Guideline

NSW GOVERNMENT

Surveillance and Response to Carbapenemase-Producing Enterobacterales in NSW Health Facilities

Summary This Guideline supports NSW Health organisations to manage the surveillance and response to Carbapenemase producing Enterobacterales (CPE) and other carbapenemase producing organisms (CPOs).

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NSW GOVERNMENT

NSW Health
Guideline

Surveillance and Response to Carbapenemase-Producing Enterobacterales in NSW Health Facilities

Guideline Summary

This Guideline supports NSW Health organisations to manage the surveillance and response to Carbapenemase producing *Enterobacterales* (CPE) and other carbapenemase producing organisms (CPOs).

This Guideline is designed to:

- Identify suspected cases of CPE and CPOs.
- Implement control measures to prevent transmission of CPE and CPOs.
- Understand the local epidemiology of CPE and CPOs.

While this Guideline has been written specifically for CPE, recommended measures may also be applicable to other carbapenemase producing organisms, for example, *Acinetobacter* and *Pseudomonas species.* Implementation of measures should be based on local decision in consultation with content experts.

Key Principles

Prevention or reduction of CPE/CPO acquisition and the management of infection outbreaks require a combination of targeted surveillance and response within the NSW Health organisation. To achieve this, the following principles are to be followed:

- Conduct a risk assessment to identify people at risk of CPE/CPO acquisition.
- Screening, detection, and investigation of cases.
- Manage cases with appropriate infection prevention and control measures.
- Manage outbreaks and local transmission.

This Guideline assists NSW Health organisations with developing local systems and processes to identify and manage patients with CPE/CPO in a timely and effective manner to ensure minimal impact on service provision.

Revision History

Version	Approved By	Amendment Notes
GL2025_010 June-2025	Deputy Secretary, Population and Public Health & Chief Health Officer	This Guideline contains: • Update to include other carbapenemase producing organisms with similar clinical consequences. • Guidance to support the investigation and management of additional organisms, without the need for notification.
GL2019_012 August-2019	Deputy Secretary, Population and Public Health	New guideline

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1. Background

Carbapenemase producing organisms are bacteria that are resistant to many antibiotics, including carbapenems. These organisms have genes which encode carbapenemases which are enzymes that can degrade or hydrolyse carbapenems and other beta-lactam antibiotics. A common group of these bacteria is *Enterobacterales,* which includes E. coli, Klebsiella, Enterobacter, Citrobacter, Proteus, and Serratia. When these bacteria produce carbapenemases, they are called carbapenemase-producing Enterobacterales (CPE).

CPE are part of a larger group of organisms, called carbapenemase-producing organisms or CPOs, which also include species such as *Pseudomonas* and *Acinetobacter* [1]*.* As the clinical management, including infection prevention and control strategies are very similar, the guidance in this document is applicable for CPOs and both terms will be used (CPE and CPO).

In NSW, CPE infection or colonisation is a laboratory-notifiable condition under Schedule 1, category 3 of the *Public Health Act 2010* (NSW). In other jurisdictions, CPO are notifiable rather than just CPE. CPOs have been associated with many hospital outbreaks and may become endemic [2].

CPE are identified as a priority pathogen by the World Health Organization [3] and are included in the Critical Antimicrobial Resistance Alert (AURA) group of organisms for Australia [4]. CPE colonisation and blood stream infection are included in the mandatory NSW healthcare associated infection clinical indicators.

Carbapenemases are enzymes which hydrolyse (breakdown) carbapenems (as well as other beta-lactam antibiotics, such as penicillins and cephalosporins) and Table 1 provides a summary of their distinguishing features. Carbapenemase genes can spread between different families of organisms through healthcare settings, including via the environment in the form of environmental reservoirs. These can be challenging to manage.

There are various types of carbapenemases found in CPE/CPO, with the five most significant globally being Imipenemase (IMP), Klebsiella pneumoniae carbapenemase (KPC), New Delhi metallo-β-lactamase (NDM), Oxacillinases (OXA), and Verona integron-encoded metallo-β-lactamase (VIM). All of these have been detected in patients in Australia [5] [6].

Preventing or reducing the risk of acquiring, infecting, and transmitting CPOs requires a combination of targeted surveillance to identify potentially colonised patients, antimicrobial stewardship, and effective infection prevention and control measures, including attention to environmental sources like sinks and wastewater [7-9].

Patients who acquire CPO, particularly if they have other co-morbidities, are at risk of infections, including blood stream infections. In low risk (non-intensive care) groups, the risk of blood stream infection after colonisation is about 2.4%[10]. In high-risk groups the risk of invasive infection has been reported to range from 30-60% with mortality rates of 34-49% [11, 12].

Route of transmission

Both the organism and the carbapenemase(s) can be transmitted by direct and indirect contact, most commonly by contamination of health workers' hands, shared patient equipment and the healthcare environment. Therefore, mitigation strategies are to address these transmission routes.

Public health significance

The acquisition of carbapenem resistant organisms in people attending healthcare facilities is a significant public health threat because:

- Plasmids encoding carbapenem resistance in Gram-negative organisms can be transmitted effectively between organisms of both the same and different types, including non-*Enterobacterales* species allowing spread of carbapenem resistance.
- CPOs can have environmental reservoirs with bidirectional cross contamination between patients and the environment.
- Infections caused by CPOs are usually more difficult to treat and have been associated with significant morbidity and mortality.
- Outbreaks of CPOs are well documented and may be prolonged and difficult to control.

Table 1: Summary of carbapenem resistance distinguishing features

Organism group	Lactose non-fermenters		Enterobacterales	
Resistance mechanism	**Inherent**	**Acquired carbapenemase**	**ESBL or AmpC plus prion loss**	**Acquired carbapenemase**
Carbapenem-resistant organism (CRO)	✓	✓	✓	✓
Carbapenemase-producing organism (CPO)	×	✓	×	✓
Carbapenem-resistant Enterobacterales (CRE)	×	×	✓	✓
Carbapenemase-producing Enterobacterales (CPE)	×	×	×	✓

Source: Adapted from Reflections on Infection Prevention and Control [Do you know your CRO from your CPO from your CRE from your CPE?]

1.1. About this document

This Guideline provides instruction and direction for the response to CPE in NSW Health Organisations. Although CPO is not notifiable, as the infection prevention and control implications are very similar, it is also referred to in this guidance.

Note: All clinical (infection or colonisation) CPE isolates must be reported to NSW Health.

This document should be read in conjunction with the following documents:

- NSW Health Policy Directive *Infection Prevention and Control in Healthcare Settings* (PD2023_025)
- Clinical Excellence Commission *Infection Prevention and Control Practice Handbook*
- NSW Health Policy Directive *Cleaning of the Healthcare Environment* (PD2023_018)
- NSW Health Guideline *Triggers for Escalation Following Detection of Infection Outbreaks or Clusters* (GL2024_013).

Note: Neither NSW Health nor the Clinical Excellence Commission (CEC) endorses or promotes any products or equipment identified in this document.

1.2. Key definitions

CARAlert	The National Alert System for Critical Antimicrobial Resistances. CARAlert collects, analyses and reports on nationally agreed priority organisms with critical resistances to last-line antimicrobials.
Carbapenemase enzymes	Enzymes produced by a variety of bacteria that hydrolyse carbapenems, usually along with other beta-lactams.
Carbapenemase producing organism (CPO)	An organism with an acquired gene or genes that allow the bacteria to produce one or more carbapenemases, leading to resistance to carbapenems and other beta-lactams. CPE is part of the CPO group.
Carbapenemase-producing *Enterobacterales* (CPE)	*Enterobacterales* that produce a carbapenemase, through an acquired carbapenemase gene.
Carbapenem-resistant *Enterobacterales* (CRE)	*Enterobacterales* that are resistant to carbapenem antibiotics, by a number of means, including carbapenemase gene acquisition.
Cohorting	Cohorting (zoning) or ring fencing refers to the grouping of patients with the same condition or same risk in the same area.

Contact	**Immediate contact:** A person who shared a room and/or bathroom with a confirmed CPE case for ≥ 24 hours in a health service during the CPE case's period of transmission risk. **Extended scope contact:** Criteria for extended scope contacts are determined by the facility CPE Outbreak Management Team (CPE-OMT).
CPE Case	**Confirmed CPE case:** A person with *Enterobacterales* isolated from a clinical and/or screening specimen where a carbapenemase gene is detected in a sample or isolate irrespective of phenotypic susceptibility. **Suspected CPE case:** A person with *Enterobacterales* isolated from a clinical and/or screening specimen with phenotypic characteristics suggestive of a carbapenemase gene without confirmation.
CPE colonisation	Colonisation refers to the detection of pathogenic organisms in clinical specimens in the absence of disease. Colonisation does not usually require treatment.
CPE infection	Infection refers to the detection of a pathogenic organism in the setting of either localised tissue invasion, in a normally sterile site (for example, blood stream infection) and/or in an organ (for example, pneumonia). Infection usually requires treatment.
Enterobacterales	A group of Gram-negative bacilli that occur naturally in the gastrointestinal tract.
Incident Management Team (IMT)	In this Guideline, an Incident Management Team (IMT) is a group of experts from NSW Health convened by Health Protection NSW for a system level response with the purpose of reviewing, risk assessing and making recommendations for risk management.
Local transmission	When there is epidemiological and/or laboratory evidence indicating the transmission of CPE/CPO from one person to another within the health facility.

Outbreak	The occurrence of disease exceeding the expected level for a given population within a specific timeframe. This includes single cases of some diseases not previously seen or those that have previously been eliminated. Typically, in healthcare, this has been defined as 2 or more cases, which should trigger an outbreak management process.
Outbreak Management Team (OMT)	In this Guideline, an Outbreak Management Team (OMT) is a multi-disciplinary group usually from the affected facility(ies) who work together to investigate and manage an outbreak. The core team is responsible for planning and coordinating any investigation.

1.3. Legal and legislative framework

CPE colonisation and infection are notifiable under the *Public Health Act 2010* (NSW). Laboratories are required to notify their local Public Health Unit by usual processes for non-urgent notification (electronic or fax) within 24 hours of validating a result. For more information refer to NSW Health Disease notification.

Children and young people under 18 years of age

For children and young people impacted by these guidelines, care must be provided in accordance with the Child Safe Standards as required under the *Children's Guardian Act 2019* (NSW).

Children or young people assessed at higher risk of being infected or colonised with CPE/CPO, and suspected or confirmed cases of CPE/CPO may need to undergo screening and isolation. Discussions about screening options and consent should involve the child or young person and parents/carers, in particular if more invasive methods are needed. If the isolation of a child or young person is required under these guidelines the safety of the physical environment must be considered, including supervision requirements and minimising the opportunity for harm to occur.

2. Governance

The prevention, detection, and management of Carbapenemase-producing Enterobacterales (CPE)/ carbapenemase producing organism (CPO) requires a coordinated approach in any healthcare facility, and especially in those with patients requiring complex and chronic care.

The overall surveillance and management of CPE/CPO needs collaboration between NSW Health entities including Health Protection NSW, the Clinical Excellence Commission, Local Health Districts and Specialty Health Networks (LHDs/SHNs), and NSW Health Pathology.

The local Public Health Unit will provide support (where relevant) in the investigation and reporting of an outbreak.

2.1. Local health districts and specialty health networks

Local health districts and specialty health networks must have a plan which is implemented at facilities, for the identification, response, and management of CPE/CPO. A local plan is to include the following:

- antimicrobial stewardship
- outbreak management
- information and education for patients, families, and visitors.

In the event of a possible local CPE/CPO transmission (outbreak), the facility should convene a local outbreak management team (OMT) pending whole genome sequencing.

The facility OMT is to:

- review all relevant patient information
- investigate possible transmission routes
- develop a line list (a table in which important information on each affected patient is recorded) in consultation with the PHU if necessary
- implement and oversee mitigation measures
- manage screening of contacts
- communicate, where relevant, CPE/CPO contact or status to other facilities or treating team.

2.2. NSW Health Pathology

Pathology services are to ensure that organisms phenotypically resembling CPE/CPO are further investigated using molecular methods to identify the likely carbapenemase(s) present. These results are to be communicated to treating clinicians and the local infection prevention and control team. In the setting of an outbreak, whole genome sequencing is recommended.

NSW Health Pathology must ensure proper notification processes are in place for CPE which is notifiable to the local Public Health Unit and included in the CARAlert.

Note: According to the *Public Health Act 2010* (NSW) CPE is notifiable by laboratories to NSW Health on detection of a carbapenemase gene in a species of *Enterobacterales* isolated from a clinical or screening specimen.

2.3. Public Health Units

Local Public Health Units can provide support to NSW Health Organisations in the investigation, reporting and follow-up of CPE/CPO, particularly for outbreak management.

2.4. Clinical Excellence Commission

The Clinical Excellence Commission (CEC) provides infection prevention and control expertise, guidance, and support for health services in the prevention and management of

CPE/CPO. The CEC may be included as part of the incident management team in the event of an outbreak.

The CEC is responsible for governance of the mandatory healthcare associated infection clinical indicators for NSW Health Service Level Agreements.

2.5. Health Protection NSW

Health Protection NSW (HPNSW) provides statewide surveillance for CPE notifications and shares data with LHDs and SHNs on request. HPNSW may convene an incident management team in partnership with the CEC and the LHDs/SHNs in the event of an outbreak. They will collaborate with NSW Health Pathology to coordinate whole genome sequencing when appropriate.

3. Screening, detection and investigation of CPE/CPO

Prevention of carbapenemase-producing Enterobacterales (CPE) and carbapenemase producing organism (CPO) transmission requires a combination of targeted screening for colonisation, effective laboratory identification, as well as infection prevention and control strategies for potential and confirmed cases. This section describes the minimum requirements for healthcare facilities in relation to contact tracing and screening.

NSW Health workers with infection prevention and control expertise should oversee local risk assessment to inform more extensive screening.

3.1. Screening for CPE

While evidence supporting the benefits of active surveillance primarily pertains to CPE, during a CPO outbreak, active surveillance should encompass all relevant organisms. Therefore, this section emphasizes active surveillance or screening for CPE.

The aim of screening is to identify patients with CPE, both to understand the extent of the issue and to implement appropriate infection prevention and control measures to reduce further transmission. See Figure 1 Risk assessment for CPE for more information.

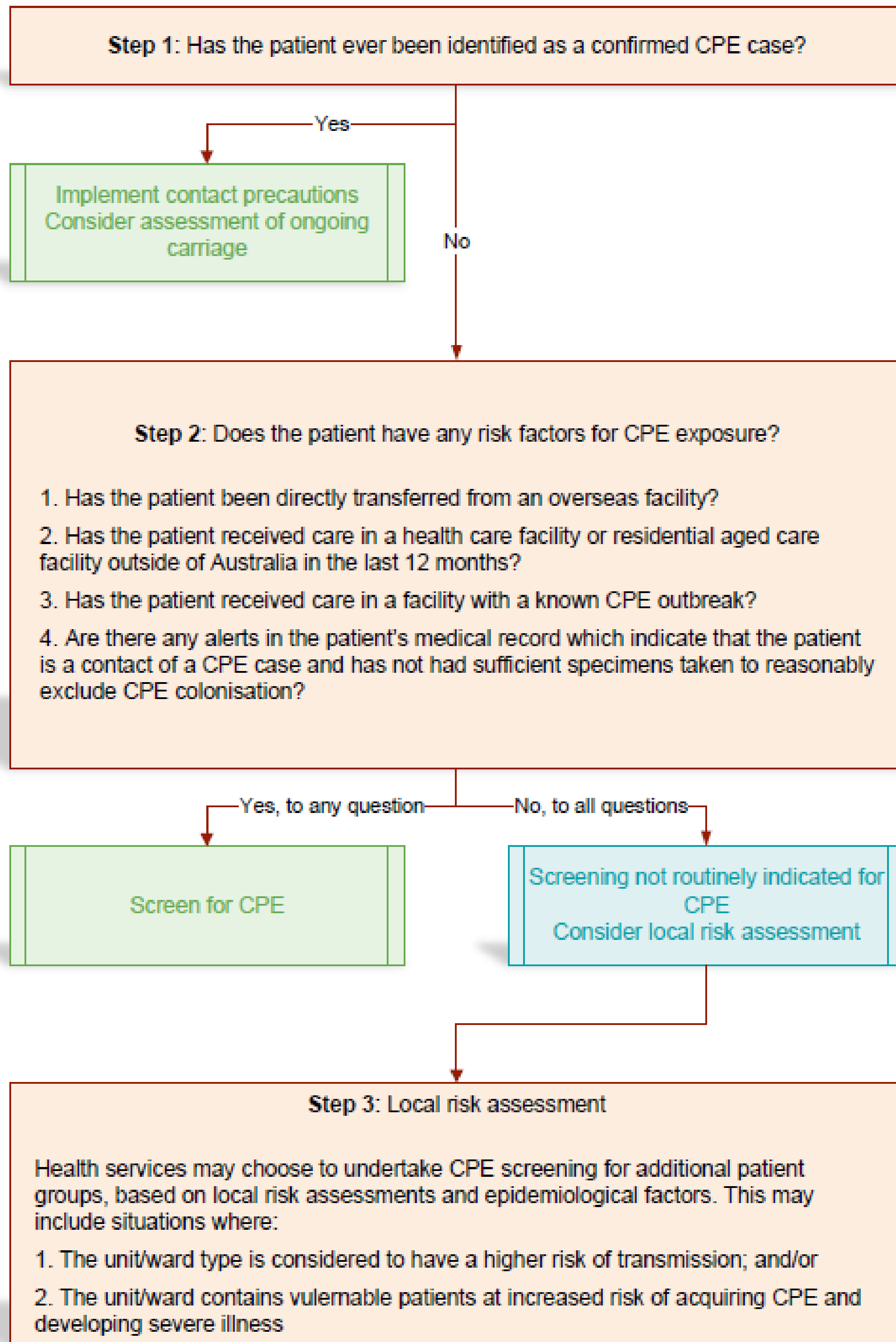
The in-patient admission process must include relevant questions to identify patients requiring screening and isolation. The following patients are at significant risk of being infected or colonised with CPE:

- a direct transfer from an overseas hospital
- receipt of care in an overseas healthcare facility or residential aged care facility (RACF) in the previous 12 months
- a room contact of a CPE case
- a ward contact of a CPE case where transmission has been identified in room contacts.

The need for pre-emptive CPE screening in high-risk units, for example, intensive care units, needs to be risk assessed and performed only after consultation with infection prevention and control, infectious diseases and/or clinical microbiology or the pathology provider.

Additional risks for CPE acquisition include mechanical ventilation and admission to an intensive care unit [13]; recent hospitalisation in a facility with a known CPE outbreak or known endemic transmission [14]; prolonged hospitalisation; dialysis or chemotherapy in the previous 12 months; and exposure to broad spectrum antimicrobial therapy.

Figure 1: Risk assessment for CPE



3.1.1. Screening procedure

Screening is recommended for patients identified as being at risk of CPE colonisation, and this should be discussed with the patient and their family or carers.

Consider 2 key aspects: which sites to swab/samples to collect and how many screening sets need to be done. For CPE, **prioritise** the following sites for swabbing/collecting samples. For example, if a faeces sample is unavailable, then perform swabs from the rectum and inguinal areas.

1. Collect a faeces sample.
2. Perform a rectal swab and an inguinal swab (ensure the rectal swab has visible faeces).
3. Perform a rectal swab only.
4. Use a perianal swab only if faeces/rectal swab cannot be obtained.

If there are wounds or indwelling devices, also obtain screening samples from wounds, urine, and other body fluids.

For other CPOs, (such as *Acinetobacter spp and Pseudomonas spp)* axillary and inguinal swabs are recommended.

For direct hospital transfers, admission screening includes at least one faecal sample and a rectal swab, both taken more than 7 days after the patient's most recent contact with an overseas facility.

Contact (room) screening involves taking at least one faecal sample or rectal swab upon detection of contact status and repeating the process 7 days after the last known CPE contact.

3.1.2. Clearance criteria

Clearance criteria for patients who have received care in an overseas health facility or residential aged care facility in the past 12 months

- Screening samples must have been taken at least 7 days after the last contact with the relevant facility with the following conditions:
  - a faeces sample has been screened and is negative, and
  - any other body fluid or other sites that have been screened have a negative result.

Clearance criteria for room or ward contacts

- two negative screening specimens/swabs taken at least 48 hours apart with the following conditions:
  - at least one of these specimens/samples must be at least 7 days after the last contact with a confirmed case, and
  - any other body fluid or other sites that have been screened have a negative result.

If there has been only one set of screening specimens prior to discharge repeat screening should be performed if readmitted within 12 months.

Clearance criteria for a known CPO case

Patients with confirmed CPE colonisation or infection can remain colonised for many months. Isolate patients pre-emptively if they tested positive for CPE within the last 12 months. Re-screening for CPE is not required unless this is being done to determine clearance. This advice also applies to patients colonised or infected with CPO.

If patients are admitted more than 12 months after their last positive test, conduct a risk assessment to determine if they are still likely to be colonised. Antibiotic exposure, for example, may prolong colonisation. If colonisation is likely, patients should be pre-emptively isolated and managed under transmission-based precautions and screening performed. At least 3 negative results from swabs/samples taken at least 24 hours apart are required before ceasing transmission-based precautions and isolation.

All swabs, including any additional swabs of wounds, urine, and other specimens, must be negative for a patient to be cleared of CPE/CPO.

3.2. Actions if one case of CPE/CPO is suspected

If a patient is suspected of having CPE/CPO based on phenotypic appearance, implement infection prevention and control precautions, as practicable, while awaiting confirmation.

Targeted infection prevention and control precautions are required to minimise the risk of CPE/CPO transmission. Standard and transmission-based precautions are detailed in section 5.1 Infection prevention and control measures for CPE/CPO case management.

3.3. Management of local transmission of CPE/CPO

Local transmission is defined as 2 or more cases of CPE/CPO that are genetically and epidemiologically related. Transmission may be from patient-to-patient, or environment-to-patient [11]. In the absence of whole genome sequencing (WGS) or if there is a delay in obtaining sequencing results, local transmission is likely, though not confirmed, when there are 2 or more cases with the same species/carbapenemase combination, or in some instances, the same carbapenemase found in different organisms. Ideally both require a plausible epidemiological link, or clustering in time and place if an environmental source is suspected. Facilities must take action to prevent further transmission for suspected or confirmed cases.

Confirming local transmission requires WGS but management should not be delayed if this is pending. Without WGS, transmission can be assumed, but some cases might be missed, especially due to multispecies plasmid transmission. The ‘incubation’ period for CPE acquisition is not well known but in one study, the median time to CPE acquisition after known exposure was 14 days (range 3 – 33 days) [15].

Each NSW Health facility must have written procedures that address outbreak management for common communicable infections and multidrug resistant organisms. Refer to the *Infection Prevention and Control Practice Handbook* and NSW Health Guideline *Triggers for*

Escalation Following Detection of Infection Outbreaks or Clusters (GL2024_013) for more information.

3.3.1. Convene an outbreak management team

NSW Health organisations should convene a local outbreak management team if a local transmission of CPE/CPO is identified (see section 1.3 Key definitions). The team should oversee contact and case identification, investigation, risk management, and communication while minimising disruption to service delivery. This is crucial if transmission occurs in a high-risk area or if the species/carbapenemase combinations have not been previously identified in the facility.

An outbreak management team usually comprises the following representatives:

- infection prevention and control
- infectious diseases and/or clinical microbiology
- patient flow
- hospital executive
- environmental services
- nursing and medical representatives from affected clinical areas
- communications/media.

Additional support is available from the Clinical Excellence Commission (CEC) and the local Public Health Unit, particularly if multiple cases are identified.

3.3.2. Additional actions to reduce transmission risk

Following a risk assessment, the outbreak management team are to consider the following actions to reduce ongoing transmission:

- Commence a screening program (identify room contacts and screen as in section 3.1.1 Screening procedure):
    - If room contacts have been transferred, ensure the risk and the need for screening are communicated to the receiving facility.
    - If room contacts have been discharged, ensure the patient/carer is given information about the risk and need for screening.
    - Where an environmental source is identified, consider performing environmental screening.
- Review environmental cleaning and disinfection.
- Review cleaning and disinfection of shared patient equipment.
- Review hand hygiene, standard and transmission-based precautions.
- Ensure patients and families/carers have adequate information.
- Consider additional measures such as:

- patient cohorting
- changing staff allocation
- restricting transfers into and out of the affected area
- closure of affected wards.

3.4. Environmental screening

Environmental reservoirs are implicated in some hospital CPE/CPO transmission episodes. These reservoirs are associated with bathroom and water environments, including contaminated sinks, wastewater drainage, patient toilets, and a patient mattress [16].

Environmental screening may be useful to detect CPE/CPO reservoirs in the setting of local transmission. Although there is limited access to environmental testing, a decision to request this must be discussed with the outbreak management team and pathology provider. Targeted screening could include sites such as toilets and surrounds, washbasins or sinks, shared patient equipment including, blood glucose monitors, blood pressure monitors, patient lifting devices, and frequently touched surfaces (for example call buttons, bedside tables, chairs, door handles, computers on wheels).

For further information on environmental assessment and management see NSW Policy Directive *Cleaning of the Healthcare Environment* (PD2023_018) and NSW Health Environmental Cleaning Standard Operating Procedures.

3.5. Laboratory testing

Local pathology laboratories will have variable capability to detect carbapenemases via phenotypic screening and/or molecular methods. Laboratories without capacity to detect carbapenemases must have an established process to refer isolates which are phenotypically consistent with CPE to a referral laboratory. The Australian Commission on Safety and Quality in Health Care has a detailed document outlining relevant laboratory testing for organisms in the CARAlert group, see the *CARAlert Laboratory Handbook 2022*.

Whole genome sequencing in combination with epidemiological review will provide the most useful information for the investigation and management of transmission of CPE/CPO within health facilities [17] [18] [19].

3.6. Antimicrobial stewardship

Antimicrobial stewardship (AMS) is critically important to reduce the emergence and spread of antibiotic-resistant pathogens such as CPE/CPO. It is essential that clinical practice ensures that the use of antibiotics is consistent with *Therapeutic Guidelines: Antibiotic*, taking into consideration local susceptibility information and local AMS. Consult Infectious Diseases physicians and/or medical Microbiologists for advice on managing antimicrobial therapy in patients with CPE/CPO infections.

3.7. Escalation pathway

NSW Health organisations are to develop internal and external communication pathways to enable timely escalation of information to the appropriate level. These procedures are to

include a documented process with triggers, response required for escalation, responsibility, and timeframes aligned with the NSW Health policy Directive *Incident Management* (PD2020_047). For more information refer to NSW Health Guideline *Triggers for Escalation Following Detection of Infection Outbreaks or Clusters* (GL2024_013).

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Additional Resources

1. Australian Commission on Safety and Quality in Health Care: *Recommendations for the control of carbapenemase-producing Enterobacterales, November 2021*
2. *Victorian guidelines on carbapenemase producing organisms for health services, version 1.1*
3. Gastroenterological Nurses College of Australia Position Statement, August 2023: *Infection Control in Endoscopy*.
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5. Appendices

1. Infection prevention and control measures for CPE/CPO case management
2. Implementation checklist for CPE/CPO

5.1. Infection prevention and control measures for CPE/CPO case management

The following applies to both suspected and confirmed cases.

Infection prevention and control measures	Actions required
Prevention of transmission	• Ensure standard precautions are in place. • Implement contact precautions including patient isolation. • Use single patient equipment and devices where possible.
Patient placement	• Patients should be placed in a single room with ensuite bathroom. • If a single room with an ensuite is not available, use a single room with access to either a dedicated toilet or commode. • Patients may be cohorted with other patients with the same organism and carbapenemase, except if they are also colonised with another multidrug resistant organism such as methicillin-resistant *Staphylococcus aureus* or vancomycin-resistant *Enterococcus*. • Any decision to cohort patients should be done in conjunction with the local infection prevention and control team. • Limit non-essential patient movement but not compromise essential treatment or investigations.
Standard precautions	• Perform hand hygiene. • Use personal protective equipment (PPE) based on risk assessment. • Needle-stick and sharps injury prevention. • Cleaning and disinfection of the environment. • Reprocess reusable medical devices and equipment. • Respiratory hygiene and cough etiquette. • Aseptic technique. • Waste disposal. • Appropriate linen management
Contact precautions	• Appropriate patient placement (single room or cohorting). • Hand hygiene. • Appropriate PPE selection and use, based on risk assessment. • Gloves as per risk assessment. If needed don immediately before patient contact and change between different tasks on same patient and must be changed between patients. • Hand hygiene must be performed before donning and after doffing gloves. • Where practical, disposable or dedicated patient care equipment. • Clean and disinfect reusable shared equipment in between use. • Enhanced cleaning of patient care areas.

Infection prevention and control measures	Actions required
Alerts and communication	• Signage indicating contact precautions should be placed outside the room. • Place an alert in the patient's medical record. Ensure the alert includes information on infection prevention and control for subsequent admissions. • Having CPE/CPO should not delay diagnostics or treatment. For example, patient should not be routinely placed last on the theatre list. • A positive CPE/CPO result on its own should not defer or delay transfer or discharge from the health facility.
Inform and educate health providers	• Infection prevention and control team must have a process for providing education to health workers. • Ensure all relevant health workers are notified of the patient's status. • Ensure that the status is communicated prior to transport within a facility or transfer to another facility including residential aged care.
Inform and educate the patient and family who are inpatients at the time of either a positive diagnosis, or who are a contact requiring screening	Provide information to the patient and family/carers on CPE/CPO considering their cultural, linguistic and health literacy: • Why they are being isolated and the use of contact precautions. • How and when to clean their hands. • Ensure easy access to hand hygiene products.
Food services	• No specific requirement for food service provision.
Laboratory	• Request confirmatory testing for CPE/CPO.
Visitors	• There are no restrictions for visitors. • They do not need to wear PPE (gloves and gowns) unless assisting with personal care such as bathing and/or toileting. • Visitors to be informed not to visit other patients in the health facility immediately after visiting a patient. • Recommended to visitors that they perform hand hygiene before and after visiting any patient in hospital.
Cleaning and disinfection of shared equipment	• Wherever possible, use single use patient equipment. • If this is not possible, equipment should be dedicated for the use of one patient for the duration of their stay and store in a way to prevent contamination. • If equipment is to be used between patients, it must be cleaned and disinfected according to the manufacturer's instructions. • The room should be free of clutter and consumables and equipment in the room kept to a minimum. • Ensure clean equipment is not stored in a 'dirty' room.

Infection prevention and control measures	Actions required
Environmental cleaning	• Daily cleaning and disinfection of the room, bathroom and associated equipment with an approved product. • Twice daily cleaning and careful attention to high-touch surfaces (for example, bed rails, call bells, IV pumps) • Terminal cleaning or discharge cleaning and disinfection as per routine, including changing of curtains.
Transport	• Any medical transport services must be informed of a patient's status at the time of booking. Multi loading is not recommended routinely but possible with appropriate cleaning and disinfection of shared equipment and environment. Refer to *Infection Prevention and Control Practice Handbook* for more information • Contact precautions in addition to standard precautions are to be maintained for the patient's transport. • The vehicle must be cleaned and disinfected with products accordance with the *Therapeutic Goods Administration* regulation.
Waste management	• Manage as per standard precautions.
Linen	• Manage as per standard precautions.
Treatment	• Patients who are colonised with CPE/CPO do not require specific treatment. • There is no recognised method for effective decolonisation although chlorhexidine body washes have been used in an outbreak situation but have not been proven to be effective in either reducing the risk of colonisation or invasive infection. • Patients who have an invasive infection with CPE/CPO need to be managed in consultation with Infectious Disease physicians and/or medical Microbiologists and concordant with local antimicrobial stewardship processes.
Antimicrobial stewardship (AMS)	• AMS is a crucial component in the prevention of multi- resistant organisms. All NSW Health facilities are required to have AMS that is effectively monitored in the organisation. • Treatment with multiple classes of antimicrobial agents has been shown to be a risk factor for CPE colonisation and/or infection. When local transmission of CPE/CPO is identified, any restriction on the use of specific antimicrobials is to be overseen by the AMS lead for the health facility or managed using existing AMS processes.

5.2. Implementation checklist for CPE/CPO

Note: this is not mandatory, however it may be helpful when looking at the facility's capacity to respond to CPE.

LHD/SHN Facility:	Assessed by:	Date:

Implementation requirements	Not applicable	Not started	Partial	Compliant	Action required
1. Local process in place for risk assessment at admission (emergency, transfer or transport and planned) for a patient with suspected or confirmed CPE	¨	¨	¨	¨	
2. Development of a communication flowchart/plan for increasing cases, patient to patient transmission or outbreaks:	¨	¨	¨	¨	
a) When to escalate within the facility	¨	¨	¨	¨	
b) When to escalate within the LHD/SHN	¨	¨	¨	¨	
c) When to escalate to the Clinical Excellence Commission (CEC) during outbreaks	¨	¨	¨	¨	
3. Health facility has identified which units/wards are considered to have higher risk due to local risk assessment and/or epidemiological factors	¨	¨	¨	¨	
4. Local process for identifying, collecting and following up screening specimens determined		¨	¨	¨	
5. Local process for assessing for ongoing carriage of CPE determined	¨	¨	¨	¨	

Implementation requirements	Not applicable	Not started	Partial	Compliant	Action required
6. Local procedure for application of alerts to patient medical records determined	¨	¨	¨	¨	
7. Local plan for staff education on CPE/CPO determined	¨	¨	¨	¨	
8. Templates (outbreak management, incident notification or patient education) modified to suit local needs	¨	¨	¨	¨	
9. Local procedure(s) for outbreak management reviewed to include CPE/CPO and the requirement for a CPE/CPO outbreak management team	¨	¨	¨	¨	
10. Local cleaning procedures for CPE/CPO reviewed	¨	¨	¨	¨	
11. Local AMS procedures reviewed to include management of CPE/CPO	¨	¨	¨	¨	
12. Review of local policy for reprocessing of bronchoscopes and endoscopes to ensure they are aligned with appropriate policy	¨	¨	¨	¨	
13. Development of a surveillance plan for CPE/CPO	¨	¨	¨	¨	
14. Development of a reporting system to local infection prevention and control committee on:	¨	¨	¨	¨	
a) CPE/CPO surveillance trends	¨	¨	¨	¨	
b) Barriers or challenges to implementation of this Guideline	¨	¨	¨	¨	
c) Incidents (including patient to patient transmission, outbreaks, breaches of	¨	¨	¨	¨	

Implementation requirements	Not applicable	Not started	Partial	Compliant	Action required
infection prevention and control)					
d) Staff education programs	..	..	..	..	
e) Adherence to screening programs	..	..	..	..	