

# Carbapenemase-producing *Enterobacterales* (CPE) infection or colonisation control guideline

## Control Guideline for Public Health Units

**Public Health Priority:** Routine

**Public Health Response Time:** HPNSW will enter confirmed case information onto the Carbapenemase-producing *Enterobacterales* (CPE) database within 3 working days of notification. Where Public Health Units become aware of a CPE cluster outside of a public health care facility, they should report to HPNSW immediately.

**Case management:** Primarily the responsibility of the treating doctor and facility infection control team according to *Surveillance and Response Guideline for Carbapenemase-producing Enterobacterales (CPE) in NSW Health Facilities*. [[HYPERLINK once published on CEC website](#)]

**Contact Management:** Responsibility of the facility infection prevention and control team. Community contacts are not generally at high risk of acquiring CPE.

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### 1. Reason for surveillance

To monitor the epidemiology of carbapenemase-producing *Enterobacterales* (CPE) to inform prevention strategies and support control strategies.

### 2. Case definition

A confirmed case is a person with a species of *Enterobacterales* isolated from clinical or screening specimens (infection or colonisation) where a carbapenemase gene is detected in a sample or isolate irrespective of phenotypic susceptibility.

*Note: Only molecular test results for confirmed cases are to be notified*

### 3. Notification criteria and procedure

CPE is notified by laboratories to HPNSW on confirmation.

Public Health Units should not routinely receive test results from laboratories and are not required to enter cases on NCIMS. If notifications are received they should be directed to HPNSW.

CPE infection or colonisation is a laboratory-notifiable condition under Schedule 1, category 3 of the Public Health Act 2010.

Following confirmatory testing, a copy of the molecular test results (doctor's report) should be sent, via secure fax, to Health Protection NSW by the testing laboratory.

#### 4. The disease

##### Infectious agent

*Enterobacterales* are an order of Gram-negative bacilli that occur naturally in the gastro-intestinal tract. They can spread outside the gastro-intestinal tract and cause serious infections such as bacteraemia, pneumonia, urinary tract and wound infections.

Carbapenemase-producing *Enterobacterales* (CPE) are resistant to carbapenem antibiotics, by means of an acquired carbapenemase gene. CPE produce carbapenemase enzymes which hydrolyse carbapenems (as well as other  $\beta$ -lactamases, such as penicillins and cephalosporins). CPE infections are therefore often difficult to treat.

There are multiple mechanisms by which *Enterobacterales* can acquire carbapenemase resistance. Some acquired beta-lactamases (e.g. ESBL and AmpC enzymes) can result in carbapenem-resistant *Enterobacterales* (CRE) in certain circumstances. Not all acquired carbapenemases result in carbapenem resistance. Thus, CRE are commonly CPE, and CPE are commonly CRE, but neither group is entirely a subset of the other.

There are a number of different types of carbapenemases found in CPE; the five most important globally are:

- Imipenemase (IMP),
- Klebsiella pneumoniae carbapenemase (KPC),
- New-Delhi metallo- $\beta$ -lactamase (NDM),
- Verona integron-encoded metallo- $\beta$ -lactamase (VIM) and
- Oxacillinases (OXA).

Each of these has been identified in patients in Australia.

##### Clinical presentation

CPE colonisation refers to the presence of the bacteria on a body surface without signs of invasive infection. The primary site of CPE colonisation is usually the lower gastro-intestinal tract. Other potential sites for colonisation include the urinary system.

CPE infection refers to the invasion of a person's bodily tissues by the bacteria and their subsequent multiplication, typically resulting in disease-causing symptoms and the reaction of host tissues to these organisms and the toxins they produce.

##### Acquisition of CPE

In Australia the major risk factor for acquiring CPE is thought to be overseas travel, especially when medical care in an overseas health care facility is involved. Local transmission in health care settings has been reported. Internationally, risk factors associated with an increased risk of CPE acquisition include:

- Prolonged hospitalisation
- Dialysis or chemotherapy in the previous 12 months
- Multiple or recent exposure to different antibiotic agents (Including extended-spectrum penicillins, cephalosporins, fluoroquinolones and carbapenems)
- Indwelling medical devices (such as central venous catheters, urinary catheters, biliary catheters or wound drains)
- Organ or stem cell transplant recipients

- Mechanical ventilation
- Admission to an intensive care unit
- Diabetes mellitus
- Prior VRE colonisation
- Hospitalisation in a health care facility overseas
- Recent hospitalisation in a hospital with a known CPE outbreak or endemic transmission

#### Mode of transmission

Patients who are colonised with, or have clinical infections with CPE can transmit CPE to other patients in health care settings via direct or indirect contact.

**Direct contact:** patient to patient contact (with contamination from a colonised/infected site)

**Indirect contact:** could occur via a health care worker whose hands have been contaminated following contact with a patient with CPE, or via a contaminated environmental surface (including basin or toilet) and/or contaminated shared equipment.

Some CPE-positive patients are more likely to transmit CPE than others, including those with:

- Diarrhoea, faecal incontinence or enterostomies (especially if they have gastrointestinal colonisation/infection)
- Urinary catheters (especially if they have urinary tract colonisation/infection)
- Discharging wounds
- Inability to attend to their own personal hygiene

#### Timeline

The natural history and duration of CPE carriage is variable and incubation period unclear. Colonisation beyond 12 months is well documented. It is unclear whether carriage varies with the nature of the infection, the organism or resistance type.

## 5. Managing notifications

Health care facilities should manage patients and contacts according to the guideline: *Surveillance and Response Guideline for Carbapenemase-producing Enterobacterales (CPE) in NSW Health Facilities*. [[HYPERLINK once published on CEC website](#)]

#### Response times

##### Data entry

HPNSW will enter confirmed case information onto the CPE database within 3 working days of notification. Public Health Units are not required to enter case notifications into NCIMS.

HPNSW will provide regular surveillance reports to LHDs, including PHUs regarding notifications from their LHD, and to CEC.

##### Response procedure

None routinely for Public Health Units. HPNSW will request PHUs' assistance in an investigation where there is concern about local community transmission.

##### Case management

Responsibility of treating doctor, who should seek specialist infectious disease and infection control advice.

### *Treatment, Isolation and restriction*

See: *Surveillance and Response Guideline for Carbapenemase-producing Enterobacterales (CPE) in NSW Health Facilities* [[HYPERLINK once published on CEC website](#)] and CPE factsheet [[HYPERLINK once published on CEC website](#)].

For case treatment, refer to [Therapeutic Guidelines: Antibiotic](#) and consult with infectious diseases team.

There is currently no recognised method of decolonisation for CPE.

### *Contact management*

See: *Surveillance and Response Guideline for Carbapenemase-producing Enterobacterales (CPE) in NSW Health Facilities*, and CPE factsheet.

## 6. Special situations

### *Outbreaks / clusters in healthcare facilities*

In the event that surveillance data allows identification of a potential cluster in a health care facility, Health Protection NSW will liaise with the Clinical Excellence Commission (CEC) who will liaise with the relevant LHD. LHDs may seek PHU advice in the investigation of clusters. Healthcare facilities should inform the Clinical Excellence Commission (CEC) – Hospital Acquired Infection (HAI) program when local transmission is suspected in a healthcare facility.

Where a PHU or HPNSW becomes aware of a CPE cluster outside of a healthcare facility, they should consult with each other. PHUs should report a CPE cluster occurring outside of a public health care facility to Health Protection NSW immediately.