



OPERATIONAL DIRECTIVE

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Subject: Infection Prevention and Control of Carbapenem-resistant *Enterobacteriaceae* (CRE) in Western Australian Healthcare Facilities

Compliance with this Operational Directive is mandatory for all public hospitals and those private healthcare facilities, including satellite haemodialysis units, contracted to provide services to public patients.

This Operational Directive describes the minimum requirements for the routine screening and subsequent management of patients identified with carbapenemase-resistant *Enterobacteriaceae* (CRE) in Western Australian (WA) healthcare facilities (HCFs). All acute care HCFs shall ensure their procedures are aligned with those described in the attached document *Infection Prevention and Control of Carbapenem-resistant Enterobacteriaceae (CRE) in Western Australian Healthcare Facilities*. Guidance for the management of CRE-positive patients in residential care facilities (RCFs) is also provided, with the expectation that WA RCFs will comply with the precautions described in the *Guidelines*.

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1. INTRODUCTION

Enterobacteriaceae are a family of Gram-negative bacilli that occur naturally in the human gastro-intestinal tract and include clinically important genera such as *Escherichia*, *Klebsiella*, *Serratia*, *Citrobacter*, *Proteus* and *Enterobacter*. These organisms can spread outside of the gastro-intestinal tract and cause serious infections, such as bacteraemia, pneumonia, urinary tract and wound infections. Carbapenem-resistant *Enterobacteriaceae* (CRE) are *Enterobacteriaceae* that are resistant to the carbapenem group of antibiotics (e.g. imipenem, meropenem, doripenem, ertapenem). Carbapenems are considered last resort antibiotics as they offer broad spectrum cover, enabling safe and effective treatment of severe gram-negative infections. CRE, in almost all instances, are also resistant to all penicillins, cephalosporins (e.g. cefepime, ceftriaxone) and the monobactams (e.g. aztreonam). CRE also pose infection prevention and control challenges because of their high transmissibility. Over the past decade, outbreaks of infection due to CRE have occurred on the eastern seaboard of the United States, particularly New York City, certain European countries, and in Israel, and have been associated with significant morbidity and mortality. The increasing occurrence of antimicrobial resistance in these Gram-negative bacteria is reported world-wide and is a major threat to the provision of healthcare.

2. INFECTION PREVENTION AND CONTROL

It is critical that all HCFs implement appropriate infection prevention and control strategies for the identification, management and control of CRE in order to minimise the risk of CRE becoming endemic in WA HCFs.

The infection prevention and control strategies to be implemented for CRE screening and for the management of CRE colonised or infected patients are described in the attached document *Infection Prevention and Control of Carbapenem-resistant Enterobacteriaceae (CRE) in Western Australian Healthcare Facilities*.

3. RESPONSIBILITIES

- 3.1 Executive Directors of public acute-care HCFs and licensed private acute-care HCFs funded to provide care for public patients, including satellite haemodialysis units, are responsible for ensuring implementation and compliance with this Operational Directive.
- 3.2 Governance bodies of WA RCFs are to ensure they have effective infection prevention and control programs in place that address the management of CRE-positive patients that are congruent with the recommendations in the attached *Guidelines* and specifically Section 11.
- 3.3 All HCFs are to ensure their local infection prevention and control policies are aligned with the minimum requirements described in this Operational Directive.
- 3.4 All HCFs are to ensure procedures are in place to identify higher risk patient populations that require screening, and that screening is performed in a timely manner in accordance with this Operational Directive.
- 3.5 All HCFs are to ensure that a high level of communication is maintained between facilities when transferring patients who are known to be either CRE positive or a contact of a CRE positive patient who requires screening.
- 3.6 The WA Multi-Resistant Organism (WAMRO) Expert Advisory Group (EAG) is responsible for providing expert advice regarding the investigation and management of CRE cases in WA.



Infection Prevention and Control of Carbapenem-resistant *Enterobacteriaceae* (CRE) in Western Australian Healthcare Facilities

Version 1.0 October 2012

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Department of Health 2012. *Infection Prevention and Control of Carbapenem-resistant Enterobacteriaceae (CRE) in Western Australian Healthcare Facilities (Version 1)*, Healthcare Associated Infection Unit (HAIU), Communicable Disease Control Directorate, Department of Health, Western Australia.

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Introduction

The purpose of these guidelines is to ensure patients colonised or infected with carbapenem-resistant *Enterobacteriaceae* (CRE) are identified early and strategies to minimise the risk of transmission to other patients within the healthcare setting are undertaken.

These guidelines represent the minimum requirements for the screening and management of CRE-positive patients in acute care healthcare facilities (HCFs) in Western Australia (WA). Additional measures may be required in some HCFs on advice from their infection prevention and control professionals. Guidance for the management of CRE-positive patients in residential care facilities (RCF) is also provided.

There is no requirement for residents of WA RCFs to be routinely screened for CRE on admission to an acute care HCF.

The strict adherence to standard precautions and the adoption of transmission-based contact precautions when CRE colonisation or infection is identified is essential to prevent these organisms causing outbreaks and becoming endemic in WA HCFs. In addition, the importance of regular routine cleaning and disinfection (when required) of the environment and shared equipment is critical to the prevention of transmission of microorganisms.

At no time should a person's CRE status interfere with the admission, transfer or provision of healthcare in any WA HCF.

Definitions

Acute care healthcare facility (HCF): includes all public and private hospitals, private haemodialysis units and acute care mental health facilities.

Carbapenemases: are a class of enzymes that inactivate carbapenem antibiotics.

Carbapenem-resistant *Enterobacteriaceae* (CRE): are *Enterobacteriaceae* that are non-susceptible to carbapenem antibiotics. This is usually, but not always, via the production of carbapenemase.

Carbapenemase-producing *Enterobacteriaceae* (CPE): are *Enterobacteriaceae* that are non-susceptible to carbapenem via production of a carbapenemase enzyme.

Colonisation: is the presence, growth and multiplication of microorganisms without observable clinical signs or symptoms of infection.

CRE-contact: any patient who has shared a room, bathroom or toilet facility with a CRE-positive patient prior to the patient having contact precautions initiated.

CRE-positive patient: any patient who has had CRE isolated from any body site.

Decolonisation: refers to the use of topical and / or systemic antibiotics to eradicate colonisation of bacteria.

Endemic: the constant presence of a disease or infectious agent in a defined area.

Infection: the invasion of bacteria into tissues with replication of the organism. Infection is characterised by isolation of the organism accompanied by clinical signs of illness such as fever, inflammation or pus formation.

Outbreak: an increase in the number of cases, infections and / or colonisations, above the number normally occurring in a HCF over a defined period of time.

Residential care facility (RCF): all private and public facilities registered to provide 24 hour non-acute care to persons not able to live independently. It includes nursing homes, hostels, hospices and mental health and rehabilitation facilities.

Screening: a process to identify patients/residents at risk of being colonised with a particular microorganism, and if risk factors are present, obtaining appropriate specimens.

Characteristics

Background

Enterobacteriaceae are a family of gram-negative bacilli that occur naturally in the gastro-intestinal tract. These organisms can spread outside the gastro-intestinal tract and cause serious infections such as bacteraemia, pneumonia, urinary tract and wound infections. Clinically important genera include *Escherichia*, *Klebsiella*, *Enterobacter*, *Serratia*, *Citrobacter*, *Proteus* and *Morganella*. The occurrence of antimicrobial resistance in these and other gram-negative bacteria is increasingly reported world-wide and has become a major threat to the provision of healthcare.¹

The carbapenem group of antibiotics (imipenem, meropenem, doripenem, ertapenem) are considered last resort antibiotics as they offer broad spectrum antibiotic cover, enabling safe and effective treatment for severe infections. Carbapenem-resistant *Enterobacteriaceae* (CRE) occur due to the acquisition of carbapenemase enzymes (i.e. carbapenemase-producing *Enterobacteriaceae* or CPE) or less commonly arise via other mechanisms (e.g. porin loss). Within the *Enterobacteriaceae* family, carbapenemases have been found most commonly in *Escherichia coli* and *Klebsiella pneumoniae*, although have also been reported in other genera of gram-negative bacteria, such as *Pseudomonas* and *Acinetobacter* species.

Carbapenemase-producing *Enterobacteriaceae* are a particular infection prevention and control risk to HCFs compared to the remainder (i.e. non-carbapenemase mediated) of CRE for two reasons. Firstly, the genes encoding carbapenemase production are found on mobile genetic elements together with genes that code for resistance to other classes of antibiotics, such as fluoroquinolones (e.g. ciprofloxacin) and aminoglycosides (e.g. gentamicin). This makes Carbapenemase-producing *Enterobacteriaceae* difficult to treat. Secondly, Carbapenemase-producing *Enterobacteriaceae* can more efficiently be transmitted between patients within a HCF and have caused a number of HCF outbreaks overseas.

Recently in Australia, a number of cases of Carbapenemase-producing *Enterobacteriaceae* have been reported in people who acquired the organism overseas,² but transmission to other patients in Australian HCFs is rare.

There are a number of different types carbapenemases found in Carbapenemase-producing *Enterobacteriaceae*, each having a three-letter acronym. The five most important carbapenemases globally are described in Table 1.

Table 1 Characteristics of most important carbapenemases

Enzyme	Geographic distribution
KPC <i>Klebsiella pneumoniae</i> carbapenemase	First reported from the USA in 1996. Now prevalent in hospitals on the United States Eastern seaboard, Israel, Greece, China and Latin America.
NDM New-Delhi metallo- β - lactamase	Widespread in <i>Enterobacteriaceae</i> from Indian sub-continent hospitals and also appear to be spreading in the community.
VIM Verona integron-encoded metallo- β -lactamase	Scattered globally, with increased prevalence in Greece.
OXA Oxacillinases	Europe (in particular Turkey), Israel, and northern African countries.
IMP Imipenemase	Scattered worldwide, no clear associations. Endemic in Australia.

Following the detection of a CRE by the pathology laboratory, the confirmation of Carbapenemase-producing *Enterobacteriaceae* requires specialised molecular testing in a referral laboratory which may take several days. Therefore these guidelines refer to the screening for CRE and management of CRE-positive patients and their contacts.

Reservoir

- The majority of people who acquire CRE are colonised rather than infected.
- The primary site of colonisation is the lower gastro-intestinal tract.
- The duration of colonisation is unknown, but is possibly life-long.
- CRE can survive on environmental surfaces and equipment.

Risk Factors for Acquisition (colonisation or infection)

- In Australia the major risk factor for acquiring CRE is recent hospitalisation in a healthcare setting overseas. Hospitalisation in the Indian subcontinent, Israel, Greece, Eastern Europe, China, North America, and South East Asia appears to confer the greatest risk.³
- Within HCFs in countries where CRE are endemic, risk factors include prior antimicrobial use, length of hospital stay, severity of illness, mechanical ventilation, intensive care, the presence of wounds, prior surgery and recent transplantation.⁴

Risk Factors for Transmission

- Certain CRE-positive patients are more likely to contaminate the environment and hands of healthcare worker (HCWs). These include:
 - patients with diarrhoea or faecal incontinence
 - patients with enterostomies
 - patients with discharging wounds
 - catheterised patients with CRE colonisation of the urinary tract
 - patients who are incapable of maintaining their own personal hygiene.
- HCWs providing direct care to these patients are at increased risk of transient acquisition of CRE on their hands if standard and transmission-based contact precautions are not followed.

Routes of Transmission

- The routes of transmission from patient to patient are either by:
 - direct contact through carriage of CRE on the hands of HCWs
 - indirectly via contaminated environmental surfaces or shared equipment.

Infection Prevention and Control

1. Surveillance Screening

- All HCFs should have a protocol in place that is applied to all patients admitted to their facility, to determine the patient's infection prevention management requirements including the need for any microbiological surveillance screening.
- The following patients shall have routine screening for CRE performed on admission to a WA HCF, by obtaining specimens as described in Section 2.
 - any person who has been hospitalised in an overseas HCF or has resided in an overseas RCF in the past 12 months
 - any person who is identified as a CRE-contact during their hospitalisation or is readmitted with a micro-alert 'H' i.e. a previously identified CRE-contact.
- Routine screening of patients for CRE who have been hospitalised within a WA HCF or who reside in a RCF, in the absence of a micro-alert, is not required.
- Routine screening of HCWs for CRE is not recommended.

2. Screening Requirements

- Screening of patients who have been an inpatient in a HCF or resided in a RCF overseas in the past 12 months is achieved by the collection of a single rectal swab or faecal specimen and, if appropriate, one swab from other sites as described in Section 3.
- Screening of patients who are identified as a CRE-contact, or have a micro-alert 'H', is achieved by the collection of three rectal swabs or faecal specimens collected on three separate days and, if appropriate, one swab from other sites as outlined in Section 3.
- There is no screening protocol to clear CRE-positive patients and repeated screening of these patients is not required.

3. Specimen Collection

- All laboratory request forms are to be marked "For CRE Screening."
- The procedure for collecting a rectal swab is as follows:
 - dip a sterile cotton swab in sterile water or normal saline
 - insert swab 1cm into rectum and gently rotate 360 degrees
 - place swab into transport container and process as per normal .
- For those patients with enterostomies a stomal specimen is required.

- If concurrent VRE screening is required, a separate rectal swab should be used.
- If a wound or drain is present, a single wound or drain specimen is required.
- If an indwelling or supra-pubic catheter is present or the patient is having intermittent urinary catheterisations, a urine specimen is required.
- If an endotracheal tube (ETT) is present, an ETT aspirate is required.

4. Bed Placement Requirements

- All patients who have been hospitalised in an overseas HCF or resided in an overseas RCF in the last 12 months should be admitted to a single room with ensuite facilities under transmission-based contact precautions.
- Inpatient contacts of CRE-positive patients and all micro-alert 'H' patients should be placed in a single room under transmission-based contact precautions.
- These precautions should remain in place until all required CRE screening results are negative.
- Patients infected or colonised with CRE should not be routinely cohorted without prior discussion with the infection prevention and control unit.

5. Surveillance and Notification

- Laboratory capability is required for detecting clinical isolates of CRE.
- Possible CRE isolated from screening or routine clinical samples shall be confirmed by formal susceptibility testing.
- All laboratories isolating CRE shall ensure prompt notification is made to the medical practitioner responsible for the care of the patient and in the case of a CRE-positive inpatient, prompt notification to the hospital infection prevention and control personnel, and other personnel as specified at a local HCF level.
- All CRE isolates, including those detected at private laboratories, are to be sent to the Department of Microbiology, QEII Network, PathWest for molecular testing for carbapenemase production.

6. Micro-Alert System

- If CRE is confirmed by formal susceptibility testing, CRE-positive patients are to be assigned a 'G' alert on the Micro-Alert System by the HCF where the specimen originated. The QE11 laboratory will support micro-alerting for the private sector.
- All CRE-positive patients shall be provided with written information (Appendix 2).

- As carriage of CRE can be prolonged and there is no clearance procedure, 'G' alerts are to remain in place for the life of the patient.
- A micro-alert 'H' is to be initiated by the HCF where the specimen originated, for those patients identified as a CRE-contact, and for whom screening has not been undertaken or completed prior to discharge or transfer to another HCF.

7. Antimicrobial Stewardship

- Antimicrobial stewardship is a mandatory requirement of the National Safety and Quality Health Service Standards. All WA acute care HCFs are to ensure:
 - an antimicrobial stewardship program is in place
 - the clinical workforce prescribing antimicrobials have access to endorsed therapeutic guidelines on antibiotic usage
 - monitoring of antimicrobial usage and resistance is undertaken
 - action is taken to improve effectiveness of antimicrobial stewardship.

8. Outbreak Management and CPE confirmation

- In WA, where carbapenemase-producing *Enterobacteriaceae* are rarely isolated, identification of one case of carbapenemase-producing *Enterobacteriaceae* warrants investigation.
- On confirmation (or high level suspicion) of a carbapenemase-producing *Enterobacteriaceae*, all HCFs are to ensure notification to the Director, Communicable Disease Control Directorate (CDCD) on 9388 4801 during office hours. The Director will ensure the WA Multi-resistant Organism (WAMRO) Expert Advisory Group (EAG) is notified.
- If requested, the WAMRO EAG will provide advice on the investigation and management of any carbapenemase-producing *Enterobacteriaceae* outbreak or suspected transmission of carbapenemase-producing *Enterobacteriaceae* within WA HCFs.
- The Healthcare Associated Infection Unit (HAIU) within the Communicable Disease Control Directorate (CDCD) is responsible for further communication to other hospitals and other key stakeholder groups, as required.

9. Management of CRE-Positive Patients (Hospital Inpatient)

Note: CRE status must not compromise patient management and CRE-positive patients shall not be refused admission to any HCF or RCF.

9.1 Transmission-based contact precautions

- Transmission-based contact precautions are required to be implemented as soon as possible on identification of a new CRE-positive patient or upon re-admission of a micro-alert 'G' patient
- Precautions are to remain in place for the length of the patient stay
- Refer Appendix 1 for details of transmission-based contact precautions
- Decolonisation of CRE-positive patients is not effective and should not be attempted.

Note: Based on a risk assessment by the acute care HCFs infection prevention and control personnel, modified transmission-based contact precautions, contact tracing and micro-alerting may be applied to specific non- carbapenemase producing CRE.

9.2 External Patient Transfers

- The transferring facility shall notify the receiving HCF or RCF prior to transfer of a CRE-positive patient or unscreened CRE-contact to ensure appropriate bed management occurs
- The medical and nursing documentation accompanying the patient must include a risk assessment for CRE transmission e.g. an increase risk for transmission with discharging wounds or incontinence (refer page 6).

9.3 Patient Discharge

- All CRE-positive patients are to be provided with information on the risk of transmission, the importance of notifying health care providers of their status, and be made aware of the possible life long carriage of CRE, see appendix 2.

10. Management of CRE-Positive Patients in Specific Settings

10.1 Hospital non-inpatient settings

These include departments where the patient is not admitted to the facility overnight and invasive services are provided e.g. emergency, day surgery, endoscopy, haemodialysis and radiology. The following should be implemented:

- Standard precautions are to be applied for all patients at all times, including the requirements for HCWs to comply with hand hygiene policies
- Any patients colonised or infected with CRE shall be asked to perform hand hygiene with an alcohol-based hand rub (ABHR) prior to entering the area
- If risk factors for transmission are present (refer page 7) the patient should be physically separated from other patients, if this can be achieved without affecting the provision of care
- On discharge, all surfaces contacted by the patient shall be cleaned using a 2-step clean or a 1-step clean with a 2 in 1 product (see Appendix 1).

10.2 Acute care mental health facilities

- The number of acute mental health patients that would require routine screening is low. However, routine screening as described in Section 1 still applies in this setting. It is acknowledged that screening may not be possible due to valid consent issues or a patient's mental capabilities. Consideration should be given on an individual basis and risk assessment approach.
- Management of any CRE-positive patient in this setting needs to be based on an individual patient risk assessment by the HCFs infection prevention and control personnel. Where possible, the procedures outlined in this document should be followed to reduce the transmission between patients as transfer of acutely ill mental health patients to acute care HCFs may occur.

11. Management of CRE- Positive Patients in Residential Care Facilities

Although it is recognised that a RCF is the resident's home, and it is optimal not to place restrictions on their mobilisation, socialisation or room allocation, there is also a need to ensure appropriate infection prevention and control occurs in this setting. Residents colonised or infected with CRE and who have risk factors for transmission (refer page 6), or in whom basic personal hygiene practices may be compromised by cognitive or functional impairment, are more likely to contaminate their environment. It is essential that RCFs engage with their infection prevention and control professional to ensure appropriate management occurs.

Special emphasis should be placed on hand hygiene and if the resident's cognitive state is impaired, HCWs caring for them must be responsible for this activity, especially after any toileting or contact with colonised / infected sites or devices.

Prudent use of antimicrobial agents including antibiotics is essential. All RCFs should have strategies in place to evaluate, monitor and improve antibiotic prescribing in accordance with recommendations made by the Australian Commission on Safety and Quality in Healthcare.

11.1 Management of a CRE-positive or unscreened CRE-contact in a RCF

- Prior to transfer of a CRE-positive patient or an unscreened CRE-contact to a RCF, the transferring facility shall:
 - ensure the receiving facility is notified of the patient's CRE status
 - review, discuss and document the risk of transmission with the receiving RCF to establish if appropriate accommodation is available (refer page 7)
 - discuss the screening requirements if the patient is a CRE-contact.
- If a patient is identified as a CRE-contact after the patient has been discharged to a RCF, the transferring facility is to notify the RCF and advise of the screening requirements (refer Section 2 & 3).
- Prior to receiving a resident who is CRE-positive or an unscreened CRE-contact the RCF shall:
 - notify the infection prevention and control professional (or RCF duty manager out of hours) for the facility of the pending transfer

- document the risk assessment that includes resident status i.e. CRE-contact or CRE-positive, and if CRE-positive, the risks for transmission
- allocate an appropriate room based on the risk assessment
- ensure HCWs are informed and have appropriate knowledge of what CRE is and the importance of reducing the transmission of this organism within the RCF.
- If the CRE-positive or unscreened CRE-contact resident has no risk factors for transmission the resident can be transferred to the RCF and managed with standard precautions.
- If the CRE-positive or unscreened CRE-contact resident does have risk factors for transmission the resident should be placed in a single room with ensuite facilities and managed with transmission-based contact precautions as described in Appendix 1.
- The CRE-positive resident with risk factors for transmission may attend community activities as long as any colonised / infected site or invasive device can be securely covered, e.g. chronic wound, tracheostomy tube, urinary catheter, and there is no leakage of any body fluids / secretions/ excretions.
- Unscreened CRE-contacts require the collection of three rectal swabs or faecal specimens collected on three separate days and, if appropriate, one swab from other sites as described in Section 3 of this document. If the unscreened CRE-contact resident does have risk factors for transmission then transmission-based contact precautions are to remain in place until all screening results are negative.

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Appendix 1: Transmission-based contact precautions for CRE-positive patients

1. Patient Placement

- Single, non-carpeted rooms, with ensuite facilities are required.
- A clinical hand basin inside, or in close proximity to, the room is required.
- Patients infected or colonised with CRE should not be routinely cohorted. If there are insufficient single rooms, cohorting may be permitted as advised by the local infection prevention and control team.

2. Room Preparation

- Remove all non-essential equipment.
- Ensure impermeable mattress and pillow covers are intact.
- Patient charts shall be left outside the patient room.
- Personal protective equipment (PPE) supplies are to be available outside the room or in the anteroom, if present (see PPE requirements).
- Signage advising of contact precautions shall be evident outside the room.

3. Hand Hygiene

- Only products approved by the Australian Therapeutic Goods Administration (TGA) for hand hygiene shall be used.
- HCWs shall use an alcohol based hand rub (ABHR) or an antiseptic hand wash for all hand hygiene.
- All HCWs shall perform hand hygiene in accordance with the '5 moments for hand hygiene.' In addition, the requirements for performing hand hygiene associated with donning and removing PPE shall be followed.
- The use of gloves does not negate the need to perform hand hygiene following their removal.
- All patients and visitors shall be advised (via signage) of the importance of performing hand hygiene. ABHR shall be made available for their use.

4. Personal Protective Equipment

- Contact precautions require the HCW to don gown and gloves prior to entering a room if contact with the patient or environment is anticipated.

- Disposable long-sleeved, fluid resistant gowns are required. All gowns are for single use only and are not to be left hanging in the patient's room for use on subsequent occasions.
- When gloves are worn, minimise touching environmental surfaces e.g. light switches, door handles, to decrease environmental contamination.
- Prior to leaving the patient's room, gown and gloves are to be removed and hand hygiene performed.
- As per standard precautions, masks and eyewear are required when there is potential for exposure to blood / body fluids.

5. Patient Equipment

- Disposable, single-use patient equipment shall be used, whenever possible.
- Dedicate non-critical items to the patient's room e.g. stethoscope.
- Minimal stocks of disposable items e.g. dressings, kidney dishes, are to be stored in the room. On patient discharge, these items are to be discarded.
- Designated reusable equipment required for use on other patients shall be cleaned with detergent and disinfected prior to reuse. Items requiring further reprocessing e.g. sterilisation shall be processed as per normal.
- Alcohol disinfectant wipes may be used for specialised medical equipment e.g. x-ray and ECG machines.
- Used bedpans / urinals / measuring jugs shall be sanitised in a pan sanitiser immediately following use, or disposed of in a macerator.

6. Use of Disinfectants

- As disinfectants are inactivated by organic material, any visible soiling is to be removed with paper towels prior to cleaning.
- Information on how to prepare and use the disinfectant and relevant material safety data sheets (MSDS) shall be available to cleaning staff.
- Use of automated dispensing systems for cleaning solutions is encouraged.

7. Environmental Cleaning of CRE-Positive Patient Rooms

Note: Persistence of environmental reservoirs of pathogens is usually related to a failure to follow recommended cleaning procedures rather than specific cleaning and disinfectant agents. For effective environmental disinfection, physical cleaning with detergent and thorough application of the disinfectant, which allows for adequate contact time with the surfaces, is required. Physical cleaning is very important, whether a two-step procedure (detergent then disinfectant) or a 1-step (detergent plus disinfectant) 2-in-1 product is employed.

- Cleaning regimens shall ensure the room is cleaned on a daily basis using detergent and a chlorine-based disinfectant. Increased frequency of cleaning is recommended if the patient has risk factors for dissemination, such as diarrhoea or discharging wounds.
- Disposable single-use cleaning equipment shall be used when available.
- Re-useable cleaning equipment shall be dedicated to the patient's room e.g. mop bucket cleaned and disinfected after each use. If re-useable mop heads are used they shall be bagged and sent for laundering at the completion of each use.
- Two-step cleaning, using a neutral detergent followed by the use of a chlorine-based disinfectant, or a one-step clean using a 2-in-1 product that contains detergent and chlorine based disinfectant, is to be used.
- Chlorine-based solutions are to be used at a dilution of 1000ppm of sodium hypochlorite.
- On patient discharge:
 - any unused / unopened disposable medical items in the patient's room shall be discarded and unused linen sent for laundering
 - patient bed screens (and window curtains, if fitted) shall be sent for laundering / dry cleaning
 - a disinfectant clean that utilises detergent and a chlorine-based solution is required
 - the room can be used immediately after cleaning, once surfaces are dry.

8. Standard Precautions

- Standard precautions apply to the management of the following:
 - linen – stockpiling supplies in the patient’s room is not to occur and any unused items in the room are to be sent for laundering.
 - crockery and cutlery
 - waste disposal
 - laboratory specimens
 - care of the deceased patient.

9. Patient Transfers

- Regarding internal transfers:
 - avoid unnecessary transfers of CRE-positive patients within the hospital
 - notify receiving departments of patient’s status prior to transfer
 - whenever possible, place CRE-positive patients last on procedural lists to allow adequate time for cleaning and disinfection procedures.
- Regarding external transfers to private, public or RCFs:
 - the transferring facility shall notify the receiving HCF or RCF prior to the transfer of CRE-positive patients or unscreened CRE-contacts to ensure appropriate bed management occurs
 - The medical and nursing documentation accompanying the patient must include if there is a risk for CRE transmission (Refer page 5).

10. Patient Discharge

- All CRE-positive patients are to be provided with information on the risk of transmission, the importance of notifying health care providers of their status, and be made aware of their possible life long carriage of CRE.

11. Duration of Contact Precautions

- Precautions are to continue for the length of the patient stay.

12. Visitors

- Visitors are to be instructed to perform hand hygiene prior to entering, and on leaving, the patient’s room. No protective clothing is required to be worn by visitors unless they are providing care to the patient.

Appendix 2 Fact Sheet

Carbapenem-resistant Enterobacteriaceae (CRE)

Information for patients, residents and visitors

What are CRE?

Enterobacteriaceae are a family of bacteria (germs) that are found in the normal human intestinal tract (bowel). Sometimes these bacteria can spread outside of the bowel and cause infection e.g. urinary tract infection, wound infection, pneumonia. **Carbapenems** are powerful antibiotics used to treat serious infections. Some *Enterobacteriaceae* have become **resistant** (the antibiotics are no longer effective) to the carbapenem antibiotics, and these are referred to as **carbapenem-resistant Enterobacteriaceae** or CRE. In recent years, infections caused by CRE have become more common in overseas hospitals. These bacteria are currently very rare in Western Australian hospitals.

Can CRE be treated?

Many people can carry CRE in their bowel without getting an infection. These people are said to be colonised and they do not need to have antibiotics. These people are likely to stay colonised for life. If the CRE are causing infection, there are still some antibiotics that can be used. CRE that have become resistant to all antibiotics are rare.

Who is at risk of CRE infections?

Healthy people generally do not get CRE infections. Currently, people most at risk for getting CRE infections appear to be those who have been in a hospital in an overseas country. People who get CRE often have serious medical conditions that have resulted in them receiving multiple antibiotics, complex surgery, staying in an intensive care unit or insertion of foreign material e.g. urinary catheters. CRE can cause infections when they enter the body through medical devices such as urinary catheters, ventilators or intravenous catheters. It is not spread by coughing or sneezing.

How is CRE spread?

To get CRE, a person must be exposed to the bacteria. CRE are usually spread from person to person through contact with infected or colonised people. This is either directly from the hands of another person or indirectly from medical equipment or surfaces that have become contaminated.

How can the spread of CRE be prevented?

Early detection of people who carry CRE is essential to stop any spread. This is why we screen for CRE in WA hospitals. If someone has a history of being in a hospital or residential care facility overseas in the last 12 months, a specimen to screen for CRE (either a stool sample or a rectal swab) will be taken from them when they are admitted to hospital.

What happens if I have a CRE?

If CRE is found in a specimen taken from you, your healthcare team will continue to provide the same level of care. However, some extra precautions will be taken:

- you will be moved to a single room
- everyone, including your visitors and you, will need to wash their hands or use an alcohol-based hand rub before entering or leaving your room
- a sign will be placed on your door to remind others of the precautions they need to follow e.g. to wear a gown and gloves when providing care
- an alert will be placed against your name in the hospital computer system that can be seen by all the metropolitan public hospitals in WA. This alerts staff at the time of future admissions that extra precautions are required
- as there is no method for this information to be shared with WA country or private hospitals, residential care facilities or hospitals outside of WA, it is important you advise these health providers that you have acquired a CRE.

What about my family/visitors?

Your family and friends can visit you, however, to prevent the spread of CRE to other patients or the environment, it is important that all visitors:

- always perform hand hygiene before entering and leaving your room
- do not eat or drink in your room and
- do not use your hospital bathroom.

Why is hand hygiene important?

Our hands will always be covered with the bacteria (germs) that live in or on us and when we touch other people we can transfer our germs to them. Hand hygiene is a simple but very effective measure that stops the spread of germs.

What will happen at home?

Carrying CRE will not affect your family or friends provided that you have good hand hygiene practices. You and your family members should always perform hand hygiene by washing your hands with soap and water:

- after using the bathroom
- if you touch any wounds or medical devices that you may have e.g. a urinary catheter or wound drain.

No special cleaning is required in your home and clothing may be laundered in the usual manner, along with the rest of the household laundry.

If you go to another healthcare facility, visit another doctor or have home care services, you should tell them that you have a CRE.

Produced by the Healthcare Associated Infection Unit, Communicable Disease Control Directorate. For contact details visit: www.public.health.wa.gov.au/1/64/1/contact_us.pm



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