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## ***CARBAPENEM-RESISTANT ENTEROBACTERIACEAE (CRE) HEALTHCARE FACILITY LEVEL PREVENTION STRATEGIES***

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**Carbapenem-resistant Enterobacteriaceae (CRE)** include organisms under the Enterobacteriaceae family that are resistant to carbapenems. Antibiotics within the carbapenem class include imipenem, meropenem, ertapenem and doripenem. Enterobacteriaceae commonly found to exhibit significant clinical resistance to carbapenems include *E. coli*, *Klebsiella* and *Enterobacter* species.

CRE are frequently resistant to multiple antibiotic groups, making treatment of CRE infections challenging. Carbapenem resistance may be chromosomal in nature or, acquired through plasmids. Different mechanisms of resistance exist; of these the production of carbapenemases, typically acquired via plasmids, is of great concern due its proclivity to spread, hence the focus on infection prevention. CRE containment is a vital infection prevention activity.

### **Purpose**

These recommendations are intended to provide infection prevention and control guidance for healthcare facilities in the management of patients infected or colonized with CRE.

### **Detection**

Identification of CRE in clinical laboratories is based on antimicrobial susceptibility to carbapenems. Advanced molecular testing can be used to detect the presence of carbapenemase production.

### **Prevention**

At the present time, New Mexico is considered a low CRE prevalence state. Implementation of prevention and control strategies when CRE is detected can help prevent the spread of CRE. Infections caused by CRE are associated with high morbidity and mortality. Early detection and rapid implementation of infection prevention and control measure are effective in reducing the spread of transmission in healthcare settings.

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## ***RECOMMENDATIONS FOR CRE INFECTION CONTROL MEASURES IN HEALTHCARE FACILITIES***

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### ***Inter-facility Communication/Identification of CRE Patient at Admission***

Communication of patient's CRE status is critical upon transfer within different healthcare facilities. The referring facility should verbally communicate the patients' CRE status to the infection control staff at the receiving facility as well as to transport services. In addition, the transfer notes should clearly indicate the patient's CRE status and include laboratory results. The referring facility should ensure the documentation is readily accessible to all parties involved in patient transfer. Admission to the receiving healthcare facility should not be denied based on the CRE status.

### ***Patient Placement***

Patient's with CRE should be placed in a private room under Contact Precautions. If no individual room is available, the patient may be cohorted in

the same room with another patient with CRE. Appropriate roommates are those who:

- Also have CRE
- Do not have an invasive device (such as central line, catheter, etc)
- Are not immunocompromised

### ***Hand Hygiene***

Hand Hygiene is an essential part of preventing disease transmission, especially CRE. Facilities should ensure that healthcare personnel are familiar with proper hand hygiene techniques as well as its rationale. Routine hand hygiene should be performed:

- Before touching a patient, even if gloves will be worn
- Before exiting the patient's care area after touching the patient or the patient's immediate environment

- After contact with blood, body fluids, excretions, or wound dressings
- Before performing an aseptic task such as capillary blood glucose (CBG) testing or giving a subcutaneous injection (must wear gloves)
- If hands move from contaminated body sites to clean body sites during patient care
- After glove removal

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### *Healthcare Personnel Education*

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Healthcare personnel (HCP) who care for patients with CRE should be educated on preventing transmission of this family of bacteria. HCP include, clinical providers, nurses, emergency medical personnel, dental professionals, trainees and students, pharmacists, laboratory personnel, technicians, therapists, dietary and housekeeping personnel, volunteers and administrative staff. The education should include proper use of contact precaution, hand hygiene, personal protective equipment (PPE), and infection control measures.

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### *Personal Protective Equipment (PPE) for Healthcare Personnel Entering Patient's Room*

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PPE should be worn for anticipated contact with body fluids/secretions/excretions as well as contact with the patient's environment. This applies to *all* staff and volunteers who may be exposed.

- **Gloves:** When caring for the patient or patient's environment
  - Remove gloves just before leaving the patient room/area
  - Dispose of gloves in the regular trash and perform hand hygiene immediately
- **Gown:** When extensive contact with the patient or patient's environment is possible (such as cleaning up stool, changing linens, contact with the bed, bed rail, or immediate patient environment)
  - Remove gown just before leaving the patient's room/area

- Place gown in a dirty laundry container or dispose of in regular trash, if appropriate
- Remove gloves after removing the gown and perform hand hygiene
- immediately
- **Surgical Mask:** Mask should be used whenever splashing, or spraying of body fluids is possible

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### *Use of Invasive Devices*

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Minimize the use of invasive devices (e.g., central venous catheters, endotracheal tubes, and urinary catheters). These devices not only put patients at risk for device-associated infections but, may increase the risk of acquiring infections with multi-drug resistant organisms, including CRE. Minimizing device use is an integral part of the effort to decrease the incidence of these infections. Devices should not be placed longer than needed.

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### *Environmental Cleaning and Disinfecting*

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The environment of care may play a role in transmission and should also receive special attention. Cleaning and disinfection of surfaces such as bedrails, bedside commodes, remote controls, telephones, and doorknobs in the patient's room can help reduce bacterial burden and contribute to the reduction of transmission. In addition, CRE has been found in sink drains, raising the possibility that equipment and patient supplies could become contaminated if stored within the splash zone. Surfaces around sinks should be cleaned and disinfected regularly and medical equipment should not be stored near sinks. Use an EPA-registered cleaning/disinfecting product; follow instructions for dilution, application, and contact time. Written, step by step instructions including dilution quantities and contact time can help assure manufacturers recommendations are followed. Patient dedicated equipment and supplies should be utilized when possible. Clean/disinfect re-useable critical and

non-critical equipment should be performed after use and before use by another patient.

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### *Screening Contacts of CRE Patients*

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Screening is used to identify unrecognized CRE colonization as clinical cultures alone will identify only a fraction of all patients with CRE. Generally, this testing has involved stool and sometimes cultures of wounds or urine (if a urinary catheter is present). CRE screening includes screening epidemiologically-linked contacts of newly identified CRE patients and active surveillance cultures.

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### *Active Surveillance*

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Healthcare facilities should be aware of whether CRE has been isolated from patients admitted to their facility. Facilities may consider screening high-risk patients who come from areas where CRE is highly prevalent. Advanced testing to detect absence/presence of carbapenemase

production is a helpful tool. Contact the state HAI coordinator if you need assistance.

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### *Antimicrobial Stewardship*

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Antimicrobial stewardship is an important part of CRE control. Facilities should work to ensure that antimicrobials are used for appropriate indications and duration and that necessary based on laboratory results. Core elements that are included in successful healthcare antimicrobial stewardship programs, including commitment from facility leadership to support antimicrobial stewardship activities, designation of appropriate personnel to lead the program and provide drug expertise, implementation of policies and interventions to support optimal antimicrobial use, tracking and reporting of antimicrobial use and resistance rates, and education on optimal antimicrobial prescribing practices.

### **Additional Online Resources**

CDC's CRE Toolkit: [CDC's CRE Toolkit](#)

NMDOH HAI Program: [NMDOH HAI](#)

### **NMDOH HAI Program Contact**

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