

PREVENTION AND MANAGEMENT OF CARBAPENEM-RESISTANT ENTERBACTERIACEAE IN NSW HOSPITALS

INFORMATION FOR CLINICIANS

Infections with carbapenem-resistant Enterobacteriaceae (CRE) are emerging as a major public health problem.¹ CRE infections are associated with much higher mortality rates than similar infections that are not carbapenem-resistant.²

In 2015, an increase in detection and nosocomial spread of a type of CRE called *Klebsiella pneumoniae* carbapenemase-producing bacteria (KPC) was reported in some Australian hospitals.

Historically, very low levels of CRE have been detected in Australia.

Health services should take action to detect and isolate CRE-colonised or infected patients, monitor the prevalence and prevent spread of CRE in healthcare facilities.

Clinicians should be aware that a significant risk for CRE acquisition in patients is travel to countries with high CRE prevalence. This presents an increased risk of CRE spread.

Preventing and managing CRE in NSW hospitals

Successful infection control measures are based on early detection and containment through isolation and cohorting.^{1,3}

Staff should consult their local Infectious Diseases (ID) and/or Infection Prevention and Control (IP&C) staff about appropriate infection control measures.

Standard infection prevention precautions

Standard precautions include:

1. Strict adherence to hand hygiene as per the 5 Moments for Hand Hygiene⁴
2. Correct use of personal protective equipment^{1,5}
3. Cleaning of all equipment and other potential fomites following each patient use
4. Thorough cleaning/disinfection of the healthcare environment.⁶

Patients and visitors should be educated about correct hand hygiene practice, which includes washing hands with liquid soap and water or using alcohol based handrub on dry unsoiled hands.

If CRE outbreaks occur, ward closure may be necessary to allow for high-level cleaning to eliminate environmental reservoirs.

Additional transmission-based contact precautions

Contact precautions should apply for:

1. patients known to be colonised or infected with CRE
2. patients awaiting results of screening for CRE
3. patients at high risk of colonisation with CRE.¹

Patients with CRE must be isolated or, if no single room is available, cohorted with other CRE patients in a room with ensuite or dedicated commode.

Patients with documented CRE carriage must be isolated during every subsequent admission over the following 12 months to allow for rescreening to determine CRE status. It is recommended that staff work with ID and/or IP&C teams to ascertain and achieve clearance.

Antimicrobial stewardship

Follow best practice antimicrobial prescribing principles:

1. Use local guidelines (or *Therapeutic Guidelines: Antibiotic*, if no local guidelines exist) when selecting and prescribing antimicrobials
2. Document the indication for treatment
3. Undertake microbiological assessment through collection of necessary specimens prior to first dose of antimicrobials
4. Assess the need for antimicrobial treatment modification after 48 – 72 hours
5. Specify treatment duration and review date.^{1,7}

Ensure that empirical use of antibiotics complies with *Therapeutic Guidelines: Antibiotic*, taking into consideration local antimicrobial susceptibility information.⁸

Monitor usage of antibiotics and aim to reduce overall use of cephalosporins, carbapenems and quinolone classes in ICU and non-ICU settings. In particular:

1. Avoid the empirical use of broad-spectrum beta-lactam antibiotics including third generation cephalosporins (e.g. ceftriaxone) and carbapenems (e.g. meropenem) for treatment of infections when unnecessary
2. Avoid the empirical use of quinolones (e.g. ciprofloxacin, moxifloxacin) for treatment of infections when unnecessary.

Consult ID physicians and/or medical microbiologists for advice on managing antimicrobial therapy in patients with CRE infections.

Screening for CRE

Screening should be performed in patients who have been in contact (e.g. were in same bed area for more than 6 hours) with a patient colonised or infected with CRE.

Routine admission, discharge and periodic screening should be considered in high risk units (e.g. ICU and haematology/ bone marrow transplant units) in hospitals where CRE have been identified.

Screening on admission should be performed in patients judged to be at increased risk of colonisation with CRE e.g. patients who have recently received medical care in high prevalence countries.⁹

Screening specimens should include rectal swab or stool, wound swabs, endotracheal tube (ET) aspirate (if relevant), and urine if the patient is catheterised.

Consult ID, IP&C teams, and/or medical microbiologists for advice on screening for CRE infections.

About CRE

Carbapenems are a group of broad-spectrum beta-lactam (penicillin-related) antibiotics that are effective against most Gram negative infections. Examples of carbapenem antibiotics include meropenem and ertapenem.

The most common and important Gram negative pathogens are the Enterobacteriaceae, represented particularly by *Escherichia coli*, *Klebsiella* spp. and *Enterobacter* spp. Carbapenems are generally the last line of treatment for serious infections due to multi-resistant organisms from this group.

Carbapenem-resistant Enterobacteriaceae (CRE) are resistant to all beta-lactam antibiotics, including penicillins, cephalosporins and carbapenems. They are usually also resistant to most aminoglycosides and fluoroquinolones, leaving few options for treatment.

Where to go for more resources

For more detailed guidance on prevention and management of CRE, please refer to:

- *Recommendations for the control of Multi-drug resistant Gram-negatives: carbapenem resistant Enterobacteriaceae*, published by the Australian Commission on Safety and Quality in Health Care (available at: <http://www.safetyandquality.gov.au/publications-resources/publications/>)
- *Carbapenem Resistant Enterobacteriaceae (CRE): Clinician information sheet* published by the Australian Commission on Safety and Quality in Health Care (available at: <http://www.safetyandquality.gov.au/our-work/healthcare-associated-infection/mrgn-guide/>)

An information sheet on CRE for patients and their visitors has also been published by the Australian Commission on Safety and Quality in Health Care and can be available at:

<http://www.safetyandquality.gov.au/our-work/healthcare-associated-infection/mrgn-guide/>.

References

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About the HAI Program

The CEC's Healthcare Associated Infections (HAI) program assists NSW local health districts improve systems to manage and monitor the prevention and control of HAI.

For further information on the HAI program, please visit <http://www.cec.health.nsw.gov.au/programs/hai>

Prevention and management of carbapenem-resistant Enterobacteriaceae: Information for clinicians. Released September 2015
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