

# Guidance for Preventing Transmission of Carbapenem- Resistant *Enterobacteriaceae* (CRE) in Skilled Nursing Facilities

Wisconsin Division of Public Health  
CRE Toolkit



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## **Guidance for Preventing Transmission of Carbapenem-Resistant *Enterobacteriaceae* (CRE) in Healthcare Settings**

The Wisconsin Division of Public Health (DPH) and the City of Milwaukee Health Department (MHD) initiated a project during 2013 to develop a regional collaborative approach to preventing transmission of CRE among healthcare settings. As part of that project, MHD convened a panel of subject matter experts among acute care hospitals, long-term care hospitals and skilled nursing facilities within its jurisdiction to establish inter-facility communications and consistent CRE prevention practices.

This document contains the expert panel recommendations, which are based on the Centers for Disease Control and Prevention, "Facility Guidance for Control of Carbapenem-Resistant *Enterobacteriaceae* (CRE) – November 2015 Update CRE Toolkit." Healthcare settings covered by these recommendations include skilled nursing facilities. A separate document was developed for acute care and long-term care hospitals.

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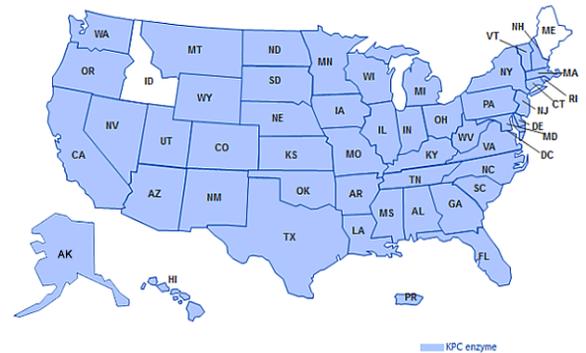
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# Understanding Carbapenem-Resistant *Enterobacteriaceae* (CRE)

CRE stands for Carbapenem-resistant *Enterobacteriaceae*. *Enterobacteriaceae* are a large family of gram-negative bacilli that are normal inhabitants of the gastrointestinal tract of humans and other animals. *Enterobacteriaceae* can cause infections when they invade the bloodstream, bladder, or other areas of the body. Some CRE have become resistant to all or almost all antibiotics, including last-resort drugs called carbapenems. Three species of the *Enterobacteriaceae* family—*Klebsiella*, *Enterobacter*, and *Escherichia*—are the most frequently identified CRE in the U.S.

## Epidemiologic and Clinical Importance

Some *Enterobacteriaceae* are resistant to nearly all antibiotics, including carbapenems, which are often considered the antibiotics of last resort. More than 9,000 healthcare-associated infections are caused by CRE each year. As of February 2016, CDC laboratories have confirmed at least one type of CRE among healthcare facilities in 48 states. Approximately 4% of U.S. short-stay hospitals and 19% of long-term acute care hospitals reported at least one patient with a serious CRE infection during the first half of 2012.

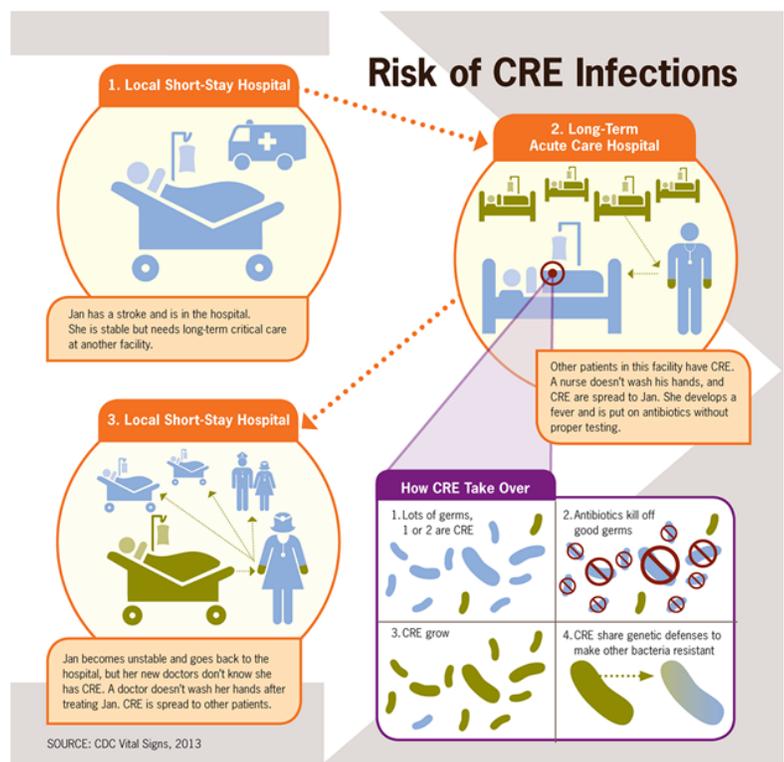


## Risk Factors for Carbapenem-Resistant *Enterobacteriaceae* (CRE)

Healthy people typically do not acquire CRE infections. CRE infections usually occur among hospitalized patients or residents of long-term care facilities who have underlying medical conditions. The major risk factors for acquiring CRE infections in the U.S. include exposure to healthcare and treatment with antibiotics such as carbapenems, cephalosporins, fluoroquinolones and vancomycin. Additional risk factors include a compromised immune system, admission to an intensive care unit and treatment with invasive devices. Outbreaks of CRE have been associated with exposure to long-term care settings.

### Transmission

CRE bacteria are most frequently spread from person to person through contact with infected or colonized individuals. CRE can cause infections when they enter the body, often through medical devices such as intravenous catheters, urinary catheters, or through wounds caused by injury or surgery.



## Difference between CRE Colonization and Infection

Isolation of CRE in a clinical culture can represent either colonization or an infection. Colonization means that the organism is found on or in the body but is not causing symptoms of disease. Colonization with CRE can lead to infection if the organisms gain access to body sites, such as the bladder, lungs, or bloodstream, that are normally sterile. Symptoms of infection vary depending on the site of infection, (e.g., cough if in the lungs, urinary symptoms if in the bladder) but can also include general symptoms such as fever or chills. Both colonized and infected persons can transmit CRE.

## Treatment of CRE Infections

CRE are often resistant to many commonly prescribed antibiotics but may remain susceptible to some antibiotics. Decisions regarding treatment of CRE infections are made on a case-by-case basis by a health care provider. Some individuals may be colonized rather than infected with CRE and may not require any treatment.

## CDC Definitions of CRE

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CDC defines CRE as *Enterobacteriaceae* that are:

- Resistant to any carbapenem antimicrobial (i.e., minimum inhibitory concentrations of  $\geq 4$  mcg/ml for doripenem, meropenem, or imipenem OR  $\geq 2$  mcg/ml for ertapenem)

OR

- Documented to produce carbapenemase. At present, acceptable tests for carbapenemase production include polymerase chain reaction, Modified Hodge Test, Carba NP, and metallo- $\beta$ -lactamase testing (e.g., MBL tests or screens).
- For bacteria that have intrinsic imipenem nonsusceptibility (i.e., *Morganella morganii*, *Proteus* spp., *Providencia* spp.), resistance to carbapenems other than imipenem is required.

## What Is Currently Being Done to Prevent CRE

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### Federal Government:

1. Monitoring the presence of and risk factors for CRE infection through the National Healthcare Safety Network (NHSN) and Emerging Infections Program (EIP).
2. Providing CRE outbreak support such as staff expertise, prevention guidelines, tools and lab testing to states and facilities.
3. Developing detection methods and prevention programs to control CRE (the CDC “Detect and Protect” effort supports regional CRE programs).
4. Helping medical facilities improve antibiotic prescribing practices.

## Wisconsin:

During 2011, DPH initiated CRE surveillance to determine prevalence among healthcare facilities, identify incidents of healthcare transmission and guide CRE prevention efforts. Wisconsin was the first state to mandate reporting of CRE using the CDC National Healthcare Safety Network (NHSN).

All Wisconsin acute care, critical access and long-term acute care hospitals are required to report laboratory-identified CRE, specifically, carbapenem-resistant *Klebsiella oxytoca*, *Klebsiella pneumoniae*, *Enterobacter* spp., and *E. coli*, among hospitalized patients to DPH. During 2017, these same mandatory CRE reporting requirements will be extended to include skilled nursing facilities.

Patients with CRE are placed in contact precautions in private rooms, and healthcare personnel wear gowns and gloves upon entry to the rooms. In some cases, epidemiologically related patients are tested for CRE to determine whether transmission has occurred.

Transferring facilities should notify receiving healthcare facilities and agencies of the patient's history of CRE to ensure continued use of appropriate prevention measures.

Strict compliance with contact precautions and hand hygiene should be observed by all healthcare providers caring for CRE patients. If more than one CRE patient is located on a unit, they should be housed in a separate location on the unit and use of dedicated staff should be considered to further reduce chances of transmission.

Patients with histories of CRE colonization or infection should be placed in contact precautions with each subsequent hospital admission. There are no recommendations for decolonization or for removing CRE patients from contact precautions.

In skilled nursing facilities, contact precautions are modified when appropriate, to allow for social interactions in these community settings.

Education regarding prevention of CRE transmission can be provided to patients and their families and to staff using the educational pamphlets provided in this toolkit.

## What Can Also Be Done to Prevent CRE

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### Healthcare CEOs/Medical Officers Can:

1. Require and strictly enforce CDC guidance for CRE detection, prevention, tracking, and reporting.
2. Make sure your lab can accurately identify CRE and alert clinical and infection prevention staff when these organisms are present.
3. Know CRE trends in your facility and in the facilities around you.
4. When transferring a patient, require staff to notify the other facility about infections, including CRE.
5. Join or start regional CRE prevention efforts and promote wise antibiotic use.

**Healthcare Providers Can:**

1. Know if patients with CRE are located at your facility, and stay aware of CRE infection rates.
2. Ask if your patients have received medical care somewhere else, including another country.
3. Follow infection control recommendations with every patient, using contact precautions for patients with CRE. Whenever possible, dedicate rooms, equipment, and staff to CRE patients.
4. Prescribe antibiotics wisely. Use culture results to modify prescriptions if needed.
5. Request immediate alerts when the lab identifies a positive CRE patient.
6. Alert the receiving facility when a patient with CRE transfers.
7. Request information on patients transferring into your facility, specifically asking about CRE (or any hospital-acquired) infection.
8. Remove temporary medical devices as soon as possible.

**Patients Can:**

1. Tell your doctor if you have received overnight health care in another facility or country.
2. Take antibiotics only as prescribed.
3. Ask questions. Understand the risks and benefits of your treatment.
4. Wash hands often.
  - a. Before and after changing wound dressings or bandages.
  - b. After using the restroom.
  - c. After blowing your nose, coughing, or sneezing.
5. Insist that everyone practice hand hygiene before touching you.
6. Tell your healthcare providers if you have a history of CRE.

# Appendices

## Appendix 1: Sample Nursing Home CRE Policy and Procedures

### Management of residents with Carbapenem-resistant *Enterobacteriaceae* (CRE)

Effective date

Department

Dates of review/revision						
Initials						

### Background

CRE are a group of bacteria resistant to the last line of drugs that were developed to treat infections with certain drug-resistant organisms. CRE can be divided into two groups: those that produce carbapenemase and are therefore resistant to all beta-lactam antibiotic agents, and those that are not carbapenemase-producing organisms and are usually susceptible to agents other than the carbapenems.

Currently persons with extensive exposure to health care are at highest risk of CRE infections, however, because the *Enterobacteriaceae* family includes common gut organisms such as *Klebsiella* spp. and *E. coli*, the potential for transmission into the community exists. If this occurs, once-treatable conditions such as pneumonia and urinary tract infections could become difficult or impossible to treat.

This policy describes the nursing home response to both non-carbapenemase-producing CRE and carbapenemase-producing CRE.

### Purpose

To prevent transmission of CRE through rapid identification and prompt use of contact precautions and other infection control measures.

### Procedures for residents with isolates of *K. oxytoca*, *K. pneumoniae*, *E. coli*, or *Enterobacter* spp. testing non-susceptible to at least one carbapenem agent.

1. Microbiology laboratory staff will submit isolates to the Wisconsin State Laboratory of Hygiene (WSLH) for fee-exempt testing to determine carbapenemase production, and will notify infection prevention staff and unit staff immediately following identification of isolates testing non-susceptible to at least one of the following carbapenem agents:
  - a. Doripenem (MIC  $\geq 2$  and  $< 4$  mcg/mL)
  - b. Imipenem (MIC  $\geq 2$  and  $< 4$  mcg/mL)
  - c. Meropenem (MIC  $\geq 2$  and  $< 4$  mcg/mL)
  - d. Ertapenem (MIC  $\geq 0.5$  and  $< 2$  mcg/mL)

2. If the resident has no signs or symptoms of an active infection:
  - a. Observe standard precautions.
  - b. Instruct the resident to perform good hand hygiene (some residents may require assistance with hand washing or use of the alcohol gel).
  - c. Ensure that the resident has clean clothes, that all body fluids and wound drainage are contained, and that he/she has performed hand hygiene prior to leaving the room for community activities or therapy.
3. If the resident has signs and symptoms of an active infection:
  - a. Implement contact precautions in addition to standard precautions, until signs and symptoms resolve.
  - b. Place the resident in a private room when possible. If private rooms are not available, place the resident with a roommate who also has a history of infection or colonization with the same CRE organism, or lastly, place with a resident who has no recent surgical incisions or open wounds, no indwelling devices, is not immunocompromised and who is able to follow infection control measures.
  - c. Staff should wear gown and gloves upon entry to the resident's room and when providing cares or therapy in treatment rooms.
  - d. Clean and disinfect all items before removing from the isolation room or discard disposable items in the room.
  - e. Implement use of a commode when a separate restroom cannot be arranged.
  - f. Limit resident movement outside the room to the extent possible during period of active infection. If body fluids or wound drainage are not contained, the resident should remain in the isolation room until they can be contained.
4. Infection prevention staff will place the resident on an alert list and the unit supervisor, unit staff, or infection preventionist will notify receiving facilities (e.g., acute care, emergency departments, home health, hospice and other long-term care facilities) regarding the need to manage the resident with contact precautions.
5. If needed, the infection preventionist or unit staff will provide the resident and family members with a CRE educational pamphlet and will be available to answer questions. Education for staff members will also be provided when necessary.

**Additional procedures for residents with isolates of *K. oxytoca*, *K. pneumoniae*, *E. coli*, or *Enterobacter* spp. testing positive for carbapenemase production.**

1. If testing at the WSLH determines the CRE isolate is a carbapenemase-producer, the infection prevention staff will report to DPH within 24 hours of identification using NHSN. If entry into NHSN will be delayed, reporting to DPH should occur by telephone.
2. Residents identified with a carbapenemase-producing CRE isolate must be placed in a private room. It may be necessary to convert a semi-private room to a private room to accommodate residents identified with this type of CRE isolate.
  - a. Instruct staff to wear gown and gloves upon entry to the resident's room and when providing cares or therapy in treatment rooms.

- b. Instruct family members and visitors to wear gown and gloves and to practice hand hygiene when visiting residents in their rooms.
  - c. Clean and disinfect all items before removing from the isolation room or discard disposable items in the room.
  - d. Implement use of a commode when a separate restroom cannot be arranged.
  - e. Assess movement out of the room: Residents may leave their rooms and participate in social activities if not symptomatic of an active infection and if body fluids and wound drainage can be contained. Residents should be instructed to wash hands before leaving their rooms or be assisted to do so if needed, and clothing should be clean and free of body fluids.
3. If DPH determines active screening of exposed residents is necessary, infection prevention staff will work with resident care staff to obtain rectal swabs (following instructions in Appendix 2) from residents present on the same units where a CRE resident was identified. DPH will report results of the CRE screening tests to the facility infection prevention staff.
  - a. Infection prevention staff will obtain authorization from DPH (608-267-7711 or 608-267-9003 for assistance) to submit rectal swabs to WSLH for fee-exempt testing.
  - b. DPH will report the results of the CRE screening tests to the facility infection prevention staff.
  - c. Unit staff will notify residents of their CRE screening results using one of the scripts in Appendix 3.
  - d. Residents identified with CRE colonization or infection will be promptly placed in contact precautions.
4. If more than one resident is identified with an isolate of the same CRE species, residents should be cohorted in a separate area of a unit when possible, and dedicated staff should be used to provide care. Residents may be placed in semi-private rooms in the cohorted area.
5. Patients/residents admitted from facilities with high rates of CRE will be placed in contact precautions upon admission. If the individual has no history of CRE colonization or infection, a screening test will be conducted to determine the status of CRE carriage.

## **Appendix 2: Instructions for Collecting and Submitting Rectal Swabs to the Wisconsin State Laboratory of Hygiene (WSLH) to Detect Carbapenemase Production**

### **Supplies**

- Culturette,<sup>™</sup> ESwab,<sup>™</sup> or similar suitable collection system (do not use calcium alginate swabs)
- Disposable gloves
- Alcohol hand sanitizer

NOTE: As an alternative to collecting a rectal swab, a swab of a stool specimen can be obtained and submitted for CRE surveillance testing.

1. Inform the resident/responsible party that a rectal swab will be collected. Scripts such as the ones below may be used.

“Recently a resident was found to have drug-resistant bacteria called CRE. These organisms can be spread from person to person by direct contact with the infected person or by contact with infected body fluids. Hands can become contaminated after contact with infected persons and that can also serve as a way to spread this organism.

Cases of CRE in Wisconsin are uncommon, but when they do occur, the state health department asks that we screen other residents on the unit to assess whether this organism has spread. We want to make sure we are providing you and other residents on the unit with safe health care.”

The method for screening requires collection of a rectal swab. Your test results should return in a few days, and if positive for CRE, you will be placed in a private room (or with someone who has the same test results), and anyone (including staff and visitors) who enters your room should be wearing gowns and gloves and should perform hand hygiene when entering and exiting your room.”

### **Sixth grade reading level sample script**

“A patient on this unit was found to have a germ called CRE (Carbapenem-resistant *Enterobacteriaceae*). This germ can be dangerous because it is hard to kill with normal antibiotics.

CRE is not common in Wisconsin, but when it is found, the state health department asks that we check other patients on the unit to see whether this germ has spread. A quick rectal swab is used to collect the screening test. Your results should return in a few days. If you have CRE, you will be placed into contact precautions. This means that anyone who enters your room will need to wear a gown and gloves. Hand washing is very important for everyone when entering and leaving your room.

We want to make sure you and other patients get safe care. It is our job to protect patients from infection while they are here.”

2. Perform hand hygiene with alcohol hand sanitizer or antimicrobial soap and water, and don a pair of clean, disposable gloves.
3. Insert the swab into the rectum, past the anal sphincter, then rotate one full turn. Withdraw the swab and place back into the culturette tube.
4. Remove gloves, discard into regular trash, and perform hand hygiene.
5. Promptly submit the specimen to the laboratory for transport to the WSLH.
6. Clinical laboratory staff will complete a WSLH requisition form.
  - a. To select the test, under “other,” write in “culture for CRE.”
  - b. Indicate on the requisition that testing is “authorized for fee-exempt status by the Division of Public Health.”
7. Store specimens at 2–8° C and ship as soon as possible (under refrigeration) to the WSLH. Specimens may be shipped Monday–Thursday.

### **Appendix 3: Sample Scripts to Inform Residents/Responsible Parties of CRE Screening Results**

If active surveillance testing indicates the resident is colonized with CRE, the following script may be used to inform the resident/responsible party of the positive test results.

“The results of your CRE screening test indicate you are colonized with, that is you carry, CRE in your intestinal tract. Even though you may not feel any symptoms of illness at this time, we will continue to take precautions to help prevent the CRE from spreading to others. We will place you in a private room, and we will be wearing a gown and gloves whenever we come into your room to care for you. You will also be placed in a private room if you are hospitalized. A more detailed care plan will be provided in the near future. Please read this pamphlet for more information on CRE, and let me know if you or your family members have any questions.”

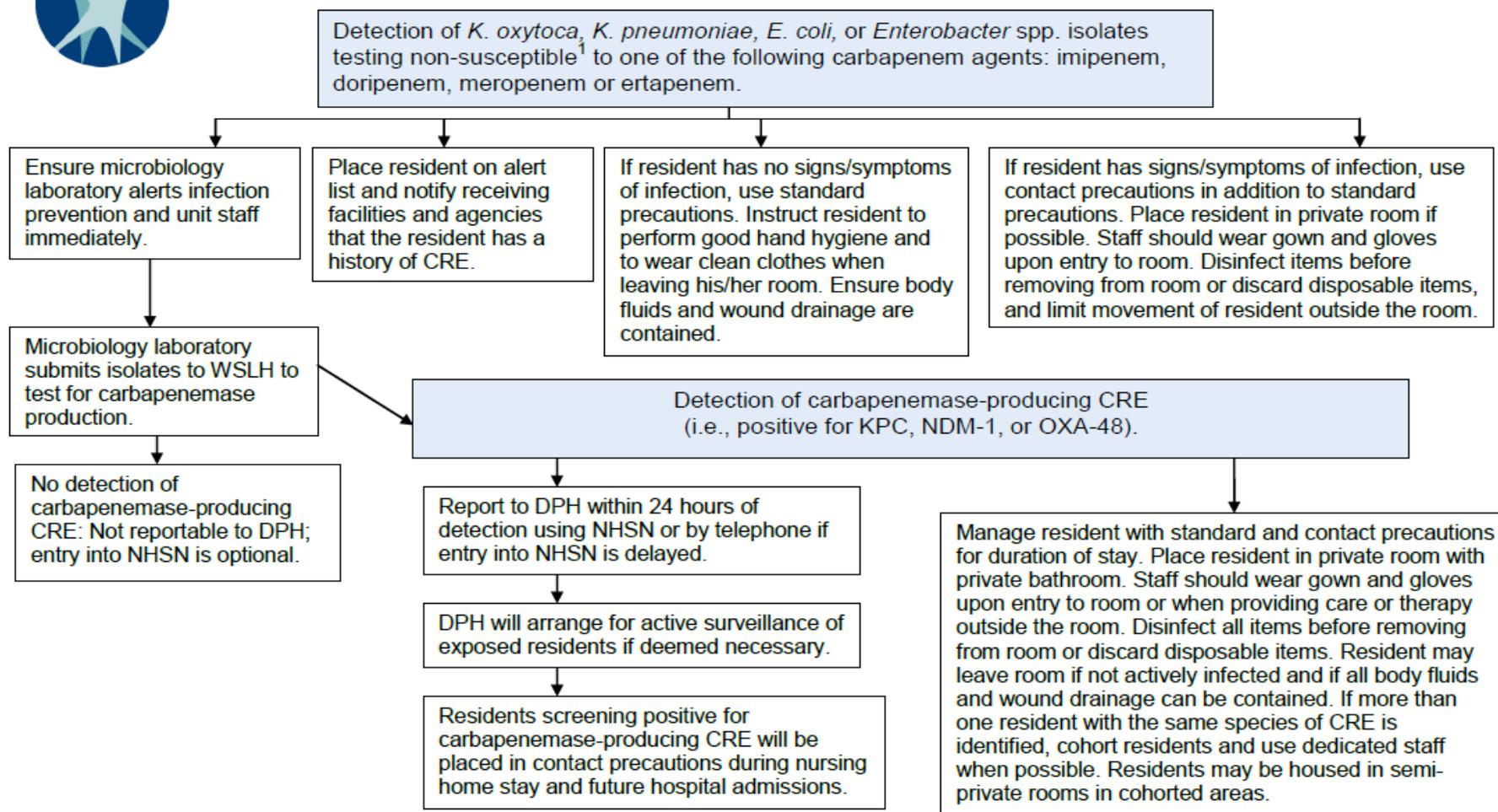
If active surveillance testing indicates the patient is negative for CRE, the following script may be used to inform the resident/responsible party of the negative test results.

“The results of your CRE screening test indicate you are not colonized or infected with CRE at this time. We will continue to practice good infection control measures, such as hand hygiene, when caring for you, but special precautions are not currently needed. Please let me know if you have any questions.”

## Appendix 4: Algorithm for Nursing Home Response to CRE



### Management of Residents with Carbapenem-resistant *Enterobacteriaceae* (CRE) in Wisconsin Skilled Nursing Facilities, 2016



<sup>1</sup>Minimum inhibitory concentrations (MIC) considered non-susceptible:

- Doripenem (MIC  $\geq 2$  and  $< 4$  mcg/mL)
- Imipenem (MIC  $\geq 2$  and  $< 4$  mcg/mL)
- Meropenem (MIC  $\geq 2$  and  $< 4$  mcg/mL)
- Ertapenem (MIC  $\geq 0.5$  and  $< 2$  mcg/mL)

Minimum inhibitory concentrations (MIC) considered resistant:

- Doripenem (MIC  $\geq 4$  mcg/mL)
- Imipenem (MIC  $\geq 4$  mcg/mL)
- Meropenem (MIC  $\geq 4$  mcg/mL)
- Ertapenem (MIC  $\geq 2$  mcg/mL)

Please visit the CDC CRE tool kit for more information regarding CRE prevention <http://www.cdc.gov/hai/pdfs/cre/CRE-guidance-508.pdf>

## Appendix 5: Sample Inter-facility Communications Form

### Wisconsin Inter-facility Infection Control Transfer Form

Please note that this form is a template and can be adapted to better meet the needs of your facility.

This form is important for ensuring communication among facilities about patients/residents with multidrug-resistant organisms, to help prevent transmission of these organisms across the health care continuum. This form should be completed for transfer to the receiving facility with information communicated prior to or during transfer. Please attach copies of the most recent culture reports with susceptibilities, if available.

#### Sending Healthcare Facility:

Patient/Resident Last Name	First Name	Date of Birth	Medical Record Number

Name/Address of Sending Facility	Sending Unit	Sending Facility Phone

Sending Facility Contacts	Name	Phone	E-mail
Case Manager/Admin/SW			
Infection Prevention			

Is the patient/resident currently in isolation?  No  Yes  
 Type of Isolation (check all that apply)  Contact  Droplet  Airborne  
 Other: \_\_\_\_\_

Does patient/resident currently have an infection, colonization OR a history of positive culture of multidrug-resistant organism (MDRO) or other organism of epidemiological significance?	Currently Colonized or has history of colonization or infection Check if YES	Active Infection on Treatment Check if YES
Methicillin-Resistant <i>Staphylococcus aureus</i> (MRSA)		
Vancomycin-Resistant <i>Enterococcus</i> (VRE)		
<i>Clostridium difficile</i>		
<i>Acinetobacter</i> , multidrug-resistant		
<i>E coli</i> , <i>Klebsiella</i> , <i>Proteus</i> , etc. w/Extended Spectrum B-Lactamase (ESBL)		
Carbapenem-Resistant <i>Enterobacteriaceae</i> (CRE)		
Other:		

Comments

Printed Name of Person Completing form	Signature	Date	If information communicated prior to transfer: Name and phone of individual at receiving facility

## **Appendix 6: CRE Educational Materials**

CRE patient and family education pamphlet available at  
<http://www.dhs.wisconsin.gov/publications/P0/P00486.pdf>

CRE healthcare staff education pamphlet available at  
<http://www.dhs.wisconsin.gov/publications/P0/P00486B.pdf>

CRE fact sheet available at  
<http://www.dhs.wisconsin.gov/publications/P0/P00470.pdf>

Aurora Health Care CRE staff education slides available at  
<https://www.dhs.wisconsin.gov/disease/cre.htm> under the “Healthcare Professionals”  
tab

CDC CRE website available at  
<http://www.cdc.gov/HAI/organisms/cre/index.html>

## **Appendix 7: Preparing to Respond to Cases of CRE**

The majority of CRE cases have been reported from facilities in Southeastern Wisconsin, but nursing home personnel throughout the state should be prepared to manage CRE-positive residents. The following checklist is suggested to help facilities to be ready for CRE.

- CRE policies and procedures have been written and are available to nursing home staff.
- The clinical laboratory has a mechanism of immediately alerting infection prevention and unit staff when microbiology results identify a CRE isolate.
- During absence of the infection preventionist, back-up staff has been identified and trained to ensure immediate reporting of CRE cases and prompt implementation of infection control measures.
- Infection prevention staff has the authority to collect specimens from residents as part of active CRE surveillance testing and monitoring for transmission.
- Staff education regarding CRE prevention has been conducted at least once.
- CRE educational pamphlets are available for residents and their families when needed.

## **Appendix 8: Frequently Asked Questions**

**1. Does consent need to be obtained before collecting rectal swabs for CRE surveillance testing?**

Because this is a surveillance activity for purposes of preventing disease transmission and is not a research project, no separate consent to test for CRE colonization is required.

**2. What should we do if a resident refuses to be screened for CRE colonization?**

If screening tests among other residents on the same unit indicate possible CRE transmission, it may be necessary to assume the declining resident is also CRE-positive, and to manage him/her accordingly. The non-tested resident, however, should not be cohorted with other CRE-positive residents.

**3. What types of specimens can be collected to conduct CRE screening?**

The preferred specimen is a rectal swab, but a perirectal swab or a swab of stool material may also be submitted for testing.

**4. Who should order the CRE screening tests?**

Infection prevention staff may request an order from the medical director of the facility, or from the individual resident's personal physician.

**5. Who usually collects the specimens?**

Usually the resident's nurse or other appropriate care provider will explain the purpose of the CRE screening test to the resident/responsible party, collect the specimen and report the results to the resident or his/her family.

**6. Should family members of CRE-positive patients be tested?**

It is not usually necessary to test family members, as they are less likely to acquire CRE than hospitalized patients or residents being treated with invasive devices or who are receiving antibiotics. The current CDC recommendations do not include testing of a resident's family members.

**7. Should healthcare workers exposed to cases of CRE be tested?**

There are no recommendations to test healthcare workers for CRE colonization. Transmission of CRE usually occurs from resident-to-resident due to contaminated hands of healthcare workers. Healthcare workers are usually healthy individuals and are therefore at lower risk of acquiring CRE.

The best way to protect both residents and healthcare workers is to practice good hand hygiene, standard precautions, and other infection control measures proven effective in preventing transmission of healthcare-associated pathogens.

**8. Is the alcohol hand sanitizer effective against CRE?**

Yes, alcohol-based hand sanitizers are effective against CRE in the same way they are effective against non-antibiotic resistant bacteria. They can and should be used to decontaminate hands when caring for residents with CRE colonization or infection.

**9. Do rooms housing CRE residents need to be cleaned and disinfected differently from other patient rooms?**

No additional cleaning and disinfecting measures are required, and the currently used EPA-registered, hospital-approved disinfection products are effective against CRE. During outbreaks, increasing the frequency with which high touch surfaces and items are cleaned and disinfected may help reduce CRE transmission.

Centers for Disease Control and Prevention. HAI prevention stories from the states: Wisconsin calls for reporting of Carbapenem-resistant *Enterobacteriaceae*. Retrieved from [http://www.cdc.gov/hai/state-based/pdfs/HAIpreventionStories\\_WI\\_CRE\\_508.pdf](http://www.cdc.gov/hai/state-based/pdfs/HAIpreventionStories_WI_CRE_508.pdf). Accessed June 2013.

Centers for Disease Control and Prevention. Healthcare-associated infections: Clinicians–CRE infections. Retrieved from <http://www.cdc.gov/hai/organisms/cre/cre-clinicians.html>. Accessed June 2013.

Centers for Disease Control and Prevention. Healthcare-associated infections: General information about CRE. Retrieved from <http://www.cdc.gov/hai/organisms/cre/cre-patientgeneral.html>. Accessed June 2013.

Centers for Disease Control and Prevention. Healthcare-associated infections: Patients–CRE infections. Retrieved from <http://www.cdc.gov/hai/organisms/cre/cre-patients.html>. Accessed June 2013.

Centers for Disease Control and Prevention. Healthcare-associated infections: Tracking CRE. Retrieved from <http://www.cdc.gov/hai/organisms/cre/TrackingCRE.html>. Accessed June 2013.

Centers for Disease Control and Prevention. Vital signs: Making Health Care Safer. Retrieved from <http://www.cdc.gov/vitalsigns/HAI/CRE/index.html>. Accessed June 2013.

Centers for Disease Control and Prevention. Guideline for hand hygiene in health-care settings: Recommendations of the Healthcare Infection Control Practices and the HICPAC/SHEA/APIC/IDSA Hand Hygiene Task Force. *MMWR* 2002;51 (No. RR-16):1–44.

Centers for Disease Control and Prevention. Vital signs: Carbapenem-resistant *Enterobacteriaceae*. *MMWR* 2013;62:165-170.

Centers for Disease Control and Prevention. Facility Guidance for Control of Carbapenem-resistant *Enterobacteriaceae* (CRE) – November 2015 Update CRE Toolkit. Retrieved from <http://www.cdc.gov/hai/pdfs/cre/CRE-guidance-508.pdf>. Accessed June 2016.

Wisconsin Division of Public Health. Carbapenem-resistant *Enterobacteriaceae* (CRE) fact sheet. Retrieved from <http://www.dhs.wisconsin.gov/publications/P0/P00470.pdf>. Accessed June 2013.

Centers for Disease Control and Prevention. Outbreak Response Team: Guideline for specimen collection. Retrieved from [http://www.cdc.gov/outbreaknet/references\\_resources/guide\\_specimen\\_collection.html](http://www.cdc.gov/outbreaknet/references_resources/guide_specimen_collection.html). Accessed June 2013.

Savard P, Carroll KC, Wilson LE, Perl TM. The challenges of Carbapenemase-Producing *Enterobacteriaceae* and infection prevention: Protecting patients in the chaos. *Infect Contr Hosp Epidemiol* 2013;43:730–739.