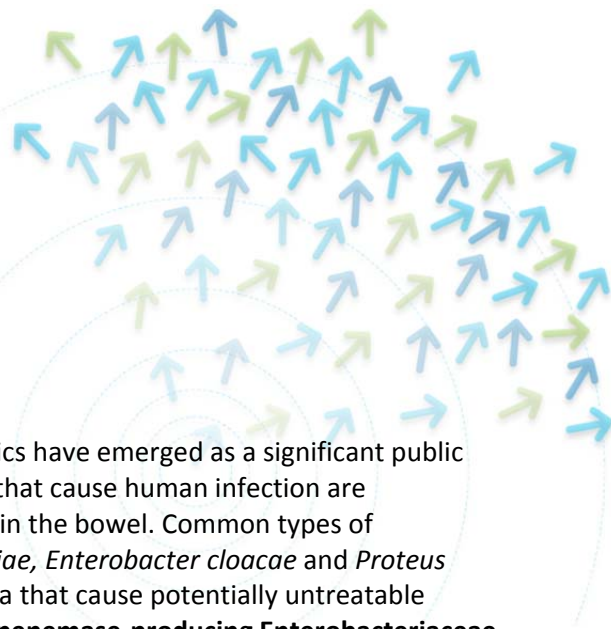


Information for clinicians and health service managers on the management of Carbapenemase-producing Enterobacteriaceae (CPE)



Gram-negative bacteria that are resistant to most or all antibiotics have emerged as a significant public health concern. An important group of gram-negative bacteria that cause human infection are Enterobacteriaceae. These are normally found living harmlessly in the bowel. Common types of Enterobacteriaceae include *Escherichia coli*, *Klebsiella pneumoniae*, *Enterobacter cloacae* and *Proteus* species. A major concern is resistant Enterobacteriaceae bacteria that cause potentially untreatable infection. One group of emerging resistant organisms are **Carbapenemase-producing Enterobacteriaceae (CPE)**.

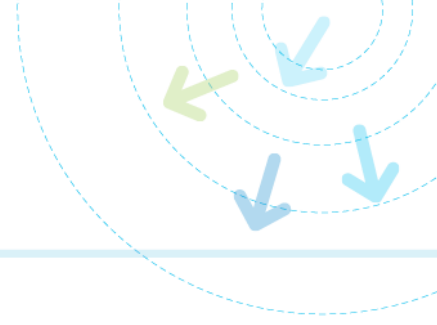
Australia has not seen the same number of number of CPE cases as has Europe, North America or the Middle East¹; this may be partly due to geographic isolation. The smaller number of cases provides an opportunity to prevent and contain CPE, and limit their impact on human health in Australia.

The Australian Commission on Safety and Quality in Health Care has developed *Recommendations for the control of carbapenemase-producing Enterobacteriaceae (CPE Guide)*. The CPE Guide should be used in conjunction with the *Australian Guidelines for the Prevention and Control of Infection in Healthcare*.²

- **This resource provides an overview for clinicians and hospital managers to assist with planning and responding to CPE.**
- **Managers are encouraged to discuss the information in this summary with the infection control team in their hospital or network. They should refer to the CPE Guide for more detail on strategies to prevent, detect and contain CPE.**
- **The health service may have developed local policies and protocols with more specific procedures that hospitals are required to follow. Some jurisdictions have policies on notification of single cases, or transmission between patients. Refer to relevant advice for information on the notification policy.**

Why are CPE important?

- Gram-negative bacteria, including CPE, cause a range of common infections including urinary tract infection, abdominal infection and bloodstream infection
- Infections caused by CPE can be difficult to treat as these bacteria produce enzymes that inactivate most of the available beta-lactam antibiotics, and are linked to resistances to several other antimicrobial classes
- CPE are of particular concern because they are easily spread between patients, and resistance genes may be transferred between different strains and species of bacteria
- It is important to know, as soon as possible, if a patient is carrying or is infected with CPE to prevent transmission to other patients
- Vulnerable patients with co-morbidities are at increased risk of developing an infection. CPE are more likely to affect patients in intensive care or while receiving chemotherapy.



Health facility governance and outbreak management plan

Hospitals need an effective infection control program and outbreak management plan incorporating CPE to minimise risk to patients and the workforce. The CPE Guide¹⁰ provides a number of recommendations for health services which are also consistent with the National Safety and Quality Health Service (NSQHS) Standards – specifically, Standard 1: Governance for Safety and Quality in Health Service Organisations⁴ and Standard 3: Preventing and Controlling Healthcare-Associated Infections⁵ and the *Australian Guidelines for the Prevention and Control of Infection in Healthcare*.²

Coordinated outbreak management plans have been shown to be effective in the control of outbreaks of CPE.³ The outbreak management plan will involve all areas of the hospital and should be developed in consultation with infection control, microbiology and infectious diseases experts.

To minimise risk to patients and the health workforce, health services should ensure that the following specific actions are considered in developing a CPE plan:

- Appropriate governance, infection control precautions, cleaning and effective antimicrobial stewardship, to prevent the transmission of CPE
- Systems for effective patient screening, including a process to screen and identify patients at high risk for CPE carriage on admission to the health facility (See Section 2 of the CPE Guide)
- Systems to detect and manage clusters, or outbreaks, of CPE, including:
 - access to a laboratory that can provide accurate testing and a rapid turnaround time for results
 - an epidemiological evaluation of every new CPE case to identify the likely source of acquisition and need for further patient screening
- An alert system for colonised or infected patients to ensure precautions are used for subsequent admissions
- Education for health service staff on how to respond to cases of CPE.

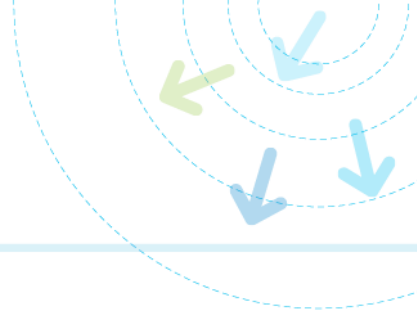
Strategies to prevent transmission of infection

Standard precautions to provide safe work practices should be observed at all times by all staff working in healthcare settings. Standard precautions are the primary strategy for minimising the transmission of micro-organisms.²

The routes of transmission of CPE from patient to patient are either by direct contact through carriage of CPE on the hands of healthcare workers, or indirectly via contaminated environmental surfaces or shared equipment.

There is good evidence that individual infection control strategies such as hand hygiene⁶, aseptic technique, environmental cleaning and disinfection⁷ can limit the impact of multi-resistant gram-negative organisms, including CPE, by reducing transmission in healthcare settings.

Further information on standard precautions is provided in the *Australian Guidelines for the Prevention and Control of Infection in Healthcare*² (Sections B1: Standard precautions; B2: Transmission based precautions; and C6.2.2: Reducing infections spread through the physical environment).



Environmental cleaning

Environmental cleaning is a key strategy to decreasing the spread of resistant bacteria. Each health facility should maintain a clean environment consistent with national guidelines and state or territory policies, regardless of patient infection status. Recommendations for cleaning and disinfection where patients are suspected or confirmed CPE cases are in Section 3.4 of CPE Guide. These recommendations are consistent with information on environmental cleaning outlined in the *Australian Guidelines for the Prevention and Control of Infection in Healthcare*² (Sections B1.4 and B5.1).

Antimicrobial Stewardship

Antimicrobial Stewardship (AMS) programs aim to reduce overall antimicrobial exposure and target treatment more effectively.⁸ Elements of effective AMS programs include restricting access to broad-spectrum antimicrobials and providing clear direction on indications for use of approved antimicrobials. Whilst antimicrobial resistance is a worldwide problem, effective local AMS programs have demonstrated a decrease in resistance, morbidity, mortality and healthcare costs.

A number of classes of antibiotics have been associated with colonisation of, or infection by, CPE. All control strategies should include AMS measures that aim to minimise overall antimicrobial use and ensure that the use of key antibiotics such as cephalosporins, fluoroquinolones and carbapenems is necessary.⁹

Participation in the annual National Antimicrobial Prescribing Survey (NAPS), National Antimicrobial Utilisation Surveillance Program (NAUSP), or in paediatrics through feedback from Antimicrobial Resistance and Prescribing in European Children (ARPEC) is strongly recommended as programs offering data to assess local use of antibiotics.

Facilities should implement AMS programs, consistent with the requirements of the NSQHS Standards (Standard 3).⁵

The information in this summary should be considered in conjunction with *Recommendations for the control of carbapenemase-producing Enterobacteriaceae (CPE Guide)* and in discussion with your infection control team.

The CPE guide provides health facilities with information according to the burden of CPE

Section 1. Planning, preparing and prevention where no cases of CPE have been identified

Outlines the recommended minimum requirements in planning and preparing for CPE by all health facilities where no cases of CPE have been identified. Strategies include governance and management, standard precautions, and antimicrobial stewardship.

Section 2. CPE detection and surveillance (screening)

Outlines the recommended minimum requirements for surveillance in health facilities to ensure that patients with CPE are identified. This section includes recommendations for the identification of CPE contacts, timing and frequency of screening, CPE clearance, and environmental screening.

Section 3. Strategies to reduce CPE transmission where there is limited transmission

Provides recommendations for health facilities to manage a small number of CPE cases that are not epidemiologically linked or where limited local transmission is occurring. This section includes recommendations on the management of CPE-positive patients, CPE contacts, patient movement, and cleaning and disinfection.

Section 4. Outbreak management (Widespread transmission)

Provides recommendations for health facilities to manage an outbreak of CPE cases where widespread transmission is occurring and cases may be epidemiologically linked. This section includes recommendations on identification of an outbreak, contact tracing, staffing considerations, cleaning and disinfection.

Section 5. Laboratory screening and confirmation methods

This section addresses laboratory procedures for screening patient specimens or cultures for CPE. It provides advice and recommendations on the detection of CPE, and outlines mechanisms for reporting to the national alert system for critical antimicrobial resistances (CARAlert).

References

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