NSW Health

Guideline

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

Guideline Summary

This Guideline has been developed to support NSW health organisations to manage the surveillance and response to Carbapenemase producing *Enterobacterales* (CPE) and other non-Enterobacterales.

This Guideline is designed to:

- Identify suspected cases of CPE and other non-*Enterobacterales*.
- Implement control measures to prevent transmission of CPE and other non-*Enterobacterales*.
- Understand the local epidemiology of CPE and other non-*Enterobacterales*.

While this Guideline has been written specifically for CPE, recommended measures may also be applicable to other carbapenemase producing organisms including non-Enterobacterales. Implementation of measures should be based on local decision in consultation with content experts.

Key Principles

Prevention or reduction of CPE acquisition and subsequent infection requires a combination of targeted surveillance and response within the health organisations. To achieve this the following principles are to be followed:

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

This Guideline provides a tool to assist NSW health organisations with developing local systems and processes to identify and manage CPE cases timely and effectively to ensure minimal impact on service provision.

Revision History

Version	Approved By	Amendment Notes
GL2024_0XX June-2024	Deputy Secretary, Population and Public Health	• Update to include Carbapenemases producing non-Enterobacterales organisms, with similar clinical consequences. • The guidance contained in this document can be used to support the investigation and management of these additional organisms, but without the need for notification.
GL2019_012 August-2019	Deputy Secretary, Population and Public Health	New guideline

Contents

1. Background

Enterobacterales are an order of Gram-negative bacilli that occur naturally in the gastrointestinal tract. They can spread outside the gastrointestinal tract and cause serious infections such as blood stream infection, pneumonia, urinary tract and wound infections. Carbapenemase producing *Enterobacterales* (CPE) are notifiable in New South Wales.

CPE produce carbapenemase enzymes which hydrolyse carbapenems (as well as other β-lactamases, such as penicillins and cephalosporins) and are therefore often resistant to carbapenems as well as many other β-lactam antibiotics. These carbapenemases are transmissible to many other organisms causing significant antimicrobial resistance.

Carbapenemases are also produced by non-*Enterobacterales* organisms, with similar clinical consequences. Therefore, the guidance contained in this document can be used to support the investigation and management of these additional organisms, but without the need for notification.

CPE have been associated with many hospital outbreaks and may become endemic [1-3]. Carbapenemase genes can be efficiently transferred between families of organisms via healthcare, including contact with the environment. Many CPE also appear to have environmental reservoirs which may be difficult to control.

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-β-lactamase (NDM), Oxacillinases (OXA) and Verona integron-encoded metallo-β-lactamase (VIM). Each of these has been identified in patients in Australia. [4]

Prevention or reduction in risk of CPE acquisition and subsequent infection requires a combination of targeted surveillance to identify potential colonised patients, antimicrobial stewardship, and effective infection prevention and control including attention to environmental sources such as sinks and waste-water [1] [5].

Patients who acquire CPE, particularly if they have other co-morbidities are at risk of infection, including blood stream infection. The risk of blood stream infection in a low risk (non-intensive care) cohort has been estimated to be about 2.4% [6]. Invasive infection risk in high-risk cohorts has been variably published to be between 30-60%.

Note: CPE infection and colonisation are included in the current set of healthcare associated infection clinical indicators for NSW acute health facilities.

1.1. About this document

The purpose of this guideline is to provide guidance on the surveillance and response to CPE and other non-*Enterobacterales*. The target audience is NSW health workers (HWs), health and care staff working in acute and non-acute healthcare settings including clinicians, infection prevention and control (IPAC) professionals, managers, and support staff. CPE are

identified as a priority pathogen by the World Health Organisation[1] and are included in the Critical Antimicrobial Resistance Alert (AURA) group of organisms for Australia[2].

Any suspected or confirmed CPE isolate from clinical, screening, or environmental samples is in scope. All CPE isolates must be reported to NSW Health.

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

NSW Infection Prevention and Control Policy Directive

Infection Prevention and Control Practice Handbook

NSW Cleaning of the Healthcare Environment Policy Directive

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

1.2. Key definitions

Carbapenemase enzymes	Beta-lactamases that hydrolyse carbapenems, usually along with other Beta-lactams
Carbapenemase-producing *Enterobacterales* (CPE)	*Enterobacterales* which produce a carbapenemase, by means of an acquired carbapenemase gene
Carbapenem resistant *Enterobacterales* (CRE)	*Enterobacterales* which are resistant to carbapenem antibiotics, by a number of means, including carbapenemase gene acquisition
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). These contacts are screened when local transmission of CPE is identified.
CPE Case	Confirmed CPE case: A person with a species of Enterobacterales isolated from a clinical and/or screening specimen where a carbapenemase

[1] WHO priority pathogen list https://www.who.int/publications/i/item/9789240093461
[2] AURA Report 2023 https://www.amr.gov.au/resources/aura-2023-fifth-australian-report-antimicrobial-use-and-resistance-human-health

	gene is detected in a sample or isolate irrespective of phenotypic susceptibility. Suspected CPE case: A person with a species of 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 requires treatment.
Enterobacterales	Gram-negative bacilli that occur naturally in the gastrointestinal tract.
Local transmission	When there is epidemiological or laboratory evidence suggestive of transmission of CPE from one person to another within the health facility.
non-Enterobacterales	Gram-negative organisms that have been identified as producing a carbapenemase enzyme but are not in the order Enterobacterales

1.3. Legal and legislative framework

CPE colonisation and infection are notifiable under the NSW Public Health Act 2010, with doctors required to notify all persons they reasonably suspect to have CPE, and laboratories required to notify all pathology tests undertaken to determine whether a person has CPE that have a positive result to Health Protection NSW via secure fax (02 9391 9189) within 24 hours of diagnosis. Laboratories are required to report all CPE isolates (including screening and clinical isolates).

2. Public health significance

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

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

Route of transmission

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

3. Governance

The detection, prevention and management of CPE requires a coordinated approach in any healthcare facility, and especially in facilities with patients requiring complex and chronic care. The overall surveillance and management of CPE requires collaboration between Health Protection, NSW Health, the Clinical Excellence Commission, Public Health Units, Local Health Districts and Specialty Health Networks, and NSW Health Pathology.

3.1. Roles and responsibilities

3.1.1. Local health districts and specialty health networks

Local health districts and specialty health networks are to have a plan for the identification, response, and management of CPE. A local plan is expected to include the following:

- Governance and communication.
- Awareness and prevention of CPE.
- Screening and detection of CPE.
- Infection prevention and control strategies including the appropriate use of transmission-based precautions and environmental cleaning.
- Outbreak management.
- Information and education for affected patients, families, and visitors.

In the event of local transmission (outbreak) of CPE, particularly if linked genomically, a local outbreak management team should be convened.

The facility outbreak management team review all relevant patient information, investigate possible transmission routes, develop a line list in consultation with the local public health unit, implement and oversee mitigation measures, manage screening of contacts, and communicate where relevant, CPE contact or CPE status.

3.1.2. NSW Health Pathology

Pathology services are to ensure that organisms phenotypically resembling CPE are further investigated using molecular methods to identify the likely carbapenemase(s) present. In the setting of an outbreak, whole genome sequencing should be considered. As CPE are notifiable and are included in the CARAlert, NSW Health Pathology are required to have processes to ensure notification takes place.

Conduct testing for CPE and report/notify results.

Note: Under the Public Health Act 2010 laboratories are required to notify the Public Health Unit via secure fax (02 9391 9189) within 24 hours of diagnosis.

3.1.3. Public Health Units

Local public health units provide support to health organisations in the investigation and reporting and follow up of CPE.

3.1.4. Clinical Excellence Commission

The CEC provides infection prevention and control expertise, guidance, and support for health services in the prevention and management of CPE. In the event of an outbreak the CEC may be included as part of the incident management team. The CEC is responsible for governance of the mandatory healthcare associated infection clinical indicators.

3.1.5. Health Protection NSW

Health Protection NSW provides statewide surveillance for CPE notifications. In the event of an outbreak, Health Protection NSW may convene an Incident Management Team in partnership with the CEC and the LHDs/SHN collaborating with NSW Health Pathology for the co-ordination of whole genome sequencing where appropriate.

4. Screening, detection and investigation of CPE

Prevention of CPE transmission requires a combination of targeted screening for colonisation, effective laboratory identification of likely CPE and 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. Local risk assessment to inform more extensive screening should be overseen by health workers with infection prevention and control expertise.

4.1. Screening

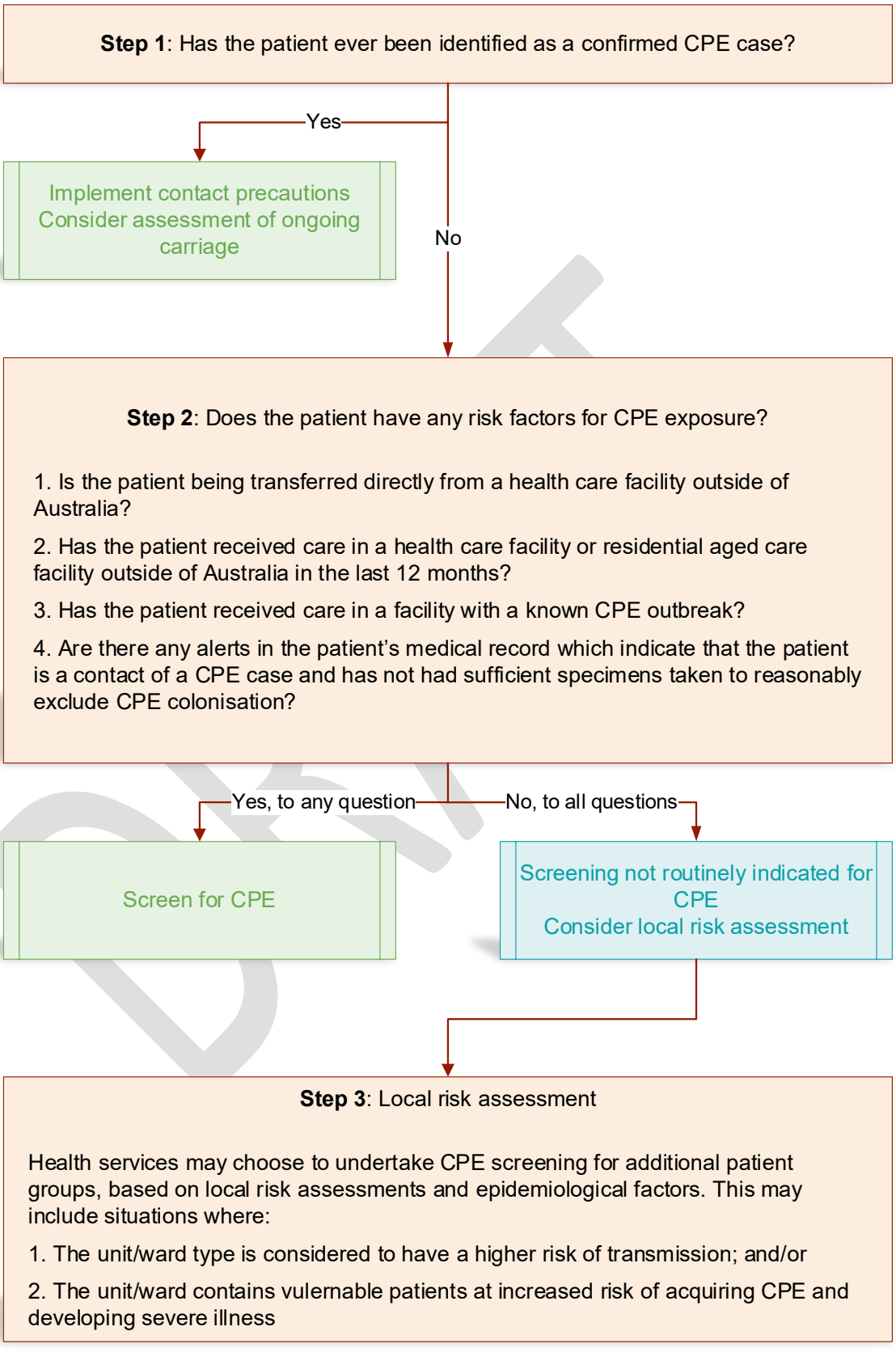
Patients at risk for CPE colonisation include those who have had healthcare overseas or healthcare in a facility with known CPE transmission. Admission processes must include questions that can identify these patients and refer them for pre-emptive isolation and screening. Early identification of CPE colonisation identifies patients most at risk of subsequent CPE infection and facilitates timely implementation of strategies to prevent CPE transmission (See Figure 1 Risk assessment for CPE for more information). When conducting a risk assessment on who should be screened for CPE the following points should be considered:

- Patients who are either a direct referral from an overseas hospital or have been hospitalised or received healthcare overseas in the preceding 12 months should be screened for CPE.
- Patients who are a room contact of a CPE case require screening if the contact has shared the same room or bathroom for a minimum of 24 hours. More extensive screening of ward contacts could be considered if there was evidence of local transmission.
- 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, and the pathology provider.

Local transmission of CPE continues to be identified and the following are risks for CPE acquisition:

- Mechanical ventilation [8]
- Recent hospitalisation in a facility with a known CPE outbreak or known endemic transmission [8] [9]
- Receipt of healthcare in an overseas hospital [10]
- Prolonged hospitalisation
- Dialysis or chemotherapy in the previous 12 months
- Exposure to broad spectrum antimicrobial therapy
- Indwelling medical devices
- Admission to an intensive care unit.

Figure 1: Risk assessment for CPE



4.1.1. Screening procedure

For patients identified at risk of CPE carriage, screening is recommended and should be discussed with the patient and relevant family/carers.

Depending on risk assessment, pre-emptive isolation and the use of contact precautions is necessary until the results of screening culture are available. This is especially important when screening a patient who has a history of care in a hospital where CPE are endemic.

There are two considerations: which sites to swab and how many screening sets need to be done. For which sites to swab, the following are recommended:

- A rectal plus inguinal swab; or a rectal swab; OR
- A faeces sample or in neutropenic patients, a perianal swab.
- If there are wounds or indwelling devices, consider also obtaining screening samples from wounds, urine, and other body fluids.
- Admission screening comprises at least one rectal swab or faecal sample AND at least one set of swabs taken more than 7 days after the patient's most recent contact with an overseas facility.
- Contact (room) screening comprises at least one rectal swab or faecal sample on detection of contact status and repeated 7 days later (after last known CPE contact).

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

4.2. Actions if one case of CPE is identified

If a patient has a suspected CPE based on phenotypic appearance infection prevention and control precautions should be implemented as practicable while pending confirmation of CPE; see Appendix 1 for a summary of infection prevention and control precautions.

4.2.1. Infection prevention and control

Targeted infection prevention and control precautions are required to minimise the risk of CPE transmission. Standard and transmission-based precautions are detailed Appendix 1: Infection prevention and control measures for CPE case management.

4.3. Local transmission (or if more than one case is identified)

Local transmission is defined as two or more cases of CPE that are genetically related. This may be from patient-to-patient, or environment-to-patient. Given either absence of whole genome sequencing or a delay in sequencing results, local transmission can also be assumed if there are two or more cases of the same organism/carbapenemase combination and a plausible epidemiological link or clustering in time and place without direct patient to patient link if an environmental source is suspected.

If local transmission is suspected or confirmed, action should be taken immediately to prevent further transmission. Confirmation by whole genome sequencing should not delay outbreak management.

Each health facility must have written procedures that address outbreak management for common communicable infections and multidrug resistant organisms. Refer to Infection prevention and control practice handbook and Triggers for escalation following detection of infection outbreaks or clusters guidelines for more information.

4.3.1. Convene an outbreak management team

If there is local transmission of CPE, a local outbreak management team should be convened to oversee contact and case identification and investigation, risk management and communication while minimizing disruption to service delivery. The outbreak management team will also escalate decisions for executive approval as required.

An outbreak management team would usually comprise the following representatives but where these are not available, the facility should contact the CEC and the local public health unit to identify assistance where appropriate:

- 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 as needed.

4.3.2. Additional actions to reduce transmission risk

Following a risk assessment the outbreak management team will consider the following actions to reduce ongoing transmission.

- Commence a screening program – identify room contacts and screen as in section 4.1.1:
    - If room contacts have been discharged or transferred, ensure the risk and the need for screening is communicated to the receiving facility.
    - Where an environmental source is implicated 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 and appropriate information.
- consider additional measures such as:

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

4.4. Environmental screening

Environmental reservoirs have been implicated in hospital CPE transmission episodes internationally and are likely to have contributed to some hospital CPE transmission episodes in Australia. Reservoirs have mostly been associated with bathroom and water environments including contaminated sinks, waste-water drainage, patient toilets and a patient mattress.

Environmental screening may be useful to detect CPE reservoirs following identification of local transmission and a decision to do environmental screening should 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 (e.g. blood glucose monitors, blood pressure monitors, patient lifting devices), and frequently touched surfaces (e.g. 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 and NSW Health Environmental cleaning standard operating procedures.

4.5. Laboratory testing

Local pathology laboratories will have variable capability to detect carbapenemases via molecular methods. It is expected that laboratories without capacity to detect carbapenemase 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 CARAlert Laboratory Handbook 2022.

4.6. Antimicrobial Stewardship

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

5. References

1 Boutin, S., Scherrer, M., Spath, I., Kocer, K., Heeg, K., and Nurjadi, D.: 'Cross-contamination of carbapenem-resistant Gram-negative bacteria between patients and the hospital environment in the first year of a newly built surgical ward', The Journal of hospital infection, 2024, 144, pp. 118-127

2 Yamagishi, T., Matsui, M., Sekizuka, T., Ito, H., Fukusumi, M., Uehira, T., Tsubokura, M., Ogawa, Y., Miyamoto, A., Nakamori, S., Tawa, A., Yoshimura, T., Yoshida, H., Hirokawa, H., Suzuki, S., Matsui, T., Shibayama, K., Kuroda, M., and Oishi, K.: 'A prolonged multispecies outbreak of IMP-6 carbapenemase-producing Enterobacterales due to horizontal transmission of the IncN plasmid', Scientific reports, 2020, 10, (1), pp. 4139

3 Tsukada, M., Miyazaki, T., Aoki, K., Yoshizawa, S., Kondo, Y., Sawa, T., Murakami, H., Sato, E., Tomida, M., Otani, M., Kumade, E., Takamori, E., Kambe, M., Ishii, Y., and Tateda, K.: 'The outbreak of multispecies carbapenemase-producing Enterobacterales associated with pediatric ward sinks: IncM1 plasmids act as vehicles for cross-species transmission', American journal of infection control, 2024

4 Aslan, A.T., and Paterson, D.L.: 'Epidemiology and clinical significance of carbapenemases in Australia: a narrative review', Internal medicine journal, 2024, 54, (4), pp. 535-544

5 Anantharajah, A., Goormaghtigh, F., Nguvuyla Mantu, E., Guler, B., Bearzatto, B., Momal, A., Werion, A., Hantson, P., Kabamba-Mukadi, B., Van Bambeke, F., Rodriguez-Villalobos, H., and Verroken, A.: 'Long-term intensive care unit outbreak of carbapenemase-producing organisms associated with contaminated sink drains', The Journal of hospital infection, 2024, 143, pp. 38-47

6 Temkin, E., Solter, E., Lugassy, C., Chen, D., Cohen, A., Schwaber, M.J., and Carmeli, Y.: 'The natural history of carbapenemase-producing Enterobacterales: progression from carriage of various carbapenemases to bloodstream infection', Clinical infectious diseases : an official publication of the Infectious Diseases Society of America, 2024

7 Flynn, E., Papanicolas, L.E., Anagnostou, N., Warner, M.S., and Rogers, G.B.: 'Carbapenemase-producing Enterobacterales: a profound threat to Australian public health', The Medical journal of Australia, 2023, 219, (7), pp. 290-292

8 Schwartz-Neiderman, A., Braun, T., Fallach, N., Schwartz, D., Carmeli, Y., and Schechner, V.: 'Risk Factors for Carbapenemase-Producing Carbapenem-Resistant Enterobacteriaceae (CP-CRE) Acquisition Among Contacts of Newly Diagnosed CP-CRE Patients', Infection control and hospital epidemiology, 2016, 37, (10), pp. 1219-1225

9 Hassoun-Kheir, N., Hussein, K., Karram, M., Saffuri, M., Badaan, S., Peleg, S., de Kraker, M.E.A., Aboelhega, W., Warman, S., Alon, T., Eluk, O., Geffen, Y., and Paul, M.: 'Risk factors for acquisition of carbapenemase-producing versus non-carbapenemase-producing enterobacterales: a case-control study', Clinical microbiology and infection : the official publication of the European Society of Clinical Microbiology and Infectious Diseases, 2023, 29, (5), pp. 629-634

10 Wielders, C.C.H., Schouls, L.M., Woudt, S.H.S., Notermans, D.W., Hendrickx, A.P.A., Bakker, J., Kuijper, E.J., Schoffelen, A.F., and de Greeff, S.C.: 'Epidemiology of carbapenem-resistant and carbapenemase-producing Enterobacterales in the Netherlands 2017-2019', Antimicrobial resistance and infection control, 2022, 11, (1), pp. 57

11 Henoun Loukili, N., Loquet, A., Perrin, A., Gaillot, O., Bruandet, A., Sendid, B., Zahar, J.R., and Nseir, S.: 'Time to intestinal clearance of carbapenemase-producing Enterobacterales in hospital patients: a longitudinal retrospective observational cohort study', The Journal of hospital infection, 2023, 135, pp. 4-10

12 Dickstein, Y., Solter, E., Schwartz, D., Nutman, A., Harevrich, I., Wulffhart, L., Carmeli, Y., and Schwaber, M.J.: 'The Israeli national policy for discontinuation of isolation of carbapenem-resistant Enterobacterales carriers by carbapenemase type: a retrospective cohort study', Clinical microbiology and infection : the official publication of the European Society of Clinical Microbiology and Infectious Diseases, 2021, 27, (10), pp. 1518 e1511-1518 e1513

13 Lim, Y.J., Park, H.Y., Lee, J.Y., Kwak, S.H., Kim, M.N., Sung, H., Kim, S.H., and Choi, S.H.: 'Clearance of carbapenemase-producing Enterobacteriaceae (CPE) carriage: a comparative study of NDM-1 and KPC CPE', Clinical microbiology and infection : the official publication of the European Society of Clinical Microbiology and Infectious Diseases, 2018, 24, (10), pp. 1104 e1105-1104 e1108

6. Appendices

6.1. Appendix 1: Infection prevention and control measures for CPE case management

The following applies to both suspected and confirmed cases.

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 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 standard precautions, don immediately before patient contact and change between different tasks on same patient and must be changed between patients. • Where practical, disposable or dedicated patient care equipment. • Clean and disinfect reusable shared equipment in between use.

Actions required	
	• Enhanced cleaning of patient care areas.
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. • A positive CPE 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 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	• Provide information to the patient and family/carers on CPE including: • The need for contact precautions and isolation. • Hand hygiene and ensure easy access to hand hygiene products. • The need for the patient to remain in their room where possible and practical.
Food services	• No specific requirement for food service provision
Laboratory	• Request confirmatory testing for CPE
Inform and educate the patient and family	• Provide information to the patient and family/carers on CPE including: • The need for contact precautions and isolation. • Hand hygiene and ensure easy access to hand hygiene products. • The need for the patient to remain in their room where possible and practical.
Inform and educate health providers	• Infection prevention and control 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.
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 organisation immediately after visiting a patient and are recommended to 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.

Actions required	
	• 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.
Environmental cleaning	• Clean and disinfect the patient's room and any associated equipment with an approved product with daily cleaning and disinfection of the room and bathroom. Careful attention to high-touch surfaces (for example bed rails, call bells, IV pump) is needed and these should be cleaned and disinfected twice daily. • Discharge cleaning and disinfection should be as for a terminal clean including changing of curtains.
Transport	• Any medical transport services must be informed of a patient's status at the time of booking. Multi loading not recommended. • 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 an approved product.
Waste management	• Manage as per standard precautions
Linen	• Manage as per standard precautions
Treatment	• Patients who are colonised with CPE 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 need to be treated in consultation with Infectious Disease and/or Microbiology and concordant with local antimicrobial stewardship processes.
Antimicrobial stewardship (AMS)	• AMS is a crucial component in the prevention of multi- resistant organisms. All 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 is identified, any restriction on the use of specific antimicrobials is to be overseen by the AMS lead for the health facility

6.2. Appendix 2: Implementation checklist for CPE

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

LHD/Facility:	Assessed by:	Date:

Implementation requirements	N/A	Not started	Partial	Full	Action required
1. Local process in place for CPE risk assessment at admission (emergency, transfer to your facility 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 Clinical Excellence Commission 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	☐	☐	☐	☐	

Implementation requirements	N/A	Not started	Partial	Full	Action required
5. Local process for assessing for ongoing carriage of CPE determined	☐	☐	☐	☐	
6. Local procedure for application of alerts to patient medical records determined	☐	☐	☐	☐	
7. Local plan for staff education on CPE determined	☐	☐	☐	☐	
8. Templates modified to suit local needs	☐	☐	☐	☐	
9. Local procedure(s) for outbreak management reviewed to include CPE and the requirement for a CPE outbreak management team	☐	☐	☐	☐	
10. Local cleaning procedures for CPE reviewed	☐	☐	☐	☐	
11. Local AMS procedures reviewed to include management of CPE	☐	☐	☐	☐	
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	☐	☐	☐	☐	
14. Development of a reporting system to local infection prevention and control committee on:	☐	☐	☐	☐	

Implementation requirements	N/A	Not started	Partial	Full	Action required
a) CPE surveillance trends	☐	☐	☐	☐	
b) Barriers or challenges to implementation of the guideline	☐	☐	☐	☐	
c) Incidents (including patient to patient transmission, outbreaks, breaches of infection prevention and control)	☐	☐	☐	☐	
d) Staff education programs	☐	☐	☐	☐	
e) Adherence to screening programs	☐	☐	☐	☐	