrobial stewardship is another primary part of MDRO control. As part of an antimicrobial stewardship program, facilities should work to ensure that 1) infection is documented prior to antibiotic administration and 2) the narrowest spectrum antimicrobial that is appropriate for the specific clinical scenario is used.

**12. Optimize environmental cleaning.** Alert environmental services or housekeeping to the room number of any CRE-infected or CRE-colonized resident. Encourage thorough cleaning of frequently contacted surfaces in the room, particularly near the resident (e.g., bed, bed rails, table) and outside the room in common areas. Ensure daily and terminal room cleaning are performed using an EPA-registered disinfectant. Consider cleaning rooms of CRE-positive residents last (i.e., after completing cleaning of other rooms) if possible.

**13. Communicate CRE infection or colonization status to ancillary service providers and receiving facilities.** Communicate residents' CRE status to ancillary service providers who will be providing direct patient care for CRE-positive residents (either on-site or off-site) and to the receiving healthcare facility upon transfer. If a resident is identified with CRE following transfer to another healthcare facility, the receiving facility should be notified of the results. Admission to the receiving facility should not be denied solely on the basis of CRE status<sup>3</sup>.

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<sup>3</sup> F205 and F206 (§483.12(b)(1-3)) require readmission of residents transferred due to hospitalization or on therapeutic leave, even if a new condition is present that the facility can adequately manage. As such, a nursing facility cannot refuse readmission of a resident solely based on a new diagnosis of CRE, which can be adequately managed using proper infection control and prevention strategies as described in this document.

**14. Educate CRE-colonized or -infected residents and their family members and visitors about hand hygiene and other measures to prevent transmission of CRE.** CRE are generally not a health risk to well persons; however, residents, 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](http://public.health.oregon.gov/DiseasesConditions/DiseasesAZ/CRE/Documents/cre_toolkit.pdf)
3. Minnesota Department of Health recommendations for management of CRE in LTCFs. <http://www.health.state.mn.us/divs/idepc/dtopics/cre/rec.html>
4. CRE webinar presented by Dr. Catherine Passaretti on July 17, 2013:  
<http://www.spice.unc.edu>