Victorian guideline on carbapenemase-producing Enterobacteriaceae

For health services

December 2015
Foreword

The emergence of multi-drug resistant organisms represents a real and growing threat in Victoria and across the world. We take for granted the effectiveness of antibiotics given for many common infections. This effectiveness will diminish and in time could disappear if there is not concerted action now to prevent the establishment of these organisms in our health services and community. The United Kingdom’s Chief Medical Officer, Dame Sally Davies, described the issue as a ‘ticking time bomb … arguably as important as climate change’.

Victoria has identified increasing numbers of the bacteria *Klebsiella pneumoniae* resistant to carbapenem antibiotics, described as a last line of defence against these bacteria. These bacteria have been limited to a few healthcare facilities and the responses have helped contain the problem, although the threat remains. There should be no illusions about the level of resources and commitment required to overcome such outbreaks, nor of what it would mean for health services if they became established. *Klebsiella pneumoniae* has been the main organism identified in outbreaks, but this guideline will apply to all carbapenemase-producing Enterobacteriaceae (CPE) since all CPE pose a threat of spreading critical drug resistance.

Australia is accelerating its response through such initiatives as the National Antimicrobial Resistance Strategy 2015–19. Existing national recommendations for the management of carbapenem-resistant Enterobacteriaceae are undergoing review and will be available soon. States and territories recognise that more needs to be done and that the risk to Australia from cases acquired overseas is also ongoing. So vigilance through surveillance and preparedness in planning are key steps for all of us.

Health services and other healthcare settings represent the frontline in this critical battle. The Department of Health and Human Services has established a team to help manage the response and provide critical information on whether local transmission is occurring. This support and oversight will be ongoing and strongly focused on the recommended preparedness and response recommendations in this guideline. The guidance in this document was informed by international experience, which has seen great successes and significant failures. A systems approach is needed to deal with CPE, recognising the range of interventions required and the interconnectedness of our health services. A key message is that thorough surveillance and screening of those at risk can identify CPE and prevent outbreaks from occurring. When local transmission is identified, intense control measures must be put in place and can prevent patients becoming colonised or infected. Patient safety demands nothing less.

The key actions required to address this challenge are neither new technologies nor new antibiotics; they are engagement and leadership. I urge you to become familiar with this guideline but then to take the critical next step – to establish the team of people who will ensure your health service is focused and ready for CPE. Use the guideline to inform your health service plan, and benchmark your efforts against the detailed guidance provided here.

We welcome feedback on the usefulness and practicality of this guideline. This is a space where evidence is limited but growing day by day. Your experience in applying this guidance and in dealing with cases of CPE will be invaluable as we go forward.

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Glossary

Carbapenem-resistant Enterobacteriaceae
The term carbapenem-resistant Enterobacteriaceae (CRE) refers to bacteria that are members of the family Enterobacteriaceae that have been found to have resistance to carbapenem antibiotics by any mechanism.

Carbapenemase-producing Enterobacteriaceae
The term carbapenemase-producing Enterobacteriaceae (CPE) refers to bacteria that are members of the family Enterobacteriaceae that have been identified to carry a carbapenemase gene.

Case

Suspected case
A person with a species of Enterobacteriaceae isolated from routine clinical or screening specimens (infection or colonisation), with any of the following:

- meropenem minimum inhibitory concentrations (MIC) ≥ 0.5mg/L, or disc diffusion zone ≤ 24 mm (CLSI or EUCAST), or CDS disc diffusion zone ≤ 6 mm, or
- phenotypic resistance to any carbapenem where the MIC is above the clinical breakpoint as defined by CLSI or EUCAST or zone diameter suggests resistance by CDS, or
- positive colorimetric test for carbapenemase (Carba NP or Blue-Carba).

This definition of suspected case will capture patients who are colonised or infected with bacteria that are more likely to eventually be found to be either CRE or CPE, in recognition of the need to take similar infection control action at the initial point of suspicion, prior to determining whether the bacteria is CPE.

Confirmed case
A person meeting the definition of a suspected case and where a carbapenemase gene is detected in a sample or isolate irrespective of phenotypic susceptibility, for example, KPC2 gene-positive Klebsiella pneumoniae.

This definition intends for the term 'confirmed case' to refer to a person who is colonised or infected with a CPE.

Potentially locally acquired case
A confirmed case of CPE who has not had an overnight stay or a healthcare encounter in a residential care facility, health service or primary care setting overseas in the 12 months prior to confirmation.

Individuals can acquire CPE from overseas travel in the absence of specific healthcare encounters. This guideline adopts a precautionary approach, by considering that confirmed cases of CPE who have not had the exposures to healthcare settings in this definition may have acquired CPE in Australia.

Rejected case
A person meeting the definition of a suspected case where comprehensive microbiological testing at MDU PHL has not detected a carbapenemase gene, irrespective of phenotypic susceptibility.
**Sporadic case**
A confirmed case of CPE where an appropriate investigation has not established an epidemiological link to another case.

**Clearance**
In this guideline clearance is a term that refers to applying criteria to determine that an individual no longer requires infection control precautions in relation to a risk of transmission of CPE.

Further detail – see ‘Clearance of cases’ in Section 3.

**Contact**
An individual who is exposed to a person (a case) colonised or infected with CPE in a manner that might allow transmission to occur or a CPE-contaminated environment where there is an increased risk of acquisition of CPE, and refers to two categories of contact – a room contact, and a ward contact.

If a person meets the criteria for being considered a case of CPE (suspected or confirmed), they should be managed as a case of CPE and not as a CPE contact.

Further detail – see ‘Contact tracing’ in Section 3.

**Frequently touched surfaces**
As per national guidelines, surfaces can be divided into two groups – those with minimal hand contact (for example, floors and ceilings) and those with frequent skin contact (‘frequently touched’ or ‘high-risk’ surfaces). Frequently touched surfaces include doorknobs, bedrails, over-bed tables, light switches, tabletops and wall areas around the toilet in the patient’s room.

**Genotypic resistance**
The detection of a resistance gene in an organism.

**Outbreak**
An outbreak is defined as: two or more confirmed cases of genetically closely related CPE that are compatible with local transmission and with a plausible epidemiological link, without an alternative explanation. The definition is deliberately inclusive. In contrast see definition of ‘sporadic case’ above.

**Phenotypic resistance**
Resistance as seen in a phenotypic susceptibility test using the interpretive criteria defined by the susceptibility testing system being used (EUCAST, CLSI or CDC). For example a *Klebsiella pneumoniae* with a meropenem MIC of 16 mg/L is phenotypically resistant to meropenem.

**Potential period of infectiousness**
This concept is explained in further detail in Section 3, under ‘Contact tracing’.

**Room contact**
A room contact is a person who resided overnight in a health service in a shared room with a case during the case’s period of potential infectiousness, or resided overnight in a different room in a health service but where there was a shared bathroom with a case.
On an exceptional basis only, when there have been other forms of close contact, for example a person has resided in the same house as a case for a period of time, the Victorian CPE Incident Management Team might assess that a person may be considered a ‘room contact’ for management purposes.

**Transmission risk area**

A transmission risk area (TRA) is an area in which local transmission is occurring or is suspected to have occurred. That is, CPE has spread from one person to another in a healthcare setting in Victoria. This concept is explained in further detail in Section 2.

**Ward contact**

A ward contact is a person who resided overnight in a transmission risk area (ward or unit or otherwise classified area) before that ward has returned four consecutive negative point prevalence screens spaced at least a week apart.
Section 1: Background

Scope of the Victorian CPE guideline

Victorian health services

This guideline applies to all paediatric and adult health services in Victoria. A health service refers to any public or private health service that admits patients overnight. The term health service also specifically includes dialysis units, regardless of location, due to the nature of the patients treated and the risk of transmission of serious infections.

This guideline has recommendations that are relevant for a wide range of health professionals, including general and specialist clinical staff, allied health professionals with responsibility for care of hospitalised patients, microbiology laboratory staff and general practitioners.

Any isolation of a suspected or confirmed CPE is in scope, as defined in the glossary of this guideline.

This guideline is relevant for all funded organisations including health services (public health services, public hospitals, denominational hospitals and multipurpose services) plus private hospitals, day procedure centres and satellite dialysis units.

Residential care facilities

This guideline does not apply to residential care facilities in Victoria. The principles of management of patients with CPE as outlined in the guideline can be applied in any setting, however it is the intention of the department to develop a more specific guideline on CPE in the future for residential care facilities.

Microbiological scope

This guideline provides recommendations around the detection and response to species of Enterobacteriaceae (see Figure 1 below) that contain a gene sequence specific for carbapenemase production that results in phenotypic resistance to carbapenems (carbapenemase-producing Enterobacteriaceae). In this guideline, CPE is used to define Enterobacteriaceae that contain a carbapenemase-encoding gene. Carbapenemase gene families that have so far been detected in Enterobacteriaceae in Australia include IMP, VIM, OXA-48 and OXA-48-like, KPC and NDM.

Figure 1: List of Enterobacteriaceae

Enterobacteriaceae include the following species:

- Cedeca spp.
- Citrobacter spp.
- Cronobacter spp.
- Edwardsiella spp.
- Enterobacter spp.
- Escherichia spp.
- Ewingella spp.
- Hafnia alvei
- Klebsiella spp.
- Kluvyera spp.
- Leclercia spp.
- Morganella spp.
- Pantoea spp.
- Plesiomonas spp.
- Proteus spp.
- Providencia spp.
- Raoulitea spp.
- Salmonella spp.
- Serratia spp.
- Shigella spp.
- Yersinia spp.

Suspected CPE are Enterobacteriaceae that have phenotypic characteristics suggestive of carbapenemase gene presence, but have not yet been confirmed. Confirmed CPE are
Enterobacteriaceae where presence of a carbapenemase-encoding gene has been confirmed by PCR or genome sequencing. A positive carbapenemase gene PCR assay refers to the situation where a PCR assay is positive for a known carbapenemase gene from a clinical sample, screening sample or environmental sample.

This guideline is designed to detect and respond to any carbapenemase-producing Enterobacteriaceae, and does not include Pseudomonas spp. and Acinetobacter spp. that are not Enterobacteriaceae. While carbapenemase presence and carbapenem resistance in these species is also clinically important and health services should take appropriate action, they are beyond the scope of this document.

The inclusion of CPE in scope is consistent with the 2015 national guidelines and reflects the greater risk that CPE carries for local transmission, including health service outbreaks and potential multi-jurisdictional spread or establishment of endemicity. Specific control measures are required for non-CP CRE to prevent emergence and spread, but this is beyond the scope of this document. These actions, however, are similar to those required for a variety of multi-resistant organisms, specified in national infection control guidance. See https://www.nhmrc.gov.au/guidelines-publications/cd33

**Epidemiology of CPE**

**Epidemiology of CPE in Australia**

Australia has not seen a level of CPE cases compared with some areas in Europe, North America, the Middle East and Asia. This may be in part due to its geographic isolation. This creates an opportunity for proactive measures to prevent, detect and contain CPE and thereby limit their impact on human health.

**Epidemiology of CPE in Victoria**

Since 2012, an increasing number of KPC-producing Klebsiella pneumoniae have been identified in Victoria. Epidemiological data and genomic analysis of clusters indicated that local transmission had occurred.

Epidemiological investigation has indicated that each genomic cluster appears to have a strong or exclusive relationship with individual health services. This suggests that transmission in Victoria is primarily through healthcare-associated spread, without recognisable ongoing community transmission.

In all clusters, transmission from cases previously known to be colonised or infected is suspected. In addition, there is evidence of missed detection of potentially exposed patients who are subsequently identified with colonisation or infection.

Other than low level IMP-4 endemicity, CPE are not believed to be endemic in Victoria, either in healthcare settings or in the community. The recommendations in this guideline reflect this status. The approaches are therefore focused on prevention and, where identified, elimination of any ongoing local transmission.

**Risk factors for CPE**

**Higher-risk patients for acquiring CPE**

Risk factors for acquiring CPE are being identified in the scientific literature and will be subject to change in some cases. To provide guidance to health services for the purposes of directing screening, the following risk factors in Figure 2 are considered to be associated with an increased risk of becoming colonised with CPE.
Figure 2: Higher-risk patients for acquiring CPE (adapted from Commission recommendations)

- A hospital stay within the previous 12 months in an area with documented or suspected CPE (for example a transmission risk area as defined in this guideline, or an overseas country)
- A prolonged hospital stay
- Multiple or recent exposures to different antibiotic agents, including extended-spectrum penicillins, cephalosporins, fluoroquinolones and carbapenems
- Diabetes mellitus
- An indwelling medical device, such as a central venous catheter, urinary catheter, biliary catheter or wound drain
- An organ or stem-cell transplant
- Admission to the intensive care unit
- Mechanical ventilation
- Poor functional status

Higher-risk of severe illness due to CPE

Within the list of patients listed in Figure 2, some patients are considered to be at increased risk of severe illness and increased mortality. These patients are listed below in Figure 3.

Figure 3: Higher-risk of severe illness due to CPE

- A patient with an organ or stem-cell transplant
- A patient admitted to the intensive care unit
- A haematology patient

Higher-risk patient for onwards transmission of CPE

The following persons in Figure 4 may be at greater risk of spreading CPE, and will be referred to as higher-risk patients for onwards transmission. Specific patient-risk factors are adapted from the 2011 Victorian Department of Health Patient-centred risk management strategy for multi-resistant organisms.

Figure 4: Higher-risk patients for onwards transmission (in CPE cases)

- Specific patient-risk factors:
  - copious or uncontained drainage from wound/abscess
  - diarhoea, incontinent of stool, intestinal stoma, colorectal procedure or surgery
  - copious or uncontained respiratory secretions / urine
  - urinary catheter
- Patients who have difficulty complying with hygiene and self-care, for example patients living with dementia with wandering behaviours
- High-acuity patients – admitted to ICU, patient with burns, malignant haematology patient
Section 2: Governance

Requirements for health service management plans

Health services have a responsibility for preventing and managing CPE by:

- minimising risk of local transmission through prompt identification of at-risk individuals, routine application of transmission-based precautions, and increased compliance with hand hygiene
- maintaining a high level of vigilance through routine surveillance
- providing a coordinated, transparent, accountable and collaborative response to any case
- ensuring good staff awareness, competence and confidence in preventing and managing cases.

Principles of management plans for CPE

Plans should follow principles outlined below:

- All health services should develop plans for the prevention, detection and management of CPE.
- Strict compliance with the recommended control measures by health service personnel is required to limit local transmission of CPE.
- Appropriate staff education on CPE and infection control is required.

Content of management plans

Health service plans should include all the essential areas covered in this guideline. The guideline is intended to provide a template for health services.

Any health service staff member managing a suspected or confirmed case of CPE should be familiar with the required actions, how to check that these are in place, and know who to contact for assistance.

Specifically, the following areas should be covered in any health services plan:

- governance and communication
- awareness and prevention of CPE
- screening and detection of CPE
- infection prevention and control measures.

Identifying actions required in health services

Risk stratification definitions and classification in this guide

Different actions are recommended for different health service settings based on whether CPE has been identified in that setting.

**Tier 0 health services** are health services where no confirmed cases of CPE have been identified for more than 12 months. The advice for Tier 0 health services is styled as ‘in settings with no cases (Tier 0)’ and applies to the whole health service.

**Tier 1 health services** are health services where one or more confirmed sporadic cases of CPE have been identified. The advice for Tier 1 health services is styled as ‘in settings with sporadic cases (Tier 1)’, and applies to the geography within the health service that has been affected by a sporadic case. For example when a health service has identified a sporadic case of CPE in a haematology ward, the advice applies to that ward (or any ward where identified contacts have moved to).

**Tier 2a health services** are health services where local transmission has been identified. The advice for Tier 2a health services is styled as ‘in settings with local transmission (Tier 2a)’ and applies to the
geography within the health service that has been classified by the Victorian CPE Incident Management Team (VCIMT) as a transmission risk area.

**A Tier 2b health service** is also known as an ‘at-risk facility’. If, within a 12-month period, two or more wards or units meet the criteria for a transmission risk area (and are affected by related CPE through molecular or genetic confirmation) then the facility may be classified by the VCIMT as an ‘at-risk facility’. This classification may also occur if single cases occur in more than one ward or unit with a plausible epidemiological link (such as shared nursing staff) and without an alternative explanation for the likely transmission.

This means the facility is assessed as ‘at risk’ of having widespread transmission and specific additional control measures should be considered. Such measures may include daily or weekly audits; wider or more frequent screening measures; and/or the establishment of a dedicated ward or wing for suspected and confirmed cases. Further information on tiers of risk is available in work by Grundmann et al.¹

**Concept of transmission risk areas**

**Transmission risk area**

A transmission risk area (TRA) is an area in which local transmission is occurring or is suspected to have occurred. That is, CPE has spread from one person to another in a healthcare setting in Victoria. It is defined as an area (usually a geographically distinct ward or unit) where the following criteria are deemed met by the VCIMT:

- there are two or more confirmed cases of genetically related CPE, and
- at least one case is a locally acquired case, and
- there is a plausible epidemiological connection between the two cases, either through geographic proximity or shared staff, equipment or other exposures.

**Stand-down of TRA**

A TRA is a term that will apply until 12 months from the last date a potentially infectious case was on the TRA not in contact precautions. At 12 months, the VCIMT will determine whether TRA status will change or be stood-down.

Screening and infection control precautions are outlined later, and are summarised below:

- For the first four weeks:
  - all patients on the ward are considered ward contacts (requiring clearance upon transfer to another facility or ward)
  - all patients should be screened weekly*
  - include that negative patients should still be screened weekly. If positive, screening should cease.
- From four weeks to six months:
  - patients are no longer considered ward contacts
  - all patients should be screened monthly* (a monthly point prevalence).
- From six months to 12 months:
  - patients are no longer considered ward contacts

– all patients should be screened quarterly* (a quarterly point prevalence).

*After assessment by the VCIMT, the 12-month period starts again if there is a positive finding indicating local transmission.

Roles and responsibilities

Department of Health and Human Services

The Department of Health and Human Services will be the first point of contact for reporting suspected or confirmed CPE cases, and will maintain the database for all information collected during the investigation of cases.

The relevant roles for the Department of Health and Human Services include:

- maintaining a notifiable conditions surveillance and response capability and capacity
- providing oversight of quality and safety in Victorian health services
- activating and maintaining a Victorian CPE Incident Management Team when required.

Microbiological Diagnostic Unit Public Health Laboratory

MDU PHL is Victoria’s bacterial public health reference laboratory and receives reports and isolates of suspected and confirmed CPE, confirms CPE, characterises and sequences CPE isolates to establish local transmission, and supports the VCIMT.

Victorian Healthcare Acquired Infection Surveillance System (VICNISS)

VICNISS has been collecting healthcare-acquired infection surveillance data on a range of conditions from both public and private healthcare facilities for a number of years. VICNISS will coordinate collection of data, audit CPE response in health services and provide advice on CPE prevention and control to health services.

Victorian CPE Surveillance and Response Unit

The Victorian CPE Surveillance and Response Unit is a term that describes the joint work of VICNISS and the MDU PHL in assessing and responding to CPE in Victoria. This Unit is based at the Peter Doherty Institute for Infections and Immunity.

A short guide to actions required that relate to the work of the Unit can be found at Appendix A.

Health services

Health services need to implement this guideline, and they have a number of specific roles and responsibilities as outlined in each chapter of this guideline.

Diagnostic microbiology laboratories

Diagnostic laboratories have a role to identify suspected CPE, and to report suspected CPE to the department by faxing the result within one business day to 1300 651 170, and to send isolates to MDU PHL for characterisation. After confirmation, the diagnostic laboratory should notify the health service infection control lead and executive as agreed locally.

For information on detailed actions and timelines, see Appendix A.

Victorian CPE Incident Management Team

The Victorian CPE Incident Management Team (VCIMT) is constituted to support and oversee the public health and health service response to CPE. The VCIMT is activated at the discretion of the department
by the identification of possible or confirmed local transmission of CPE within Victoria, and will remain activated as long as coordination of risk assessment and management is required.

The VCIMT is chaired by the Victorian Chief Health Officer or delegate, and will provide advice and guidance on required control measures based on the authority of the Public Health and Wellbeing Act 2008. The membership of the VCIMT will include expertise in public health medicine, microbiology, infectious diseases, epidemiology, infection prevention and control, communications and health service performance and quality assurance. A member from a health service(s) incident management team may be invited to join the VCIMT. The VCIMT will be supported in its functions by MDU PHL, VICNISS and other agencies, who will perform roles such as assisting in collection of information and provision of advice and guidance.

The VCIMT will oversee a range of actions, including coordinating a risk assessment, undertaking an epidemiological and microbiological investigation, determining the requirement for control measures and coordinating risk communication activities.

The key decisions that the VCIMT has the authority to make include:

- audits of infection prevention and control measures, and other control measures, and compliance with these measures, at a health service
- oversee criteria for clearance of cases previously colonised with CPE
- classification of, and stand-down of, a transmission risk area
- classification of a Tier 2b ‘at-risk’ facility
- determining any other investigation, control action or communication required.

The need for coordination of the response to the threat of CPE means that on occasion, there may be different views formed by individual professionals, health services, a health services IMT or the department as to actions relating to the control and risk communication relating to CPE. The VCIMT will retain the responsibility through the chair for final decisions on any matter of assessment, control or communication when there is not unanimous agreement as to the required approach.

**Health Service Incident Management Team**

A Health Service Incident Management Team (HSIMT) is an approach that can provide best practice governance for a response to transmission of CPE within a health service. An HSIMT should be established when there is confirmation of local transmission of CPE.

An HSIMT will be activated at the discretion of the relevant lead at a health service. Membership could include representatives from:

- the health service executive (chair)
- the affected ward/unit – for example nurse unit manager, medical lead
- infectious diseases
- infection prevention and control
- microbiology – for example a consultant medical microbiologist
- environmental services.

The formulation/configuration of the team can be discussed with the department at the time of identification. Appointed external experts may include infectious diseases physicians and infection control professional from another health service, and microbiologists from an external laboratory.

The HSIMT should ensure that:

- there is timely notification of suspected cases
- all required data is collected and provided to the VCIMT
- all control measures recommended in this guideline or by the VCIMT are implemented, including audits
• any media and risk communication is undertaken in an agreed manner with the department, which has the lead for outbreak communication in this area.

Scenario 1

The haematology ward (Acacia Ward) at Valhalla Hospital has had three patients confirmed with the same Klebsiella pneumoniae KPC within a three-week period. The Victorian CPE Incident Management Team (VCIMT) classifies Acacia Ward as a transmission risk area (TRA) and Valhalla Hospital as a Tier 2a health service. Valhalla Hospital convenes a Health Service Incident Management Team (HSIMT) to coordinate the response and interventions at the health-service level. The HSIMT includes a member of the health service executive, an infection control consultant, the Acacia Ward nurse unit manager, the medical director of the haematology unit and the manager of environmental services. They also receive infectious disease advice as they would routinely from a tertiary hospital in Melbourne. The HSIMT liaise directly with the VCIMT to provide all data required, information about interventions instituted and results of audits undertaken.

Auditing the CPE response in Victoria

Audit of preparedness and response arrangements by health services is important and example local audit checklists for health services are included in Appendix B and Appendix C. The department may initiate an audit of health service preparedness and response arrangements and will use a similar tool. The method of conducting audit of CPE responses will depend on the status of the health service, according to the Tier, up to the most concerning situation which would be a classified a Tier 2b or ‘at-risk facility’. The method intended is outlined below:

**Tier 0 health services**: annual local audits, laboratory capacity for CPE detection and alert system for cases. Health services should comply with national standards around infection prevention and control, which should include internal audit of those arrangements.

**Tier 1 health services**: regular local audits, staff education audit / hand hygiene, audit compliance with infection control measures.

**Tier 2a health services**: in addition to regular local audits and staff education, the department may initiate an audit of the adequacy of adherence to this guideline.

**Tier 2b (at-risk facility)**: in addition to the above, a departmental performance review of infection control management at the health service may be initiated, for example inclusion on regular performance reviews.
Section 3: Screening, detection and investigation of CPE

Surveillance strategy

The objective of surveillance for CPE in Victoria is to detect all cases of CPE in order to understand the extent of the problem and to ensure infection control processes and outbreak management are applied whenever necessary. A precautionary approach will be applied.

The guideline will approach the objective by describing the minimum requirements of health services for screening of patients for CPE, based on the Tier of the health service. Using scientific understanding of risk factors for acquisition, transmission and factors associated with increased severity of illness (Figure 2 and Figure 3), the recommendations below describe the minimum frequency and extent of screening for different cohorts of patients in different parts of the health system in Victoria.

In order to detect CPE that are not manifested as phenotypic resistance (that is, are less than or equal to the susceptible breakpoint of the susceptibility testing system being used), the meropenem cut-off point is lowered in order to be inclusive.

Data collection for a case of CPE

Suspected cases of CPE require immediate infection prevention and control measures.

All isolates of suspected or confirmed CPE are to be referred to the Microbiological Diagnostic Unit Public Health Laboratory (MDU PHL) for further confirmation and typing. Isolates are to be accompanied by a completed laboratory CPE isolate referral form (Appendix D).

After identifying a suspected case of CPE, the health service infection control lead or an appropriate delegate must complete Part A of the data collection form within one business day of identification of the case, as shown in Appendix E. This form should be provided to VICNISS through the contact information at the top of the form.

After the case is confirmed, the health service infection control lead or delegate should complete Part B of the data collection form (Appendix F). This form should be provided to the VICNISS through the contact information at the top of the form.

Contact tracing and screening of patients

This section describes minimum standards health services must adhere to in relation to contact tracing and screening. A health service may choose to undertake more extensive contact tracing based on a local risk assessment. This should be undertaken or overseen by an infection control professional or equivalent.

Purpose of contact tracing

The purpose of contact tracing is to identify potentially infected or colonised patients and to manage risk of transmission from these patients. This occurs by identifying which patients should be screened and over what period of time this should occur, and may also involve providing information or pre-emptive isolation until a person is cleared.
Populations to be contact traced and/or screened

This guideline defines five populations of interest for the purpose of contact tracing and screening:

- patients requiring pre-emptive isolation and screening (PRIS – see below)
- patients who are being screened as part of a six-monthly survey who are admitted to particular wards
- room contacts, who are people who resided overnight in a room or shared a bathroom overnight with a case (see glossary)
- patients who resided overnight on a ward where there was a sporadic case of CPE in a CPE case with significant risk factors for onwards transmission, but where that ward is not a TRA
- ward contacts, who are people who resided overnight in a ward or area formally designated as a transmission risk area (see glossary).

Patients requiring pre-emptive isolation and screening (PRIS)

The following patients are at significantly higher risk of being colonised or infected with CPE so that contact precautions and screening are always required on admission to a Victorian health service. See Figure 5 below. Details on requirements for transmission-based precautions for PRIS can be found in Section 4.

Figure 5: Patients requiring pre-emptive isolation and screening

- Direct transfer from an overseas hospital
- Overnight stay in an overseas hospital or residential care facility in previous 12 months
- A room contact of a CPE case who has not achieved criteria for being ‘cleared’
- A ward contact of a CPE case from a transmission risk area who has not achieved criteria for being ‘cleared’

Populations where there is no requirement for contact tracing

Healthcare workers who care for a case of CPE are not generally recommended for follow-up, although a health service may choose to undertake follow up of staff if they deem it necessary. There is no recommendation to undertake contact tracing for community contacts such as household contacts of cases, although such activity could be undertaken at the discretion of the department if required. In general, household contacts are not recommended for follow-up.

Determining the period in which to undertake contact tracing

When determining the contact tracing required for a case of CPE, the health service first needs to make a judgment about the date of likely acquisition of the CPE bacteria in the case, and thus the potential period of infectiousness of the case.

The date of likely acquisition depends on epidemiological factors, such as when contact first occurred with a known case with the same strain, or with a transmission risk area, or an overseas hospital admission in the absence of local risks. In most cases, the health service will need to determine the date of likely acquisition, although in a complex outbreak situation the Victorian CPE Incident Management Team (VCIMT) may provide advice or a specific direction.

The potential period of infectiousness then needs to be estimated in order to put a start and end date on contact tracing.

Where the date of likely acquisition is unknown then the period of potential infectiousness is – for practical purposes – a month prior to the date of CPE isolation until the time contact precautions are put in place for the case.
Requirements for contact tracing and screening

In settings with no cases (Tier 0)

The health service must:

- screen PRIS patients on admission, and
- screen patients on each readmission who have ever had CPE isolated at any point in the past unless screened within the four weeks prior to admission,* and
- screen all patients on all transplant wards, haematology wards and all intensive care units every six months as part of a point prevalence survey.

The health service could:

- consider screening inpatients who have risk factors for acquiring CPE (see Figure 2: Higher-risk patients for acquiring CPE).

* The purpose of re-screening patients known to have CPE in the past is to improve understanding of the length of carriage and to inform the assessment of risk. There is no need to do this if a patient was screened on an admission and was then discharged and readmitted within a four week period. Contact precautions and other measures are required regardless of the outcome of the screening result.

In settings with sporadic cases (Tier 1)

The health service must:

- follow requirements for Tier 0 health services above
- screen room contacts and apply clearance criteria (see below) before lifting infection control precautions for those room contacts
- ensure that all discharged room contacts have alerts placed on their medical record so that they are placed into contact precautions and screened if readmitted within the next 12 months
- undertake a single once-off screen of all patients who resided overnight on the ward at the time of a sporadic case being identified who has an elevated risk of transmission (that is, who is listed in Figure 4: Higher-risk patients for acquiring CPE).

When an apparently sporadic case has been identified in the past, limiting screening to room contacts of that patient has failed to identify local transmission. Further cases have then been identified through testing of patients admitted some time later whose only link was an admission to another part of the same ward. This indicates that spread outside of the case’s room does occur, either through unrecognised patient contact, fomites or through wider environmental contamination on a ward on which a case is admitted.

The risk of transmission to room contacts is considered significant. If the case is not a higher-risk patient for onwards transmission (Figure 4), then contact tracing should identify and follow up all room contacts back to the date of likely acquisition, or one month prior to the date of identification of CPE in the case, whichever is more recent.

If transmission is more likely – that is, the case is a higher-risk patient for onwards transmission – then contact tracing should follow up all room contacts back to the date of likely acquisition or six months prior to the date of identification of CPE in the case, whichever is more recent. This is because CPE can be carried and excreted for many months so there may be an ongoing risk to other patients from a room contact of a case of CPE.

In settings with local transmission (Tier 2a)

The health service must:

- follow requirements for Tier 0 and Tier 1 health services above
- screen all patients in the transmission risk area each week until there are at least four consecutive weeks of negative screens
- ensure that all ward contacts are screened within the seven days prior to transfer to another health service and are negative, otherwise the health service receiving the patient must ensure that the patient is placed in contact precautions until cleared
- ensure that all discharged ward contacts have alerts placed on their medical record so that they are placed into contact precautions and screened if readmitted within the next 12 months.

The risk of transmission to ward contacts is probably less than for room contacts, but can be difficult to quantify. Contact tracing should identify and follow up all ward contacts back to the date of likely acquisition of the first case in the TRA outbreak or one month prior to the date of identification of CPE in that case, whichever is more recent.

In addition if a room contact has been transferred to another health service and not screened, then in addition to generating an alert, notify the receiving health service. The receiving health service should create an alert at a minimum, and may consider further follow-up on a case-by-case basis, noting that many patients may have been discharged, re-transferred or died.

**Scenario 2**

Mr King is a liver transplant patient with faecal incontinence and confusion who was admitted on 5 February 2015 into a four-bed bay on a general medical ward of a large tertiary hospital. On 12 February 2015, Mr King was transferred to a two-bed room on the liver transplant ward for ongoing management. On 19 February 2015, a stool sample is obtained as part of routine point-prevalence screening and on 21 February the Infection Control Team is notified by the laboratory that a suspected CPE has been identified. Mr King is moved immediately to a single room and contact precautions are commenced.

The isolate is confirmed as a CPE on 24 February 2015 by MDU PHL. Completion of the CPE surveillance form by the health service’s infection control lead reveals he did not travel overseas for at least 10 years and has no known contacts with cases of CPE. Therefore the time when he acquired CPE cannot be determined. Mr King’s last admission to a health service was more than six months prior to this admission. There have been no other CPE cases recognised at this health service. This case is classified by the VCIMT as a sporadic case and as such places the health service into Tier 1.

Mr King is identified as a higher-risk patient for onwards transmission due to his faecal incontinence and confusion. As such, the period for contact tracing of room contacts is extended to a maximum of six months prior to contact precautions being implemented. A single once-off screen of all patients who resided overnight on the ward on 19 February 2015 is undertaken. As his last admission was more than six months ago, all room contacts from the date of this admission (5 February 2015) to the date Mr King was placed into a single room with contact precautions (21 February 2015) are identified.

Two of his room contacts from the general medical ward are still inpatients and four have been discharged home. One liver transplant room contact has also been discharged home. All room contacts still in the health service are placed into single rooms and contact precautions and a screening protocol is commenced. Alerts are placed in the medical history of the four patients discharged so that they can be placed into appropriate precautions and screened if readmitted within 12 months.
Responsibility for screening on transfer to other health services

In any situation where screening is indicated in relation to a Tier 1 or Tier 2a setting, the responsibility for screening patients is a collective one and these recommendations primarily reflect feasibility. Screening is only necessary if patients are to spend an overnight stay in the next health service.

The transferring health service is the preferred setting to undertake screening. The receiving health service should undertake screening where necessary, such as when urgent transfers have taken place or where cases have been identified after contacts have already transferred. The receiving facility should apply contact precautions until a result is known.

Such screening should occur until the weekly point prevalence survey (performed for four weeks) has shown no more transmissions.

Transfer of patients undergoing screening to residential care facilities

When transferring a patient requiring screening to a residential care facility, the transferring health service should always undertake screening. If a health service can reasonably await a result of screening, then a negative result can provide reassurance to the residential care facility (and a positive result can inform appropriate action). Residential care facilities should ideally have a screening result before accepting patients. A result, however, is not needed for transfer to take place. A residential care facility should not refuse transfer of a patient awaiting a screening result.

A residential care facility with a resident who is colonised or infected with a CPE organism should seek advice from an appropriate infection prevention and control professional.

Scenario 3

Mrs Cook is a patient in a large metropolitan health service (Central Hospital) who is to be transferred back to a small rural health service (Murray Hospital). The ward Mrs Cook has been in for the past two weeks was classified as a transmission risk area one week prior to her admission. The TRA has had three-weekly screening surveys at the point of her transfer with no evidence of further transmission to date. Screening specimens from the patient were taken by Central Hospital the day of her transfer. Murray Hospital placed Mrs Cook into a single room and implemented contact precautions. Central Hospital notified Murray Hospital that the screening results were negative for CPE two days after her transfer so contact precautions were ceased. After a further week of negative screening results at Central Hospital, the practice of screening before transfer was ceased after agreement with the VCIMT.

Clearance of cases

In this guideline clearance is a term that refers to applying criteria to determine that an individual no longer requires infection control precautions in relation to a risk of transmission of CPE.

A case of CPE, whether colonised or infected, can excrete CPE intermittently for many months and in some cases for over 18 months. As a result, in this guideline, once a person is identified as a case of CPE, they should be considered potentially infectious indefinitely. This means that ‘clearance’ is never applied to confirmed cases of CPE. This is an interim position until further evidence can be identified to inform a more appropriate period of time to consider a person potentially infectious.
Clearance of contacts

Screening of contacts is a key step in the risk assessment to determine whether an individual might pose a risk due to CPE. A person identified as a room contact or ward contact should have infection control precautions and other recommendations applied until clearance criteria are met.

A room contact is considered cleared when two suitable specimens taken more than 48 hours apart are found to be negative for CPE. Both of these must have been taken more than seven days after the last date of sharing a room with a case of CPE.

A ward contact is considered cleared when one suitable specimen is found to be negative for CPE at any point in time after their contact with the transmission risk area ceases. If a patient remains in contact with a TRA they should be screened accordingly. For example, for a TRA that is required to undertake weekly testing, a patient should be rescreened every week. For a TRA under monthly screening, patients should be screened at least every month.

Staff screening

Current evidence is limited on the appropriate approach to staff who are colonised with CPE and is a matter for the health service to determine.

No general recommendation has been made to screen healthcare workers, including in outbreak settings, or where staff have worked in overseas health settings in the previous 12 months.

However a health service with cases of CPE should consider reviewing the hand condition of healthcare workers and screening hands only if any wounds, lesions, paronychia or artificial nails are present.

Hand lesions must be covered with an occlusive dressing while at work. If lesions cannot be covered, healthcare workers must not perform patient care until lesions have resolved.

Where a health service is affected by an outbreak that is prolonged or extensive, consideration may be given to staff screening after consultation with the VCIMT.

Environmental screening

If activated, environmental screening should include:

- toilets and surrounds
- washbasins or sinks
- shared patient equipment, for example blood glucose meters, blood pressure machines, bladder ultrasounds and patient lifting devices
- frequently touched surfaces, for example call buttons, telephones, mattresses, beds, bedrails, bedside tables, tables, chairs, armchairs, window sills, door handles, computers on wheels.

Endoscopes should be screened / microbiologically tested if more than one patient with confirmed CPE in a setting is found to have had a common exposure to an endoscope, in addition to routine microbiological sampling as laid out in the Infection control in endoscopy guidelines 2010, third edition. Refer to section ‘Microbiological surveillance cultures’ on p. 39 and ‘Investigation of possible infection transmission by endoscopy’ on p. 46. The former section outlines routine microbiological sampling of endoscopes which should be conducted in the normal course of events, whereas the latter section outlines case-specific circumstances.

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outlines actions that should be taken when there is a possible common endoscope linked to more than one case.

**In settings with no cases (Tier 0)**

No environmental screening for CPE recommended.

**In settings with sporadic cases (Tier 1)**

Environmental screening is not generally required, even when there is a sporadic case at higher risk of transmission to others (Figure 4) who is not placed in contact precautions because in that circumstance there should be contact screening and extensive cleaning.

**In settings with local transmission (Tier 2a)**

Environmental screening should be undertaken to identify any environmental reservoir of CPE when there is local transmission on a ward / setting where cases were not always cared for in a shared room or with a shared bathroom.

Environmental screening taken before comprehensive cleaning can be a valuable part of an investigation to determine the source of persistent cases of CPE in a healthcare setting. Environmental screening undertaken after comprehensive cleaning can enable a health service to target problems areas effectively.
Section 4: Management and control of CPE

Overview of control measures

Detailed recommendations on control measures are outlined in each section of this guideline, and an overview is presented here.

Health services should ensure that their routine admission processes reliably identify patients requiring pre-emptive isolation and screening (PRIS). Assess each patient on admission from the community or after transfer from a health service, and assess each patient on readmission to the same facility.

The transmission pathways for CPE in healthcare settings can be facilitated by contamination of healthcare workers’ hands, shared patient equipment and the healthcare environment. The interventions to control transmission are therefore focused on these transmission pathways, which can transmit CRE from positive to negative patients.

Some or all of these measures may be required depending on the degree of transmission and other data related to pathways and risks. A recent review of ‘bundles’ of interventions applied to international outbreaks has highlighted that increased hand hygiene (and oversight) and contact precautions are core measures that every facility must implement. In addition, in outbreaks where initial interventions were insufficient to control transmission, then timely identification of colonised patients and their subsequent cohorting appear to be significant additional measures that can help to bring about the end of an outbreak. These are described in Figure 6 below.

Figure 6: Listing of interventions

Interventions to reduce contact (and bacterial load) between positive and negative patients:

- **Cohorting patients** – physical separation of CPE positive patients from negative patients (significant additional measure)
- **Screening of patients to inform the above** (significant additional measure)
- **Cohorting nursing personnel** (significant additional measure)
- Chlorhexidine body washes

Interventions to reduce contamination of healthcare workers’ hands:

- **Hand hygiene** (core measure)
- **Contact precautions** (core measure)

Interventions to reduce contamination of shared equipment:

- Limit shared equipment / cohort equipment
- Clean and disinfect equipment between patient use

Interventions to reduce contamination of healthcare environment:

- Daily and terminal cleaning and disinfection
- Environmental surveillance

Interventions to strengthen all the above measures:

- Healthcare setting plans
- Overall institutional governance and investment
- Outbreak governance
- **Internal and external audits** (core measure)
The following section describes infection prevention and control measures that are recommended in relation to both case and contact management, environmental cleaning and disinfection and staff.

**Prevention of CPE**

**Antimicrobial stewardship (AMS)**

AMS is a crucial aspect of the prevention of CPE. National standards provide guidance in this space and future developments are likely in relation to the recent publication of the Australian Antimicrobial Resistance Strategy.

All health services should have an AMS program regardless of Tier.

When there is local transmission, evidence is moderate as to the value and benefit of specific restrictions on the use of specific antimicrobials, so such restrictions are not routinely recommended but could be considered.

Any restriction should be overseen by the lead for the AMS program.

**Use of invasive devices**

All health services should follow guidance outlined in Standard 3 of the National Safety and Quality Health Service standards, and should aim to reduce the use of invasive devices, as indicated under national infection control guidelines.

When there is local transmission, a review of the necessity of all invasive devices should be considered on a daily basis as part of routine practice. This should continue at least until there has been four weeks of negative screening specimens.

**Prevention of clinical infection in patients colonised with CPE**

Patients who are CPE-colonised may be at risk of developing an infection in certain circumstances. An infectious diseases physician could be consulted to provide advice on the use of antimicrobials in situations such as planned invasive procedures or when a patient is unwell with sepsis or is significantly immunosuppressed.

**Treatment of CPE infection**

**Medical therapy**

Treatment of patients with infection or colonisation involving CPE must always be undertaken under the advice of an infectious diseases physician.

At the time of writing there are no proven interventions for decolonisation.

**Requirements for transmission-based precautions**

**In settings with no cases (Tier 0)**

Patients requiring pre-emptive isolation and screening (PRIS) should be placed in contact precautions until cleared.

Any previously recognised case (infection or colonisation) should be managed as described in the section below for Tier 1.
In settings with sporadic cases (Tier 1)

Patients requiring pre-emptive isolation and screening (PRIS) should be placed in contact precautions until cleared.

For cases (infections or colonisations)

Contact precautions must be applied as soon as a person is identified as a suspected case of CPE. When applying contact precautions for CPE cases, the national guidelines set the minimum required standard. This includes a requirement for staff and visitors to wear long-sleeved gown and gloves. It also means where a single room is used, this should be a Class S – standard-pressure room with own en-suite as per *Guidelines for the classification and design of isolation rooms in healthcare facilities* (Victorian Advisory Committee on Infection Control 2007).

These precautions are to be applied during the present and all subsequent health service admissions. Patients should be strongly encouraged to stay in their room while admitted.

Follow the five moments of hand hygiene ([see http://www.hha.org.au/home/5-moments-for-hand-hygiene.aspx](http://www.hha.org.au/home/5-moments-for-hand-hygiene.aspx)).

In a subacute healthcare setting, these contact precautions should be maintained to the extent possible. Contact precautions should be maintained if there are higher-risk factors for onwards transmission (Figure 4), even in the subacute setting.

If a suspected case is found not to be CPE, for example after testing for resistance genes, then the case falls outside of the scope of this guideline and the health service will need to determine what ongoing transmission-based precautions are appropriate.

For room contacts

Contact precautions should be used as for cases until the room contact is cleared. Note that room contacts are defined earlier in the document and two patients are room contacts when they have a shared a room and/or bathroom.

In settings with local transmission (Tier 2a)

Patients requiring pre-emptive isolation and screening (PRIS) should be placed in contact precautions until cleared.

For cases (infections or colonisations)

As above in Tier 1. Cohorting of confirmed same-genotype CPE infected or colonised patients can be considered.

For room contacts

As above in Tier 1. Cohorting is appropriate while room contacts are being screened.

For ward contacts

For practical reasons, it is unlikely to be feasible to place all ward contacts in contact precautions. If a ward contact is transferred to another ward or health service, contact precautions must be applied until the ward contact is cleared.

Case and contact placement and movement

In settings with no cases (Tier 0)

No addition requirements.
In settings with sporadic cases (Tier 1)

The following recommendations apply to cases and uncleared room contacts:

- minimise movement of the case, for example undertake diagnostic tests or procedures in the patient's room where possible
- when the case requires a list procedure, place last on list where possible to facilitate isolation cleaning
- minimise use of toilets outside of single room and clean after use, or use a commode if possible
- maximal use of hand hygiene if using equipment as part of a group session, and clean and disinfect equipment after use
- minimise group sessions such as gym or hydrotherapy in patients with difficulty adhering to good hand hygiene.

There are no restrictions recommended for unaffected patients in rooms outside the affected room on a ward where there is a sporadic case.

In settings with local transmission (Tier 2a)

The movement of the case should be minimised.

The following recommendations apply to all patients in the transmission risk area until they have had four weeks of negative screens at weekly intervals:

- minimise use of toilets outside of single room and clean after use, or use a commode if possible
- minimise group sessions such as gym or hydrotherapy in patients with difficulty adhering to good hand hygiene
- minimise activities and ensure heightened cleaning
- maximise use of hand hygiene if using equipment as part of a group session, and clean and disinfect equipment after use.

Once the ward or unit has four weeks of negative screens at weekly intervals, the above measures can be ceased.

Scenario 4

Mr Petrakis is identified as a sporadic case of CPE. He had been transferred from an overseas healthcare facility following a car accident while on holidays in Greece. Mr Petrakis has been in a single room with contact precautions since his admission. The health service is considered a Tier 1 health service by the VCIMT.

Mr Petrakis has required several investigations including X-rays and an MRI. Where possible X-rays were undertaken in his room. When he had an MRI Mr Petrakis was placed last on the list for the day and transferred down from the ward on a trolley just prior to the scan to avoid a long wait in the waiting area.

Mr Petrakis has now commenced rehabilitation. The physiotherapist initially implemented a program for him that could be undertaken in his room while still in the acute care setting. Mr Petrakis was subsequently transferred to a rehabilitation facility within the same health service. Although he was placed into a single room with contact precautions he is now able to undertake a more intensive rehabilitation program in the gym. Staff ensure he uses hand rub whenever entering the gym and staff wipe down all equipment with a disinfectant wipe after he has used it.

Staff, patient and equipment cohorting

This section addresses nursing staffing ratios and the potential intervention of staff cohorting.
In settings with no cases (Tier 0)

Staff and patient cohorting is not applicable.

In settings with sporadic cases (Tier 1)

When a case of CPE has two or more risk factors for onwards transmission (Figure 4), or if the health service has assessed that there are significant difficulties in ensuring compliance with infection prevention and control precautions, then there should be strong consideration of providing one-to-one nursing care.

Staff and patient cohorting is generally not applicable for sporadic cases. Equipment should wherever possible be dedicated to individual patients when contact precautions are applied.

If there are multiple sporadic cases, consider managing these cases in a single ward with dedicated nursing staff.

In settings with local transmission (Tier 2a)

When there is local transmission involving up to two cases at a particular time on a ward, local risk assessment by local HSIMT should take place regarding the value of staff and patient cohorting.

When there is local transmission involving three or more cases at a particular time on a ward, there should be staff and patient cohorting. When staff cohorting is activated, priority should be given to cohorting nursing staff, allied health professionals and patient care attendants. If patient cohorting is considered, only patients with the same strain of CPE should be cohort together.

When there is ongoing local transmission despite recognition of a local transmission plus implementation of full contact precautions, there should be active consideration of introducing staff cohorting if it is not in place.

Equipment should wherever possible be dedicated to individual patients in any instance of patients in contact precautions.

Cleaning and disinfection

In settings with no cases (Tier 0)

Meet National Standards for cleaning and disinfection as per the Australian guidelines for the prevention and control of infection in healthcare.

Frequently touched surfaces in patient care areas should be cleaned using a detergent solution and more frequently than surfaces with minimal hand contact. Clean frequently touched surfaces with detergent solution at least daily, when visibly soiled and after every known contamination.

In settings with sporadic cases (Tier 1)

When CPEs are suspected or known to be present, routine cleaning is intensified. Daily cleaning and disinfection of the case’s room and bathroom should be instituted, along with twice daily disinfection of all frequently touched surfaces and equipment.

Select a disinfectant or combined cleaning and disinfecting agent that is either ‘listed’ or ‘registered’ with the Therapeutics Goods Administration (TGA). The agent selected must be effective against the vast majority of organisms that cause healthcare-associated infections and for practical purposes have a fast kill time (or contact time). This will enable killing of organisms before the solution can dry, be removed or before the patient or staff are likely to re-touch the surface.
If using a no-touch method of surface disinfection as part of your environmental hygiene program (for example ultraviolet [UV-C] or hydrogen peroxide vapour) prior cleaning is required. Follow the manufacturer’s instructions when using the selected disinfectant (that is, amount, dilution, contact time, safe use and disposal) or no-touch method of surface disinfection.

Terminal cleaning should take place on discharge according to the same recommendations above.

For auditing see [Audit of infection control processes](#).

**In settings with local transmission (Tier 2a)**

Daily cleaning and disinfection should be undertaken for the case’s room and bathroom, and for medical devices and equipment as above. Health services should consider the use of no-touch methods for terminal disinfection, such as ultraviolet (UV-C) or hydrogen peroxide vapour.

An affected ward should have daily general cleaning and disinfection utilising a disinfectant or combined cleaning and disinfecting agent as described above. Frequently touched surfaces on an affected ward should have twice daily cleaning and disinfection as well.

**Limiting ward activity and ward closure**

If after initial control measures for example screening, contact precautions, cleaning there is ongoing transmission, then the VCIMT may consider closure of an affected ward to new admissions.

If transmission involves a surgical ward, consider cancelling elective surgery.

**Audit of infection control processes**

**In settings with no cases (Tier 0)**

Infection control ward audits as per Standard 3.

**In settings with sporadic cases (Tier 1)**

In addition to action above for Tier 0, a health service should review its past cleaning audits for any ward where there are one or more cases of CPE, in order to direct improvements if required.

Compliance auditing of hand hygiene and PPE use and environmental cleaning should be conducted according to NSQHS [Standard 3](#) and the attached audit checklist (Appendix C).

Observational audits for environmental cleaning should be supplemented with objective methods of assessing cleaning such as fluorescent gel markers or ATP bioluminescence.

**In settings with local transmission (Tier 2a)**

As above in Tier 1.

In addition to action above for Tier 1, infection control representatives should undertake daily checks for compliance with additional infection control precautions instituted and oversee auditing.

During an outbreak, a health service will perform a local audit of infection control and other actions on a monthly basis.

During an outbreak, the department may conduct external audits of management of CPE cases and the infection prevention and other measures which are in place. The frequency of these external audits may increase if local transmission continues for an extended period.
Section 5: Communication

Requirement to report cases
All suspected and confirmed cases of CPE must be reported to the Department of Health and Human Services by health services by diagnostic laboratories faxing the microbiological reports to Communicable Disease Prevention and Control on 1300 651 170 within one business day. Results should be reported regardless of whether these have arisen as sporadic cases or as part of a recognised local outbreak.

Liaise with the Victorian CPE Surveillance and Response Unit to provide patient and surveillance information detailed in Appendix E and Appendix F and to receive laboratory information. For example contact MDU PHL on (03) 8344 5701 to discuss laboratory results. To discuss surveillance information, contact VICNISS on (03) 9342 9355.

Communication when local transmission is suspected or identified
When local transmission is suspected or assessed as having occurred, a number of specific actions are required.

The affected health service should:

- identify a single point of liaison for the department from the health service, for example the chair of the HSIMT
- establish regular communication with the chair of the VCIMT or their delegate – initially by calling Communicable Disease Prevention and Control on 1300 651 160
- complete Part C of the surveillance form (Appendix G).

The department will:

- request information regarding the assessment and management of the situation
- provide advice on what information should be collected and control measures
- determine through the VCIMT whether a part of the health service should be classified as a TRA and then communicate this decision to the health service in a timely manner
- nominate a media liaison who will work with the health service media unit in order to coordinate communication. The department’s media spokesperson must agree media messaging in advance of any external communications
- communicate the classification of an area in a health service as a TRA or any stand-down of a TRA via email to the following stakeholders within 72 hours of the classification:
  - all Victorian public and private health service chief executive officers
  - all Victorian public health service infection control leads where nominated.

Patient alert and flagging systems

Alerts for CPE cases
Alerts for cases of CPE are essential given the frequency of admissions in patients at high risk of acquisition. These patients often have multiple short- and/or long-stay admissions and cycle through associated services such as subacute care, rehabilitation and long-term residential care.
As the duration of infection and carriage is insufficiently understood and could be prolonged, alerts on the medical record and patient management system for confirmed cases should remain indefinitely.

Undertake the following actions for all cases of CPE:

- place an alert in the patient medical record
- wherever feasible, place an alert in the electronic patient management system. These alerts should indicate that the case must be isolated for every subsequent admission and screened on admission
- use the pre-formatted letter for cases (Appendix H) on transfer to another health service or long-term residential facility. It should also be used on discharge to a GP, allied health professional or Royal District Nursing Service or relevant provider.

**Alerts for contacts of CPE cases**

Generate alerts in patient medical records and patient management systems for any shared room contacts who weren’t able to be screened (that is, already discharged). Screen these contacts if they are readmitted within 12 months.

Alerts for contacts can be lifted after 12 months or after clearance is achieved.

**Communication with staff**

**Tier 0:** conduct in-service education at least annually, covering issues of high-risk patient identification and isolation, screening and transmission-based precautions. This education can be ‘bundled’ into regular hand hygiene or PPE education sessions.

**Tier 1:** conduct in-service education on the affected ward or unit, covering all nursing staff who may provide care to affected patient/s and to all cleaning staff and patient care assistants. In addition, key medical, allied health and other relevant staff for that ward or unit should receive education.

**Tier 2:** conduct in-service education on the affected ward or unit and other departments as necessary. If the outbreak affects multiple areas of the facility, health service-wide education may be required.

VICNISS has developed an in-service package including a PowerPoint presentation, brochures / fact sheets and other materials for use in outbreak situations. This can be requested by any health service and delivered by the health service, with support from VICNISS and the Department of Health and Human Services as needed.


**Communication with patients and carers**

There is a need to communicate openly with patients and their families and carers. Multi-drug resistant organisms can be a source of anxiety for patients and can involve stigma for close contacts.

Health services must provide information to each patient with CPE or their carer so that the patient is aware of the diagnosis of CPE, and the diagnosis should be captured in a prominent place in the medical record. The health service must advise the patient or their carer that the patient needs to inform other health services of the diagnosis of CPE should they be admitted to another health service, so that infection prevention and control precautions can be taken.


**Communication with local doctors**

A template discharge letter is available at Appendix H.
Communication between health services on patient transfer

When a health service is transferring a patient known to be colonised or infected with CPE, the following information should be provided by the transferring health service to the receiving health service:

- organism identified and type of CPE, for example E. cloacae NDM-5
- date of last documented positive specimen
- whether patient has a colonisation or infection
- location of infection if relevant (for example, abdominal wound)
- current antibiotic therapy for the CPE if relevant
- current infection prevention and control precautions, for example contact precautions.
Section 6: Microbiological and laboratory methods

Choice of screening specimen for patients

International guidelines outline a range of specimen types and duration since an exposure event. Most patients appear to develop faecal or rectal positivity at around eight days post exposure or longer.

The ideal sampling strategy with the greatest sensitivity and specificity for the detection of CPE in a well patient is a faeces specimen.

Take a faeces specimen to screen for CPE whenever possible. Where this is not possible, a rectal swab plus an inguinal swab should be taken. A rectal swab alone is the least preferred screening specimen. A peri-anal swab is not acceptable because of a lower sensitivity and specificity.

In addition, the following samples should also be considered, but not routinely undertaken:

- for patients with wounds, a single wound swab should be collected
- for patients with intermittent or continuous urinary catheterisation, a urine sample should be collected
- for patients who are intubated, an endotracheal tube (ETT) sample should be collected
- for patients with enterostomies, a stomal specimen should be collected.

In all cases, follow appropriate referenced collection methods for the sample type(s) taken.

Environmental specimen collection protocol

Environmental screening samples should be collected pre- and post-cleaning a patient care area in order to optimise the isolation of resistant organisms, and to assess the effectiveness of cleaning and disinfection.

The method of specimen collection may vary slightly depending on the nature and shape of the surface/article to be tested.

Flat surface – bed, bedside table

- With a moistened (saline) bacterial culture swab or sterile gauze moved at right angles up and down, sample an area 10 x 10 cm, then place the swab or gauze into transport container

Irregular surface – equipment

- With a moistened (saline) bacterial culture swab, sample the surface to ensure maximal exposure, then place the swab into container.

Number of specimens

- The number of specimens collected should ensure that there is a representative sampling of the environment and equipment.
- In any specimens, obviously stained areas on equipment or frequently touched areas should be sampled.

Labelling of specimens

- All specimens should be clearly labelled with the date and site of collection including ward details.
• Label the request form with the date and site of collection, and mark as ‘CPE – environmental sample’.
• Always provide specific contact details including phone contact of the requester.
• Where possible, the same laboratory should be used for environmental and case specimens.

Requirements for primary laboratories

This laboratory protocol refers to all Enterobacteriaceae isolated from routine clinical, screening or environmental samples.

All suspected and confirmed isolates of CPE must be reported to the Department of Health and Human Services by health services within one business day by faxing results to Communicable Diseases Prevention and Control on 1300 651 170.

Infection prevention and control staff (or after hours, management staff) and treating clinicians should be notified of suspected or confirmed CPE so that appropriate precautions and necessary alerts can be implemented.

All Enterobacteriaceae that are suspected to be CPE are to be stored at the testing laboratory for six months.

All isolates of suspected or confirmed CPE are to be referred to the Microbiological Diagnostic Unit Public Health Laboratory (MDU PHL) for further confirmation and typing. Isolates are to be accompanied by a completed laboratory CPE isolate referral form (Appendix D).

Laboratories are also encouraged to send carbapenemase-producing isolates that are not Enterobacteriaceae to MDU PHL for confirmation, for example *Pseudomonas* species. This may help with the understanding of the extent of the challenge posed by highly resistant bacteria.

Methods for detecting suspected or confirmed CPE

Further advice and recommendations for primary laboratories:

• isolates of Enterobacteriaceae from any submitted sample should undergo routine susceptibility testing (AST) using the usual method undertaken by the laboratory. It is not necessary to introduce new methods of testing. As a minimum standard, laboratories should test meropenem susceptibility on all isolates
• CPE screening breakpoints that enable detection of isolates that are carbapenemase producing but phenotypically susceptible to carbapenems are available for all methods of AST
• isolates that have minimum inhibitory concentrations (MICs) or disc diameters above the screening guidelines (Meropenem MIC ≥ 0.5 mg/L, or disk diffusion zone ≤ 24 mm (CLSI or EUCAST methods), or CDS disc diffusion zone ≤ 6 mm) are suspected CPE
• some of the semi-automated methods flag isolates that have MICs between the screening and clinical breakpoints. These isolates are suspected CPE
• isolates with a positive colorimetric test for carbapenemase (CarbaNP or BluCarba) are suspected CPE
• all suspected CPE isolates (as defined above) should be referred to the MDU PHL for confirmatory testing for resistance, detection of any resistance genes and genomic analysis
• some diagnostic laboratories have the capacity to detect a limited number of carbapenemase genes in Enterobacteriaceae. These isolates should also be referred to MDU PHL for further genetic testing and sequencing.
Role of the reference laboratory

All suspected and confirmed isolates should be referred to MDU PHL for further testing. This testing includes:

- confirmation of phenotypic resistance to carbapenem
- screening for the known suite of carbapenemase gene families that have so far been detected in Enterobacteriaceae in Australia: IMP, VIM, OXA-48 and OXA-48-like, KPC and NDM
- genomic-based characterisation to determine clonality and uncover potential transmission pathways.
### Appendices

#### Appendix A: Guide to microbiological testing and data collection

<table>
<thead>
<tr>
<th>Agency</th>
<th>Action</th>
<th>When to initiate</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Diagnostic microbiology laboratory</strong></td>
<td>Process clinical and screening samples referred for CPE testing as per CPE guideline (Section 6)</td>
<td>The day the samples arrive in the laboratory</td>
</tr>
<tr>
<td></td>
<td>Report suspected or confirmed CPE isolates to Communicable Disease Prevention and Control by faxing the initial result to <strong>1300 651 170</strong></td>
<td>Same day that the positive result is available</td>
</tr>
<tr>
<td></td>
<td>Report suspected or confirmed CPE to the referring clinician and an infection control representative in the health service</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Refer suspected or confirmed CPE isolates to MDU PHL using a completed CPE isolate referral form (Appendix D)</td>
<td>Within two business days of isolation</td>
</tr>
<tr>
<td><strong>Health service</strong></td>
<td>Infection control lead or delegate complete Part A of the initial data collection form (Appendix E) and fax to VICNISS <strong>(03) 9342 9355</strong></td>
<td>Within one business day of identification of a suspected or confirmed CPE case</td>
</tr>
<tr>
<td></td>
<td>When the CPE is confirmed the infection control lead or delegate must complete Part B of the initial data collection form (Appendix F) and fax to VICNISS <strong>(03) 9342 9355</strong></td>
<td>Within one business day of receiving confirmatory CPE results</td>
</tr>
<tr>
<td></td>
<td>Refer all screening samples to your clinical diagnostic microbiology laboratory for testing. Ensure the referral form is clearly marked as a CPE sample</td>
<td>When screening samples collected</td>
</tr>
<tr>
<td><strong>MDU PHL</strong></td>
<td>Confirm phenotypic resistance and perform PCR testing for carbapenem resistance genes on suspected or confirmed CPE isolates submitted by clinical diagnostic laboratories</td>
<td>Within two business days of receiving the isolate</td>
</tr>
<tr>
<td></td>
<td>Report results to referring laboratory</td>
<td>Same day that the result is available</td>
</tr>
<tr>
<td></td>
<td>Perform genetic sequencing on all CPE isolates</td>
<td>Within five to seven business days of confirming CPE</td>
</tr>
<tr>
<td></td>
<td>Review and collate epidemiology data from all CPE cases within a health service and collaborate with VICNISS to determine if a new case is sporadic or suggests local transmission</td>
<td>Each time a CPE case is reported</td>
</tr>
<tr>
<td></td>
<td>Notify the VCIMT if samples suggest local transmission</td>
<td>When two or more cases of genetically indistinguishable CPE are detected in a health service</td>
</tr>
<tr>
<td><strong>VICNISS</strong></td>
<td>Receive and assess completed surveillance forms from health services</td>
<td>Part A with one business day of reporting, Part B within two business days of confirmation of CPE</td>
</tr>
<tr>
<td>Task</td>
<td>Frequency</td>
<td></td>
</tr>
<tr>
<td>---------------------------------------------------------------------</td>
<td>----------------------------------</td>
<td></td>
</tr>
<tr>
<td>Review and collate epidemiology data from all CPE cases within a health service and collaborate with MDU PHL to determine if a new case is sporadic or suggests local transmission</td>
<td>Each time a case is reported</td>
<td></td>
</tr>
<tr>
<td>Audit health service infection prevention and control responses</td>
<td>As directed by VCIMT</td>
<td></td>
</tr>
<tr>
<td><strong>Department of Health and Human Services</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coordinate Victorian CPE Incident Management Team</td>
<td>As required</td>
<td></td>
</tr>
</tbody>
</table>
Appendix B: Sample audit checklists

The audit tool below is to be completed by all health services at least annually or as requested by the Victorian CPE Incident Management Team (VCIMT). The tool can also be used internally by a health service to ensure compliance with the guideline. The section(s) that need to be completed will depend upon the classification of the health service. Sections are to be completed as follows:

1. Section 1: Health service audit – to be completed by all health services annually. Health services classified as Tier 0 need only complete this section.
2. Section 2: Tier 1 – to be completed in addition to Section 1 by all health services classified as Tier 1 at least annually or as required by the VCIMT.
3. Section 3: Tier 2a – to be completed in addition to Sections 1 & 2 by all health services classified as Tier 2a at least annually or as required by the VCIMT.

<table>
<thead>
<tr>
<th>Section 1: Health service audit (all Tiers)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Governance</strong></td>
</tr>
<tr>
<td>1.1 There is a management plan or guideline for CPE</td>
</tr>
<tr>
<td>1.2 The management plan includes membership &amp; establishment of a Health Service Incident Management Team (HSIMT) in the event of confirmed local transmission of CPE</td>
</tr>
<tr>
<td>1.3 All Standard 3 criteria were met at the last accreditation</td>
</tr>
<tr>
<td>1.4 List criteria ‘Not met’ No(s):</td>
</tr>
<tr>
<td><strong>2. Screening, detection and investigation of CPE</strong></td>
</tr>
<tr>
<td>2.1 A risk assessment is undertaken to identify PRIS patients on admission and/or transfer from other health services</td>
</tr>
<tr>
<td>2.2 There is a transplant ward, haematology-oncology ward, or intensive care unit</td>
</tr>
<tr>
<td>2.3 A point prevalence CPE survey is conducted on each of these wards every six months</td>
</tr>
<tr>
<td>2.4 Higher-risk inpatients for acquiring CPE are screened</td>
</tr>
<tr>
<td>2.5 Higher-risk inpatients for acquiring CPE are screened:</td>
</tr>
<tr>
<td>2.6 There is a specimen collection protocol for CPE screening</td>
</tr>
<tr>
<td>2.7 The health service uses a NATA-accredited diagnostic laboratory with ability to undertake requirements listed in the Victorian guideline for CPE</td>
</tr>
<tr>
<td><strong>3. Management and control of CPE</strong></td>
</tr>
<tr>
<td>3.1 All PRIS patients identified are placed into a single room with contact precautions and appropriate screening undertaken</td>
</tr>
</tbody>
</table>
3.2 | Screening results of PRIS patients are communicated to receiving health services when transferred before complete | Yes/No
---|---|---
3.3 | All CPE cases (readmitted or transferred) from other health services are placed into a single room with contact precautions | Yes/No
3.4 | There is a protocol for daily and terminal cleaning and disinfection | Yes/No

### 4. Communication

4.1 | There is an alert system to notify staff at readmission of CPE positive patients and/or contacts still requiring clearance screening | Yes/No
4.2 | A CPE fact sheet is available for staff to provide to patients and carers | Yes/No
4.3 | Staff education covers identification, isolation and screening of PRIS patients | Yes/No

### Section 2: Tier 1 – confirmed sporadic cases

#### 1. Reporting/notification

1.1 | All suspected and confirmed cases of CPE are reported to the Department of Health and Human Services within specified timeframes | Yes/No
1.2 | All suspected cases of CPE have Part A of Surveillance of CPE form (Appendix E) completed and faxed to VICNISS within specified timeframes | Yes/No
1.3 | All confirmed cases of CPE have Part A & Part B of Surveillance of CPE form (Appendix E and F) completed and faxed to VICNISS within specified timeframes | Yes/No

#### 2. Contact tracing, management and screening requirements

2.1 | All room contacts are identified up to a maximum of one month retrospectively (or six months if risk factors for onwards transmission identified) | Yes/No/NA
2.2 | All room contacts still inpatients are placed into isolation/cohorted with contact precautions until screening results known | Yes/No/NA
2.3 | All room contacts still inpatients had two suitable screening samples taken > 48 hrs apart more than seven days after last exposure | Yes/No/NA
2.4 | All room contacts discharged/transferred before screening have an alert placed in their medical record to isolate and screen if readmitted within twelve months | Yes/No/NA
2.5 | All room contacts not screened before discharge/transfer, when readmitted are placed into a single room with contact precautions and appropriately screened | Yes/No/NA
2.6 | Undertake a once-off screen of all patients on a ward where a confirmed sporadic case has risk factors for onwards transmission | Yes/No/NA
2.7 | All room contacts transferred to a residential care facility (RCF) or other health service have been appropriately screened prior to transfer | Yes/No/NA
2.8 | All RCFs or health services who have received a room contact transferred before screening has been undertaken have been notified | Yes/No/NA
2.9 | All RCFs or health services who receive a PRIS patient or room contact transferred before screening result is known are notified of final result | Yes/No/NA
2.10 | All previously identified cases are rescreened for epidemiological purposes if readmitted | Yes/No/NA
### 3. Management of cases

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1</td>
<td>All <strong>cases</strong> are placed in a single room with contact precautions until discharge</td>
</tr>
<tr>
<td>3.2</td>
<td>All <strong>cases</strong> have a permanent alert placed in their medical record</td>
</tr>
<tr>
<td>3.3</td>
<td>All <strong>cases</strong> have dedicated equipment where possible</td>
</tr>
<tr>
<td>3.4</td>
<td>A risk assessment is undertaken of all <strong>cases</strong> to determine requirement for one-to-one nursing (for example, two or more risk factors for onwards transmission present)</td>
</tr>
<tr>
<td>3.5</td>
<td>There are multiple sporadic <strong>cases</strong></td>
</tr>
<tr>
<td>3.6</td>
<td>Consideration has been given to managing all <strong>cases</strong> in a single ward with dedicated nursing staff</td>
</tr>
</tbody>
</table>

### 4. Cleaning and disinfection

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>4.1</td>
<td>An appropriate TGA ‘listed’ or ‘registered’ surface disinfectant or combined disinfectant/cleaning agent is used for all cleaning and disinfection</td>
</tr>
<tr>
<td>4.2</td>
<td>A <strong>case</strong>’s room and bathroom are cleaned and disinfected daily</td>
</tr>
<tr>
<td>4.3</td>
<td>Frequently touched surfaces and equipment in the <strong>case</strong>’s room are cleaned and disinfected twice daily</td>
</tr>
<tr>
<td>4.4</td>
<td>A <strong>case</strong>’s room and bathroom are terminally cleaned and disinfected when discharged/transfered</td>
</tr>
<tr>
<td>4.5</td>
<td>If a no-touch surface disinfection method is used pre-cleaning is undertaken prior to use</td>
</tr>
</tbody>
</table>

### 5. Compliance auditing

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>5.1</td>
<td>The last hand hygiene compliance audit for the health service met the Victorian hand hygiene compliance threshold of 80%</td>
</tr>
<tr>
<td>5.2</td>
<td>The hand hygiene compliance rate for the health service was: __________ %</td>
</tr>
<tr>
<td>5.3</td>
<td>Strategies have been implemented across the health service to increase hand hygiene compliance</td>
</tr>
<tr>
<td>5.4</td>
<td>In the last hand hygiene audit, moment 1 and moment 2 were both above 80%</td>
</tr>
<tr>
<td>5.5</td>
<td>Moment 1 compliance was: __________ %  Moment 2 compliance was: __________ %</td>
</tr>
<tr>
<td>5.6</td>
<td>Strategies have been implemented across the health service to increase hand hygiene compliance with Moments 1 and/or 2</td>
</tr>
<tr>
<td>5.7</td>
<td>The last cleaning audit for a ward/area with sporadic <strong>case(s)</strong> met the relevant Acceptable Quality Level (AQL)</td>
</tr>
<tr>
<td>5.8</td>
<td>The functional area risk category is: ________________  The last AQL score was: __________ %</td>
</tr>
</tbody>
</table>
5.9 Strategies have been implemented to improve cleaning practices

5.10 Assessment of environmental cleaning in the health service includes objective methods such as fluorescent gel markers or ATP bioluminescence

5.11 Compliance with contact precautions is audited

6. Education

6.1 Specific education regarding CPE has been conducted in wards or units managing cases

7. Treatment of CPE case

7.1 Treatment of cases is undertaken with the advice of an infectious diseases physician

Section 3: Tier 2a – local transmission

1. Communication/governance

1.1 The Health Service Incident Management Team (HSIMT) has been convened

1.2 A single point of liaison for the health service has been identified and communicated to the Victorian CPE Incident Management Team (VCIMT)

1.3 The HSIMT has overseen collection of all required data for the VCIMT

1.4 The HSIMT has implemented all recommendations in the guideline and/or made by the VCIMT

2. Screening

2.1 All patients during weekly screening period transferred from the TRA to a residential care facility (RCF) or other health service are screened < 7 days prior to transfer

2.2 All RCFs or health services who receive a patient from the TRA that were not screened < 7 days prior to transfer are notified

2.3 All RCFs or health services who receive a patient from the TRA transferred before a screening result is known are notified of final result

2.4 There have been four consecutive weekly screens of all patients in the TRA with no new cases identified

2.5 There have been no new cases identified during the TRA monthly point prevalence surveys (from end of four negative consecutive weeks to six months post TRA classification)

2.6 There have been no new cases identified during the TRA quarterly point prevalence surveys (from six to twelve months post TRA classification)

3. Compliance auditing

3.1 Infection control consultants/representatives perform daily checks to assess compliance with additional infection control measures

3.2 Compliance audits with infection control measures and other actions is conducted on a monthly basis in the TRA
| 3.3 | The infection control consultant/representative oversees completion of all compliance audits | Yes/No |
| 3.4 | Daily review of the use of all invasive devices (with the aim to reduce use) is undertaken in the TRA | Yes/No/NA |
| 3.5 | Assessment of environmental cleaning using objective methods such as fluorescent gel markers or ATP bioluminescence has been conducted in the TRA | Yes/No |
| 3.6 | A hand hygiene compliance audit has been conducted in the TRA | < 3 months ago | 3–6 months ago | 6–12 months ago | > 12 months ago | Never |
| 3.7 | The last hand hygiene compliance audit in the TRA met the Victorian hand hygiene compliance threshold of 80% | If No (go to 3.8) / Yes (go to Q3.10) |
| 3.8 | The hand hygiene compliance rate for the TRA was: __________ % | Yes/No |
| 3.9 | Strategies have been implemented in the TRA to increase hand hygiene compliance | Yes/No |
| 3.10 | In the last hand hygiene compliance audit in the TRA, moment 1 and moment 2 were both above 80% | If No (go to 3.11) / Yes (go to Q4.1) |
| 3.11 | Moment 1 compliance was: __________ % Moment 2 compliance was: __________ % | Yes/No |
| 3.12 | Strategies have been implemented in the TRA to increase hand hygiene compliance with Moments 1 and/or 2 | Yes/No |
| 4.1 | Staff (nursing staff, allied health professionals and patient care attendants) are cohorted to cases when there are three or more cases in a TRA | Yes/No/NA |
| 5.1 | Environmental screening has been undertaken in the TRA | Yes/No |
| 5.2 | Endoscopes suspected as source of exposure have had additional microbiological sampling | Yes/No/NA |
| 6.1 | The TRA is cleaned and disinfected daily | Yes/No |
| 6.2 | Frequently touched surfaces and equipment in the TRA are cleaned and disinfected twice daily | Yes/No |
| 6.3 | A no-touch method of surface disinfection (for example, ultraviolet [UV-C] or hydrogen peroxide vapour) is used | If Yes (go to Q6.3) / No (go to 7.1) |
| 6.4 | There is a written protocol for the correct use of the no-touch method stating need for prior cleaning of surfaces | Yes/No |
| 7.1 | Specific education regarding CPE has been conducted in the TRA | Yes/No |
Appendix C: Example environmental cleaning audit tool

Checklist for monitoring environmental cleaning

<table>
<thead>
<tr>
<th>Date:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Ward / unit:</td>
<td></td>
</tr>
<tr>
<td>Room / bay number:</td>
<td></td>
</tr>
<tr>
<td>Assessor’s name:</td>
<td></td>
</tr>
</tbody>
</table>

Method used for monitoring:
- [ ] Direct observation
- [ ] Fluorescent gel
- [ ] ATP system
- [ ] Swab cultures

Assess the following priority sites for each patient room / bay:

<table>
<thead>
<tr>
<th>Frequently touched surfaces</th>
<th>Assessed</th>
<th>Not assessed</th>
<th>Not present</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bedrail</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Over-bed table</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patient call bell</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bedside locker handle</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Telephone</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patient chair</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Room inside door knob</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Room tap handle</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Room light switch</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bathroom handrail by toilet</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bathroom light switch</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bathroom inner door knob</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Toilet seat</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Toilet flush button</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Toilet / bathroom door knob</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other:____________________</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Assess the following additional sites if this equipment is present in the room / bay:

<table>
<thead>
<tr>
<th>Frequently touched surfaces</th>
<th>Assessed</th>
<th>Not assessed</th>
<th>Not present</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>IV pole</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IV pump control</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ventilator control panel</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feeding pump control panel</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Walking frame</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Adapted from CDC Environmental Checklist for Monitoring Terminal Cleaning
http://www.cdc.gov/HAI/toolkits/Environmental-Cleaning-Checklist-10-6-2010.pdf
Appendix D: Carbapenem-resistant isolate referral form

<table>
<thead>
<tr>
<th><strong>FM2458</strong></th>
<th>Carbapenem resistant isolate referral form</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Microbiological Diagnostic Unit – Public Health Laboratory</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Department of Microbiology &amp; Immunology, University of Melbourne (APM) VIC 3010</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Director: Prof. Benjamin Howden, MBBS, FRACP, FRCPA, PhD, 206227</strong></td>
<td></td>
</tr>
</tbody>
</table>

**Sender information**

<table>
<thead>
<tr>
<th>Laboratory:</th>
<th>Address:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Phone no:</td>
<td>Fax no:</td>
</tr>
</tbody>
</table>

**Patient details**

<table>
<thead>
<tr>
<th>Name:</th>
<th>Sex: M □ F □ Not known □</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date of birth:</td>
<td>Postcode:</td>
</tr>
<tr>
<td>Patient phone no:</td>
<td></td>
</tr>
<tr>
<td>GP name:</td>
<td>GP phone no:</td>
</tr>
</tbody>
</table>

**Patient risk factors**

At the time of sample collection, patient was in a: Health care facility □ Aged care facility □ Neither □ Not known □

<table>
<thead>
<tr>
<th>Facility name:</th>
<th>Ward or unit:</th>
<th>Date of admission:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Has the patient travelled overseas in the past twelve months? Yes ✡ No □ Not known □</td>
<td></td>
<td></td>
</tr>
<tr>
<td>If yes, state country visited:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Has the patient been hospitalised overseas in the past twelve months? Yes ✡ No □ Not known □</td>
<td></td>
<td></td>
</tr>
<tr>
<td>If yes, state country visited:</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Isolate and sample details**

<table>
<thead>
<tr>
<th>Organism name (species):</th>
<th>Submitting laboratory number:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Isolated from (sample type):</td>
<td>Date of sample collection:</td>
</tr>
<tr>
<td>Reason for sampling:</td>
<td>Clinically indicated □ Screening □ Not known □</td>
</tr>
</tbody>
</table>

**Submitting laboratory testing results**

Tick those that apply

- Positive carbapenem hydrolysis test (CarbaNP or BlueCarba)
- Positive modified Hodge test
- Positive carbapenem double-disc synergy test
- Meropenem MIC ≥ 0.5mg/L, or disc diffusion zone ≤ 24mm (CLSI or EUCAST) or CDS disc diffusion zone ≤ 6mm.
- Positive molecular assay for carbapenemase gene - state gene positive:

Please send a printout of your antimicrobial results with this form

Submitted by:

<table>
<thead>
<tr>
<th>Name:</th>
<th>Signed:</th>
<th>Date:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NATA/RCPA  
Accredited Laboratory No. 1019
### Appendix E: Surveillance form part A – all cases

**Part A: Suspected/Confirmed CPE event**

<table>
<thead>
<tr>
<th>Case details—please answer all questions</th>
<th>Specimen details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Last name</strong></td>
<td><strong>Requesting doctor name</strong></td>
</tr>
<tr>
<td><strong>First name(s)</strong></td>
<td><strong>Requesting doctor tel</strong></td>
</tr>
<tr>
<td><strong>Date of birth</strong></td>
<td><strong>Medicare provider number</strong></td>
</tr>
<tr>
<td><strong>Sex</strong></td>
<td><strong>Specimen collection date</strong></td>
</tr>
<tr>
<td>Male</td>
<td><strong>Specimen reference number</strong></td>
</tr>
<tr>
<td>Female</td>
<td><strong>Date of first CPE detection (if different from specimen collection date)</strong></td>
</tr>
<tr>
<td>X/Intersex/Indeterminate</td>
<td><strong>Has the case had a previous negative CPE result</strong></td>
</tr>
<tr>
<td><strong>Residential address</strong></td>
<td>Yes, specify date of previous neg result</td>
</tr>
<tr>
<td><strong>Suburb/town</strong></td>
<td><strong>Case location (facility) at time of specimen collection</strong></td>
</tr>
<tr>
<td><strong>Postcode</strong></td>
<td>Acute hospital—admitted</td>
</tr>
<tr>
<td><strong>Tel home</strong></td>
<td>Acute hospital—emergency</td>
</tr>
<tr>
<td><strong>Tel mobile</strong></td>
<td>General practice</td>
</tr>
<tr>
<td><strong>Parent/guardian/next of kin name and contact number</strong></td>
<td>Residential aged care</td>
</tr>
<tr>
<td><strong>Is the case of Aboriginal or Torres Strait Islander origin</strong></td>
<td>Sub-acute (e.g., rehabilitation)</td>
</tr>
<tr>
<td>No</td>
<td><strong>Facility name</strong></td>
</tr>
<tr>
<td>Aboriginal</td>
<td><strong>Facility UR/ID</strong></td>
</tr>
<tr>
<td>Torres Strait Islander</td>
<td><strong>Case presented to this facility from</strong></td>
</tr>
<tr>
<td>Both Aboriginal and Torres Strait Islander</td>
<td>Acute hospital, specify below</td>
</tr>
<tr>
<td>Unknown</td>
<td>Transferred from hospital outside of Australia</td>
</tr>
<tr>
<td><strong>Country of birth</strong></td>
<td>Yes, specify country</td>
</tr>
<tr>
<td>Australia</td>
<td><strong>Home</strong></td>
</tr>
<tr>
<td>Overseas</td>
<td>Residential aged care</td>
</tr>
<tr>
<td><strong>Year arrived in Australia</strong></td>
<td>Sub-acute (e.g., rehabilitation)</td>
</tr>
<tr>
<td><strong>Interpreter required</strong></td>
<td>Unknown</td>
</tr>
<tr>
<td>No</td>
<td>Other, specify</td>
</tr>
<tr>
<td>Yes, language</td>
<td><strong>Reason for testing</strong></td>
</tr>
<tr>
<td><strong>Family/general practitioner</strong></td>
<td>Known CPE case</td>
</tr>
<tr>
<td><strong>Name</strong></td>
<td>Clinically indicated</td>
</tr>
<tr>
<td><strong>Medicare provider number (if known)</strong></td>
<td>Screening—CPE contact</td>
</tr>
<tr>
<td><strong>Practice name</strong></td>
<td>Screening—Returned traveller preadmission</td>
</tr>
<tr>
<td><strong>Practice address</strong></td>
<td>Screening—Other, specify</td>
</tr>
<tr>
<td><strong>Suburb/town</strong></td>
<td><strong>Is this case part of a suspected outbreak within the facility</strong></td>
</tr>
<tr>
<td><strong>Postcode</strong></td>
<td>No</td>
</tr>
<tr>
<td><strong>Tel work</strong></td>
<td>Unknown</td>
</tr>
<tr>
<td><strong>Tel mobile</strong></td>
<td>Yes</td>
</tr>
</tbody>
</table>

**Form completed by (print) | Tel**
Please identify the case on every page
Full name or UR
Date of birth

Clinical details
Isolation of CPE from this case represents
- Colonisation
- Infection
- Unknown

If infection, what is the likely source
- Bacteremia without obvious focus
- Bacteremia – IV device related
- Surgical wound
- Skin/soft tissue
- Intraperitoneal
- Urinary tract

Clinical outcome
- Not admitted
- Not yet discharged
- Discharged, specify discharge date
- Deceased date

Current health status
- Alive
- Deceased

Clinical comments/cause of death

Risk factors for CPE
If the case is an inpatient at the time of specimen collection, please provide details below on all wards, units and rooms the case was admitted to during this admission.

<table>
<thead>
<tr>
<th>Unit</th>
<th>Ward</th>
<th>Bed</th>
<th>Room type</th>
<th>Bathroom type</th>
<th>Arrived</th>
<th>Departed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Single</td>
<td>Single</td>
<td></td>
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<td>Single</td>
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<td>Single</td>
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<td>Single</td>
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<td>Single</td>
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<td>Single</td>
<td>Single</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Single</td>
<td>Single</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes

## Appendix F: Surveillance form part B – confirmed CPE

### Part B: Confirmed CPE case — further risk history

#### Case details

<table>
<thead>
<tr>
<th>Full name or UR</th>
<th>Date of birth</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Risk history — health care

**Hospitalisation in the last 12 months**
- No
- Unknown
- Yes, specify all facilities below

**Any further details on hospitalisation history**

**Day surgery in the last 12 months**
- No
- Unknown
- Yes, specify most recent facility below

**Dates of surgery**

**Residence in aged or long term care facility in the last 12 months**
- No
- Unknown
- Yes, specify all facilities below

**Engaged in health care work in the last 12 months**
- No
- Unknown
- Yes

**Household or other close contact with known CPE positive case ever**
- No
- Unknown
- Yes, specify PHEHS ID of positive case

#### Risk history — overseas travel

**Overseas travel in the last 4 years**
- No
- Unknown
- Yes, specify below

<table>
<thead>
<tr>
<th>Country</th>
<th>Arrived</th>
<th>Departed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Was the contact admitted to a healthcare facility overseas**
- No
- Unknown
- Yes, specify country

### Risk history — overseas travel (continued)

#### Reason(s) for travel (tick all that apply)
- Holiday or business
- Residence in country of birth
- Residence in country other than birth
- Visiting friends and relatives
- Other, specify

#### Did the case experience any illness overseas
- No
- Unknown
- Yes, specify below

<table>
<thead>
<tr>
<th>Illness</th>
<th>Country</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Did the case visit a health care facility overseas
- No
- Unknown
- Yes — as a patient, specify country and location below
- Yes — as staff, specify country and location below
- Yes — visiting a patient, specify country and location below

<table>
<thead>
<tr>
<th>Country</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

#### Location within health care facility
- General practice, specify visit date
- Day procedure centre, specify visit date
- Other medical surgery, specify visit date
- Acute hospital emergency, specify visit date
- Acute hospital outpatient, specify visit date
- Acute hospital admission, specify dates
- Other, specify type

#### Did the case receive any medical treatment or procedures overseas
- No
- Unknown
- Yes, specify

#### Did the case travel with the intention of receiving medical, dental or other healthcare overseas
- No
- Unknown
- Yes — Dental
- Yes — Medical
- Yes — Other

**Any further details on overseas travel**

<table>
<thead>
<tr>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

---


---

Victorian guideline on carbapenemase-producing Enterobacteriaceae
## Appendix G: Surveillance form part C – local transmission

Confidential  
Surveillance of Carbapenemase producing Enterobacteriacea (CPE)  

Please return all completed forms to the VCNSS Coordinating Centre by faxing 03 9342 9355. For queries telephone 03 9342 9333.

### Part C: Outbreak case risk history

<table>
<thead>
<tr>
<th>Outbreak name</th>
<th>Outbreak ID</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>320</td>
</tr>
</tbody>
</table>

#### Case details

<table>
<thead>
<tr>
<th>Full name or UR</th>
<th>Date of birth</th>
<th>Case ID</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>320</td>
<td></td>
</tr>
</tbody>
</table>

#### Risk history—additional risk factors during presentation of CPE identification

During the most recent hospital admission prior to, or at the time of, CPE detection did the case experience:

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Yes</th>
<th>No</th>
<th>Unk</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colonoscopy</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Endoscopy</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other procedure</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Long term vascular catheter (IVC, ROC, VanCott, Hickman’s line, permacath etc)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indwelling urinary catheter</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enterocutaneous fistula or abdominal wound</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mechanical ventilation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Immunosuppressive medication</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Admission to ICU</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Detail any comorbid conditions

<table>
<thead>
<tr>
<th>Comorbid conditions</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Risk history—medical conditions

Has the case ever:

<table>
<thead>
<tr>
<th>Condition</th>
<th>Yes</th>
<th>No</th>
<th>Unk</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Been diagnosed with liver disease</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Been diagnosed with renal or kidney disease</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Been diagnosed with diabetes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Been diagnosed with an immunocompromising condition</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Received an organ transplant</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Received a stem-cell transplant</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Received chemotherapy or radiotherapy</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Received antibiotic therapy &gt;1 month duration</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Antibiotic(s)</th>
<th>Duration</th>
<th>Treatment for</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

### Risk history—local nonrecurrent healthcare presentations (pre-detection)

Did the case have any other healthcare presentations within Australia in the 12 months prior to detection of CPE

- [ ] No
- [ ] Unknown
- [X] Yes, please detail all presentations below. Complete a new row for each presentation, admission or change in ward. Seeking details regarding a presentation from a healthcare provider is not necessary if only a single case in an outbreak report's presentation there. There is no need to complete a row for outpatient medical presentations or specialist medical presentations unless a procedure is performed.

#### Type of presentation

- [ ] Acute care admission
- [ ] Rehabilitation centre admission
- [ ] Day procedure
- [ ] Emergency department presentation
- [ ] Other, specify:

#### Location

<table>
<thead>
<tr>
<th>Facility</th>
<th>Ward</th>
<th>Unit</th>
<th>Admission</th>
<th>Discharged</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bed</td>
<td>Bed</td>
<td>Bed</td>
<td>Bed</td>
<td>Bed</td>
</tr>
<tr>
<td>date in</td>
<td>date in</td>
<td>date in</td>
<td>date in</td>
<td>date in</td>
</tr>
<tr>
<td>Bed</td>
<td>Bed</td>
<td>Bed</td>
<td>Bed</td>
<td>Bed</td>
</tr>
<tr>
<td>date in</td>
<td>date in</td>
<td>date in</td>
<td>date in</td>
<td>date in</td>
</tr>
</tbody>
</table>

#### Procedures

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Procedure date</th>
<th>Procedure</th>
<th>Procedure date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
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<td></td>
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<td></td>
</tr>
</tbody>
</table>

#### Reason for admission

---

---

Please add addition copies of this page as required.

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Public Health & Wellbeing Regulations 2009  Surveillance of Carbapenemase producing Enterobacteriaceae (CPE)  October 2015
**Risk history—local nonrecurrent healthcare presentations (post-detection)**

Did the case have any other healthcare presentations within Australia post detection of CPE
- [ ] No
- [ ] Unknown
- [ ] Yes, please detail all presentations below. Complete a new row for each presentation, admission or change in ward. Seeking details regarding a presentation from a health care provider is not necessary if only a single case in an outbreak reports presentation there. There is no need to complete a row for outpatient medical presentations or specialist medical presentations unless a procedure is performed.

### Type of presentation

- [ ] Acute care admission
- [ ] Rehabilitation centre admission
- [ ] Day procedure
- [ ] Emergency department presentation

### Location

<table>
<thead>
<tr>
<th>Facility</th>
<th>Ward</th>
<th>Unit</th>
<th>Admission</th>
<th>Discharged</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Procedures

<table>
<thead>
<tr>
<th>Procedure</th>
<th>procedure date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Reason for admission


### Infection control

- [ ] Yes
- [ ] No
- [ ] Unknown

<table>
<thead>
<tr>
<th>Isolation, single room</th>
<th>Isolation, cohort room</th>
<th>Single bathroom</th>
<th>Contact precautions</th>
<th>Isolation represents</th>
<th>If infection, likely source</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Unknown</td>
<td>Skin/soft tissue</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Colonisation</td>
<td>Respiratory tract</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Infection, specify likely source</td>
<td>Central nervous system</td>
</tr>
</tbody>
</table>

Was CPE identified in this case during this admission

- [ ] No
- [ ] Unknown
- [ ] Yes, specify details below

<table>
<thead>
<tr>
<th>Isolation date</th>
<th>Isolation represents</th>
<th>If infection, likely source</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Unknown</td>
<td>Skin/soft tissue</td>
</tr>
<tr>
<td></td>
<td>Colonisation</td>
<td>Respiratory tract</td>
</tr>
<tr>
<td></td>
<td>Infection, specify likely source</td>
<td>Central nervous system</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bacteraemia—N device</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bacteraemia—without obvious focus</td>
</tr>
</tbody>
</table>
Appendix H: Template discharge letter to local doctor

Dear Doctor <<Name>>,

Thank you for your ongoing care of <<Patient>>. In addition to the discharge summary, this letter is also being provided in order to alert you to fact that <<Patient>> has been identified as having a multi-resistant organism known as carbapenemase-producing Enterobacteriaceae (CPE). Your patient has been identified as having <<CPE organism>> infection / colonisation <<delete one>>.

CPE is found in patients in hospitals and clinics around the world, including southern Europe and South-East Asia. Healthy people do not usually get CPE infections. However, it is important to know that people may carry CPE in their bowel or in a wound, without symptoms.

The most important role you can play as a primary carer is to help ensure that a health service, long-term residential facility or other healthcare setting is aware of your patient’s CPE status. This means advising the health service or facility in writing or by phone whenever you are referring your patient.

This health service will have an alert for any readmission, but because there is no universal patient identifier in Victoria your (and your patient’s) roles are critical.

If your patient is admitted to a healthcare or residential care setting, in addition to usual practice, such as staff regularly washing their hands or using alcohol-based hand rub, the staff will use special practices to reduce the risk of spreading CPE to other patients which may include: a single room or a room with other patients with CPE; and wearing a gown and gloves for all contacts.

Your patient has been given a fact sheet with some guidance for minimising risk of spread at home and in hospital.

Generally, there are no special measures required for your GP practice when seeing these patients, other than thorough hand hygiene using soap and water or an alcohol-based hand rub. Contact precautions should be used where there is a risk of direct or indirect transmission that is not effectively contained by standard precautions alone. Routine cleaning of your office space and waiting area is sufficient.

More information is available from:
