Multidrug Resistant Organisms Control

Purpose

To set out clear guidance for CDHB & WCDHB staff in the management of MDRO to minimise risk of transmission to patients, staff and visitors.

Policy

This policy focuses on infection prevention and control measures to be implemented in CDHB & WCDHB healthcare facilities for multidrug resistant organisms (MDRO) as well as other potential pathogens such as fungi that are resistant to multiple antimicrobials

Applicability

All staff at CDHB & WCDHB

Principles

Antimicrobial Resistance
This is a real threat to human health. Antimicrobial resistant infections are associated with increased morbidity and mortality through the use of 'second-line' agents that are often less effective and more toxic.

Antimicrobial Stewardship
The aim is to optimise use of antimicrobial agents in the prevention and treatment of infection and minimise potential harms including antimicrobial resistance adverse drug reactions and excessive health care costs.

Roles and Responsibilities

CDHB Executive Management Team
The role of the Executive Management Team is to ensure that there is a surveillance system and processes in place for the surveillance of MDRO that meets local and national requirements. They are responsible for;

- Ensuring effective, adequate and appropriate resources are in place for the implementation of this policy.

CDHB Infection Prevention and Control Executive Committee
The role of Infection Prevention and Control Executive Committee is to provide strategic guidance and direction for CDHB & WCDHB surveillance activities. They are responsible for:

- Reviewing the "CDHB Surveillance Overview" annually to establish MDRO surveillance objectives and frequency with which such surveillance activities are to be undertaken
- Ensuring MDRO surveillance reflects changing international epidemiological trends for antimicrobial resistant organisms
- Using data from MDRO surveillance reports to inform strategic planning for future improvements

Infection Prevention and Control Operational Team
The role of the Infection Prevention and Control Operational Team is to carry out MDRO surveillance activities and ensure timely reporting to clinical areas and other key stakeholders.

They are responsible for:

- Reviewing MDRO cases in the electronic surveillance system (ICNet) on a daily basis.
- Notifying clinical staff of MDRO alert organisms and advising clinical staff on appropriate containment measures and infection prevention and control precautions.
- Ensuring patients with positive MDRO isolates are identified via ICNet and have an alert placed on patient information systems e.g. Health Connect South and SIPICS.
- Investigating suspected incidents of MDRO cross infection and outbreaks.
- Providing written MDRO surveillance reports to relevant clinical staff, IPC committees and other key stakeholders.

Microbiology Department at Canterbury Health Laboratories

The role of the microbiology laboratory is to ensure appropriate tests are available to identify MDRO as well as other potential pathogens such as fungi that are resistant to multiple antimicrobials. They are responsible for ensuring any positive results are communicated promptly to clinical teams and the infection prevention and control team.

Ward Managers / Co-ordinators / Nursing Staff

The role of ward managers / co-ordinators / nursing staff is to apply infection prevention and control policies, guidelines and procedures for MDRO to ensure patient safety and minimise risk of transmission. They are responsible for:

- Ensuring an MDRO admission risk assessment is completed on admission or upon transfer
- Ensuring patients are screened for MDRO based on admission (or pre-admission or upon transfer) risk assessment and on request e.g. contact tracing
- Ensuring screening/specimens are obtained in a timely fashion
- Ensuring electronic patient records are checked for MDRO on admission e.g. Health Connect South / SIPIC
- Ensuring infection prevention and control precautions for MDRO are carried out as detailed in CDHB & WCDHB policies

Consultants and other Medical Staff

The role of consultants and other medical staff is to apply infection prevention and control policies, guidelines and procedures for MDRO to ensure patient safety and minimise risk of transmission. They are responsible for:

- Accessing and following up on any microbiology results for their patients
- Ensuring infection prevention and control precautions for MDRO are carried out as detailed in CDHB & WCDHB policies
- Considering MDRO surveillance reports pertinent to their speciality

Other Clinical Staff and Employees

The role of other clinical staff and employees is to apply infection prevention and control policies, procedures and guidelines for MDRO to ensure patient safety and minimise risk of transmission. They are responsible for:

- Following guidance of Ward / Unit and Nursing / Medical staff when dealing with patients in transmission-based precautions for MDRO
- Asking for guidance and clarification for any areas of concern or uncertainty

Multidrug Resistant Organisms

General background

MDRO are of concern because they:

- are resistant to many antibiotics commonly used to treat infection
- patients colonised with an MDRO are at risk of progressing to clinical infection
- eradication may not be possible for colonised patients
- increase patient morbidity and mortality
- second-line antibiotics may be required for treatment that may be less effective and have more side effects
- act as a reservoir of resistant genes for transmission to other organisms
- may colonise the environment for long periods (depending on the organism)

Mode of transmission

Contact transmission is the primary mode of spread for MDRO via:

- Transient carriage on the hands of health care workers
- Contamination of surfaces and equipment

A combination of measures is required to control the spread of MDRO including antimicrobial stewardship, infection prevention and control interventions and appropriate screening.

MDRO organisms of concern

The MDRO organisms covered in these guidelines are as follows:

Methicillin Resistant Staphylococcus aureus (MRSA)

- MRSA stands for Methicillin Resistant *Staphylococcus aureus*.
- The term is used to describe a number of strains of the bacterium Staphylococcus aureus, which have developed resistance to antibiotics commonly used to treat Staphylococcal infections.
- MRSA is an opportunistic bacterium that may colonise and grow readily on the skin and mucous membranes of a person, without harm to that person.
- It is commonly isolated from warm, moist body sites such as the nose, groin and perineum.
- MRSA colonisation can lead to infection such as infected skin lesions.
- If an MRSA positive patient has more than one transmission risk factor, a patient placement risk assessment should be carried to ascertain most suitable measures for management and prevention of cross infection.
- See MDRO Risk Assessment for patient placement flowchart (Appendix 2)

Carbapenemase-producing *Enterobacteriaceae* (CPE)

- Enterobacteriaceae is the name given to a family of bacteria that normally lives in the human gastrointestinal tract.
- Carbapenemase producing Enterobacteriaceae (CPE) have developed resistance to carbapemem antibiotics e.g. meropenum by producing enzymes that hydrolyse most β-lactam antibiotics.
- Therapeutic options are exceedingly limited for patients with CPE infections due to the resistance to most antibiotics.
- Patients colonized with CPE are a reservoir creating a risk for transmission to other patients as well as developing endogenous infections themselves.
- Other intermediate vectors for spread between patients include: contaminated hands of healthcare workers, contaminated equipment and environment (particularly faecally contaminated equipment).

- CPE positive patients should always be manged on contact precautions.
- See MDRO Risk Assessment for patient placement flowchart (Appendix 2)

Extended-spectrum beta-lactamase (ESBL) producing enterobacteriaceae

- Some bacteria produce an enzyme called extended-spectrum beta-lactamase (ESBL) that inactivates penicillin and third generation or "extended spectrum" cephalosporins e.g. ceftazidime and cefotaxime resulting in antibiotic resistance.
- ESBL producers occur in gram negative bacteria commonly Enterobacteriacae in the human gastrointestinal tract e.g. E. Coli, Klebsiella species.
- Colonized patients are a reservoir for ESBL producing bacteria creating a risk for transmission to other patients as well as developing endogenous infections themselves.
- Other intermediate vectors for spread of ESBL producing bacteria between patients include: contaminated hands of healthcare workers, contaminated equipment and environment (particularly faecally contaminated equipment).
- Risk assessment for ESBL producing bacteria should always be made as some spread more easily than others especially in hospital settings:
- ESBL Klebsiella pneumoniae and other ESBL species are more transmissible than ESBL E-Coli within hospitals, therefore, patient placement assessments should always be carried to ascertain risk factors for transmission and control measures to be taken to prevent transmission.
- See MDRO Risk Assessment for patient placement flowchart (Appendix 2)

Vancomycin-resistant Enterococci (VRE)

- Vancomycin resistance occurs in Enterococcus faecium (and less often E. faecalis) due to the acquisition of a VanA or VanB resistance determinant.
- The human gastrointestinal tract is the major reservoir for VREs.
- VRE is primarily a healthcare associated pathogen.
- VRE is not currently endemic in New Zealand but is sporadically identified in association with hospitalisation or healthcare contact overseas. Local transmission and outbreaks can occur in vulnerable patient populations
- Colonized patients are a reservoir for VRE creating a risk for transmission to other patients as well as developing endogenous infections themselves.
- Other intermediate vectors for spread of VRE between patients include: contaminated hands of healthcare workers, contaminated equipment and environment (particularly faecally contaminated equipment).
- VRE positive patients should always be manged on contact precautions.
- See MDRO Risk Assessment for patient placement flowchart (Appendix 2)

Other MDRO of concern

- Other multi-drug resistant gram-negative organisms e.g. Acinetobacter species, Pseudomonas aeruginosa.

MDRO Admission Assessment

All patients are to be assessed every time they present to CDHB & WCDHB for admission (or pre-admission, day procedures or transfer) for MDRO risk factors.

Risk factors for carriage vary according to the MDRO. Significant risk is associated with: travel to an overseas area with endemic MDRO, overseas hospitalisation (especially with an ICU stay), residence in a long-term care facility.

Admission risk assessment includes checking for current MDRO alerts on the patient management system (SIPICS) and Health Connect South.

It is important to ask for previous travel history, hospitalisation history and other risk factors as noted in the *Multidrug Resistant Organisms (MDRO) Admission Assessment Flowchart (Appendix 1)*.

Information from risk assessments dictate whether a patient requires MDRO screening and which precautions are required: see MDRO Risk Assessment for patient placement flowchart (Appendix 2).

This assessment is a responsibility of the admitting nurse in all CDHB & WCDHB facilities including inter-hospital transfers

Checking medical warnings (MDRO alert) on admission
Admitting staff (Ward clerks/nursing staff) are responsible for checking medical warnings about the patient's possible MDRO status:

- Check the patient management system for previous MDRO alerts
- Print the page of any alerts documented.
- Place the alert printout in front of clinical notes for clinical staff.

Admission assessment for MDRO risk
Regardless of whether the patient has a documented alert, the admitting nurse must undertake admission assessment for MDRO using the Multidrug Resistant Organisms (MDRO) Admission Assessment Flowchart (Appendix 1).

In addition, an assessment for patient placement and what IPC precautions may be necessary must be undertaken using the MDRO Risk Assessment for patient placement flowchart (Appendix 2).

Patients will be identified as either high, medium or low risk. They will be managed on either standard or standard AND transmission-based precautions.

Risk level will determine if patients may be admitted to a multi-bedded room or if they will require isolation in a single room.

Those patients assessed as high risk will always require contact precautions in a single room with an ensuite bathroom or dedicated toilet. If this is not possible, talk with IPC staff to confirm appropriate solution.

Screening for Carbapenem-resistant *Acinetobacter baumannii* (CRAB) is recommended for patients from overseas hospitals where the patient has spent time in an Intensive Care Unit during their overseas admission (this is in addition to other screening requests for MDRO (i.e. ESBL, VRE, CRE)

NB: some clinical services e.g. BMTU, Burwood Spinal Unit, specific West Coast facilities may have a specific screening regime.

MDRO risk and screening requirements

This admission assessment flowchart has been divided into 2 sections according to patient's status:

MDRO Status Unknown (on left):

- Refer to the Multidrug Resistant Organisms (MDRO) Admission Assessment Flowchart (Appendix 1). Questions 1, 2 and 3 must be asked and the patient screened accordingly

MDRO Status Positive (on right):

- Known for be positive for CPE, VRE, ESBL, MRSA. Screen only if advised by IPC Service.
- Refer to the Multidrug Resistant Organisms (MDRO) Admission Assessment Flowchart (Appendix 1).

Laboratory specimens for MDRO screening
For CPE, VRE, & ESBL - the following specimens are required:

- Faeces sample /rectal swab or stoma with visible faecal matter. The same swab/faecal sample can be used for all three MDRO.
- Indwelling urinary catheter (including nephrostomy or SPC) specimen of urine (CSU).

- Wound swab / abdominal drain/endotracheal tubes sample.
- On the laboratory form request 'MDRO screen' if all three (ESBL, VRE & CPE) are required; otherwise specify the test e.g. ESBL.

Uploading national medical warnings (MDRO alerts)

- A medical warning ("MDRO Alert") will be entered on the Patient Management System, SIPICS, by the Infection Prevention and Control Service based on a MDRO positive result.
- These alerts are visible on Health Connect South & SIPICS under 'National Medical Warnings'.
- MDRO alerts may only be applied or removed by staff members in the IPC Service.
- SIPICS Alerts must be checked for all admissions and relevant information entered on to admission and transfer documentation.

Considerations for the care of known MDRO positive patients

Known MDRO positive patients require assessment each admission (or preadmission or transfer) as per the Multidrug Resistant Organisms (MDRO) Admission Assessment Flowchart (Appendix 1).

MDRO positive patients assessed as having high transmission risk factors are to be cared for in Contact Precautions.

Patients assessed to have low transmission risk factors may be managed with Standard Precautions only. This includes MRSA and ESBL *E coli* positive patients with no transmission risk factors. The 5 moments for hand hygiene and standard precautions will minimise transmission of MDRO.

Minimisation of psychological effects of isolation precautions

Isolated patients may suffer from negative psychological effects. The following interventions may help to prevent this:

- Ensure the patient is able to communicate effectively with staff e.g. can access a call bell.
- Provide patients with information about their MDRO and explain the requirements and rationale for any transmission-based precautions.
- Encourage visits from family and friends.
- Keep the door or curtains open (at the foot of the bed) for Contact Precautions if the patient prefers.
- Do not restrict the use of a telephone – ensure ward telephone is disinfected after use with an approved disinfectant wipe.

Visitors

Visitors are not normally required to wear PPE (some exceptions apply) but staff should inform them to:

- Wash their hands or use alcohol-based hand rub (ABHR) after visiting the patient.
- Visit other patients prior to visiting the patient in isolation.

MDRO patients requiring surgery

- While decolonisation is not possible for patients with MDRO such as ESBL producers, VRE or CPE, prior to elective surgery, consideration of a topical treatment short term to reduce bacterial load may be considered (discuss with ID Physician).
- Topical decolonisation treatment for MRSA positive patients can be effective for decolonisation prior to elective surgery. Treatment should be initiated at least 24 hours before surgery.
- If considered clinically appropriate, MRSA decolonisation in pregnancy should be initiated as close to delivery date as possible.
- If antibiotic prophylaxis is required, the patient's colonisation status should be considered. A Clinical Microbiologist or Infectious Diseases physician will be able to advise.

- There is no need to place patients with an MDRO last on the list as standard operating theatre precautions should prevent cross infection.
- The use of a disinfectant is required for the cleaning of the theatre after operating on a patient with MDRO. In addition, the PACU patient area and any shared equipment should be cleaned and disinfected after the patient leaves the area.
- Transport and Operating Theatre staff must be informed of the patient's MDRO status.
- Observing the 5 Moments for Hand Hygiene is expected best practice.

Patient movement within the ward

The purpose of isolation is to prevent of the spread of MDRO to other patients and the environment therefore movement in the ward should be limited.

Encourage patients on contact precautions to avoid using communal ward lounges and other patient rooms, unless otherwise specified by staff from the IPC service.

The patient may go outside the hospital, or into hospital cafeterias if desired. Prior to leaving their room, they should:

- Always perform hand hygiene.
- Have all wounds covered with no strike-through of wound ooze.
- Be able to follow instructions and comply with these conditions.

Accessing rehabilitation, activity or play areas

Those awaiting MDRO screening results should be managed as per Multidrug Resistant Organisms (MDRO) Risk Assessment Patient Placement Flowchart (Appendix 2).

- High risk MDRO positive patients should not access rehabilitation, activity or play areas during communal activities. However, one on one sessions can be considered. If unsure contact IPC Service for advice.
- Moderate or Low Risk MRSA and ESBL E-coli positive patients and those on standard precautions or contact precautions in the multi-bedded rooms may access normal rehabilitation and play activities. . If unsure contact IPC Service for advice.

General considerations

- Staff adhere to the 5 Moments for Hand Hygiene.
- Patients unable to manage their own continence e.g. wearing nappies or continence products are better managed in one-on-one sessions.
- Patients must be dressed e.g. not in night attire.
- All wounds must be covered prior to accessing other services.
- Patients with enteral feeding, PEG feeds, gastrostomy tubes must have these closed off/sealed off.
- Patients with indwelling urinary catheters should be secured to patient's body and covered.
- Appropriate cleaning and disinfection of equipment and/or toys that after use is required to be carried out by staff responsible for that area.
- If the bathroom has been used during an activity or rehabilitation session, cleaning and disinfection is required afterwards.

One-on-one sessions

- Staff should follow Standard Precautions and as required Contact Precautions. Risk assess the appropriate use of PPE e.g. close contact with the patient.
- The patient or family/whanau must clean their hands prior to leaving their room and after any potential contamination to the hands.

- All equipment and/or toys that have been used must be cleaned and disinfected as per CDHB & WCDHB policies by staff in that area.
- See *Appendix 3* for use of Burwood Hydrotherapy pool.

Family/whanau advice

- Family members of MDRO positive patients who are visiting or rooming-in must adhere to strict hand hygiene when exiting the patient's room or providing personal cares e.g. changing nappies or continence products, assisting with gastrostomy tubes or stoma etc.
- Child siblings of MDRO positive patients are not excluded from play areas but should be fully dressed and able to clean their hands.
- Family members must clean their hands after exiting the room and prior to accessing shared ward spaces e.g. milk room, beverage area, expressing room.

Transportation to other departments within the hospital

When transporting patients to other departments for investigations, the orderly staff should be advised of the isolation requirements before collecting the patient. The receiving department must also be advised of the MDRO status and the precautions required.

- Encourage or assist the patient to perform hand hygiene prior to leaving the room.
- On exiting the isolation room, orderlies must remove any PPE that has been used within the isolation room and then perform hand hygiene.
- The orderly does not require PPE during transportation as good hand hygiene is sufficient.
- Once the patient has been delivered to the department, orderlies must again perform hand hygiene.
- Cleaning and disinfection is required for any shared equipment used during transport of patient e.g. oximeter.
- Standard Precautions are sufficient during transport to the mortuary.
- If patients require treatment in support facilities such as physiotherapy or swimming, the IPC Service should be consulted regarding infection prevention and control precautions required.

Transfer to another hospital

- MDRO infection or colonisation should not be a barrier to appropriate clinical care. Consequently, inter-hospital transfer for clinical reasons should not be prevented.
- Good communication about the patient's MDRO status is essential prior to transfer. Communication with the receiving hospital must take place as early as possible prior to transfer.
- Communication includes:
  - MDRO status.
  - Recommended transmission-based precautions.
  - Topical clearance treatment plan if transferred on MRSA decolonisation or suppression treatment

Care of the seriously ill or terminally ill patients with MDRO

- In individual cases, under the advice of an ID Physician or Medical Microbiologist, specific variances may be made in the management of known MDRO positive patients who are seriously ill or terminally ill. They will take into account wholistic aspects of care and patient specific needs weighed against transmission risk factors.

Discharge/transfer to community facilities including residential care

- Known MDRO positive patients should be discharged promptly from hospital as soon as their clinical condition allows.

- The medical discharge letter should inform the GP of MDRO colonisation or active infection and any treatment that has been given.
- Other health care agencies involved in the patient's care should be informed, e.g. CREST, District Nurse Services.
- If the MDRO is newly identified in a patient transferring to a long-term care or aged residential care facility, the clinical staff at the facility must be informed, preferably in advance of the patient discharge.
- MDRO colonisation or infection is not a contraindication to the transfer of a patient to a residential care facility.
- If carbapenemase producing Enterobacteriaceae (CPE) or Carbapenem-resistant Acinetobacter baumannii (CRAB) positive patients are to be transferred to a residential care facility:
  - An IPC management plan should be in place beforehand.
  - Before discharge into the community, the patient's primary health care provider and the public health unit needs to be informed of the patient's status.
  - The patient and any relevant care giver(s) should be provided with relevant information on how to manage the CPE/CRAB colonisation or infection.
  - The CDHB IPC Service responsible for Residential Care Facility may be contacted to provide advice to the residential care facility if required.

Ambulance and inter-hospital shuttle transfers

- Hand hygiene must be undertaken before and after contact with MDRO positive patients as per 5 Moments for Hand Hygiene.
- Standard Precautions are implemented by Ambulance staff for MDRO transfers.
- Any bedding used for the transfer must be changed.
- Cleaning and disinfection of bed/wheelchair after use as per policy. (Additional cleaning of the rest of the ambulance is not usually required after transporting a MDRO positive patient).
- Ambulance Services should be notified in advance if the patient is considered high risk of transmission of the MDRO to other ambulance patients e.g. a discharging lesion which cannot be enclosed by an impermeable dressing, or widespread colonised skin lesions.
- See Inter-hospital transport of patients.

Management of specific MDRO

Methicillin resistant *Staphylococcus aureus* (MRSA)

MRSA risk assessment

All patients are assessed on admission, regardless of whether the patient has a documented MRSA alert admitting nursing staff must undertake risk assessment using the Multidrug Resistant Organisms (MDRO) Admission Assessment Flowchart (Appendix 1).

An MRSA admission assessment is not required for transfers between CDHB & WCDHB hospitals, when an initial admission assessment has been undertaken and documented by the original facility.

Care of the patient with known MRSA

- Refer to MDRO Risk Assessment Patient for Placement Flowchart (Appendix 2). This will identify if patient requires standard or contact precautions in a multi-bedded room or single room.
- Refer also to CDHB Transmission-Based Precautions Guidelines
- If the patient requires contact precautions, signage must be clearly visible outside the room/bed space.

- Remove unnecessary equipment from isolation area and ensure supplies are not overstocked within the room.
- Hand hygiene is performed according to the 5 Moments for Hand Hygiene with either liquid soap or alcohol-based hand rub.
- Visitors do not wear PPE but are encouraged to perform hand hygiene after visiting the patient.
- Seek advice from the Microbiologist or Infectious Diseases for appropriate antimicrobial therapy for MRSA infections.
- MRSA suppression treatment may be considered to reduce the MRSA burden in the patient's environment and on their skin.

MRSA screening

MRSA screening may be undertaken for the following reasons:

- As part of MDRO admission assessment process.
- If found positive after admission from a clinical sample and advised by IPC nursing staff.
- As part of outbreak management.
- As part of contact screening of patients (initiated by IPC nursing staff).

Screening of patients during antibiotic therapy may provide false negative results therefore is not advised.

MRSA screening specimens

A swab is used to collect clinical samples from the following sites:

- Nose (one swab for both nostrils).
- Groin (one swab for both sides).
- Perineum (natal cleft).
- Wounds, including decubitus ulcer (pressure sore) or surgical wound.
- Medical device insertion sites, e.g. IV, tracheostomy, drains, PEG
- Umbilicus in neonates.
- Catheter urine (if patient has an indwelling urinary catheter).
- Sputum (from patient with recent MRSA respiratory tract infection).

Specimen Collection Technique

Step	Action
1.	Moisten the swab using the transport media in the tube, directly before use.
2.	Rub the pre-moistened swab over the indicated area(s) indicated above, several times.
3.	Clearly label all specimens; - Name - Date of Birth - NHI Number - Site swabbed.
4.	Use one laboratory form per person; Request: MRSA screen Please indicate on the form if previously positive.
5.	Place specimens and laboratory form in laboratory specimen bag and send to laboratory.

MRSA topical decolonisation treatment for patients
A pharmacological regime for decolonisation or suppression of MRSA colonisation may be undertaken and will be on advice of the responsible Clinician, Infectious Disease Team, Microbiologist or IPC nursing staff.

Refer to MIMS or *The Pink Book*.

Post decolonisation screening
Post decolonisation screening may not always be required. If it is, collection of swabs should commence 48 hours after completing decolonisation treatment regime or cessation of antimicrobial therapy.

NB**:** Due to the possibility of re-colonisation, the patient should be advised that a MRSA medical warning 'alert' will be placed on their record in the local and national patient management system and they may be rescreened on future admissions.

Patients found to be MRSA positive after admission
Following identification, the following steps should be implemented. The Infection Prevention and Control Service will provide further advice as required.

Step	Action
1.	Inform patient and commence Contact Precautions in single or multi-bedded room; Provide patient with patient information pamphlet, 'MRSA Information for Patients and Visitors' (Ref: 0206); MRSA Information for Parents is also available for children who are MRSA positive.
2.	Obtain full MRSA screen from the patient.
3.	If clinically indicated, commence topical MRSA decolonisation treatment of the patient.
4.	Document MRSA status in the patient's notes.
5.	**Contact screening - will only be initiated by IPC Team.** Contact screening of other patients who have shared the same room and any other high-risk patients on the ward will be assessed and determined by the IPC Service.
6.	Requirement for staff screening will be assessed and determined by the IPC Service.
7.	Routine bed space clean on discharge unless they have been manged on contact precautions.

Carbapenemase producing Enterobacteriaceae (CPE)

Assess the patient for risk factors on admission using the Multidrug Resistant Organisms (MDRO) Admission Assessment Flowchart (Appendix 1).

CPE admission risk assessment
Unknown CPE status requires an admission assessment to determine CPE risk:

- In the last 12 months has the patient travelled within the Indian sub-continent or SE Asia? These countries include:
- India, Pakistan, Sri Lanka, Bangladesh, Nepal, Bhutan, Afghanistan, Vietnam, Thailand, Cambodia, Myanmar, Laos and Indonesia.
- Has the patient been in contact with a known CPE case?
- Has the patient been admitted or transferred from a residential/long term care facility?

The following samples should be taken and the 'Antimicrobial Screen' box ticked on the request form:

- Faecal sample or rectal swab with visible faecal matter.

- Indwelling urinary catheter specimen of urine (CSU).
- Wound swab / abdominal drain sample.

Care of the patient with CPE

Contact Precautions and single room with dedicated toilet facilities. CPE patients with transmission risk factors will always be prioritised for known CPE Positive patients or those awaiting screening results that are identified as high risk. (If an ensuite toilet is not available discuss with staff from IPC service.) Refer to *Multidrug Resistant Organisms (MDRO) Risk Assessment Patient Placement Flowchart* (Appendix 2).

There is currently no effective decolonisation regimes for patients with CPE so it is likely that a previously positive patient will remain positive, therefore these patients should be always managed with transmission-based precautions.

Refer also to *CDHB IPC Policy, Transmission-Based Precautions Guidelines*

- Remove unnecessary equipment from isolation room and ensure supplies are not overstocked within the room.
- Hand hygiene is performed according to the 5 Moments for Hand Hygiene with either liquid soap or alcohol-based hand rub.
- Dedicated patient-care equipment or clean then disinfect equipment between use if shared with other patients e.g. blood pressure and oximetry equipment.
- If no ensuite/shower is available contact the nursing staff from the IPC service for advice.
- Visitors do not wear PPE (there may be some exceptions) but are encouraged to perform hand hygiene after visiting the patient.
- Seek advice from a Medical Microbiologist or Infectious Diseases Physician for appropriate antimicrobial therapy.

Handling/disposing of body fluids

- Care when handling/disposing of body fluids is essential.
- Disposal of body fluids in dirty utility rooms is very high risk for environmental contamination.
- Ensure apron and gloves are worn and disposed of after use in hazardous waste in the dirty utility room.
- Dispose of waste into sluice sink, taking care not to cause splashing.
- If possible, place the waste receptacle into the sanitiser immediately.
- Clean and disinfect sluice bench with CDHB & WCDHB approved disinfectant after disposing of body fluid regardless of whether any spillage occurs.
- Perform hand hygiene on removal of aprons and gloves.

Patients found to be CPE positive after admission

Following identification, the following steps should be implemented. The Infection Prevention and Control Service will provide further advice as required.

Step	Action
1.	Consult with nursing staff from the Infection Prevention and Control Service or on-call Microbiologist out of hours.
2.	Inform staff and patient. Provide patient with patient information pamphlet, CPE Patient/Visitor Information (Ref: 2406).

3.	Commence Contact Precautions in single room with dedicated toilet. Refer to Multidrug Resistant Organisms (MDRO) Risk Assessment Patient Placement Flowchart (Appendix 2).
4.	Document CPE status in the patient's notes.
5.	**Contact Screening – only to be initiated by the IPC nursing staff:** Identify and screen patients who have shared the same room and any other high-risk patients on the ward for CPE at the time of identification of positive case and again 72 hours later. If positive patient was/is in a multi room, the patient contacts are to be cohorted with contact precautions in place while awaiting results. Staff from the IPC service will assess and determine any screening required for patients that have been discharged, outpatient/day stay & those transferred to other health care facilities.
6.	There is no requirement for staff screening.
7.	Undertake bed space cleaning and disinfection if patient moved from a multi-room and on discharge. NB: Change privacy curtains if inpatient for ≥ 24 hours or for any patient who has more than one transmission risk factors.

Previously positive CPE patients

- Previously confirmed cases of CPE are potentially colonised indefinitely.
- If previously identified positive patients are readmitted to hospital rescreening is not required.
- Specimens may be collected when clinically indicated e.g. if symptoms of a urinary tract infection are present obtain a urine specimen.

CPE outbreaks

Refer to Outbreak & Incident Management Policy.

Extended-spectrum beta-lactamase (ESBL) producing organisms

Assess the patient for risk of transmission of ESBL

Determine the causative ESBL organism e.g. *E.coli, Klebsiella pneumonia*, other *Klebsiella* species and other *Enterobacteriaceae* as this will determine the level of precautions required:

- Previously identified positive patients with an ESBL producing organism will have a medical warning i.e "alert" placed on their patient management system. If in doubt, contact staff from the IPC Service.
- Assess all patients for risk of transmission using the Multidrug Resistant Organisms (MDRO) Risk Assessment Patient Placement Flowchart (Appendix 2).
- The following factors increase risk of spreading ESBL-producing bacteria and will place the patient in a medium or high-risk category:
  - Diarrhoea, urinary or faecal incontinence
  - Abdominal drainage/stoma
  - Indwelling urinary catheters/intermittent clean catheterisation
  - Large wounds that need dressing
  - Non-compliance with basic hygiene
  - High dependency for cares
  - ESBL producing *Klebsiella* species and all other ESBL producing species e.g. *Enterobacter cloacae* (with the exception of *E. coli.*)

Please see Appendix 3 for use of a hydrotherapy pools.

Care of the patient with ESBL

Precautions for patients with ESBL producing *E-coli*) may be categorised as low risk if they do not have any risk factors i.e. that is they are usually only colonised with ESBL in the bowel:

- Standard Precautions apply at all times.
- May be nursed in a multi bed room.
- Shared toilet facilities.
- Shared equipment must be cleaned after use.
- No restrictions on patient movement.
- Inform patients of importance of good hand hygiene.
- Room or bed space does not need terminal clean on discharge

Precautions for patients categorised as Medium Risk of spread of ESBL – includes ESBL producing *Klebsiella* or other ESBL producing non-*E-coli* species. Patients categorised as medium risk may have one or more of the following risk factors:

- Abdominal drainage or stoma
- Tracheostomy
- Indwelling urinary catheter or intermittent clean catheterisation
- Large wounds that require dressings
- High levels of hand on care
- Non-compliance with basic hygiene

The following precautions are applied:

- Standard Precautions apply at all times.
- Contact Precautions for hygiene and toileting cares.
- Single room or multi bedded room if not available but no restrictions on patient movements outside of room.
- Own toilet facilities (if ensuite not available, allocate own commode chair in room or dedicated toilet).
- If the patient has their own commode/chair:
- Dedicated patient-care equipment or disinfect between use if shared with other patients e.g. blood pressure and oximetry equipment.
- If no ensuite/shower is available the patient showers last in the communal shower and the shower is disinfected after use.
- Hand hygiene with liquid soap or alcohol-based hand rub.
- Visitors do not wear PPE but are encouraged to perform hand hygiene after visiting the patient.
- Inform patients of importance of good hand hygiene.
- Terminal clean following discharge

Patients are categorised as high risk if they have diarrhoea or any urinary or faecal incontinence:

- Standard and Contact Precautions.
- Single room.
- Own toilet facilities (if ensuite not available, allocate own commode chair in room or dedicated toilet);
- If the patient has a dedicated commode/chair please refer to Handling/disposal of body fluids below.
- If no ensuite shower is available the patient showers last in the communal shower and the shower is disinfected after use.
- Hand hygiene with liquid soap or alcohol-based hand rub.

- Dedicate patient-care equipment or clean and disinfect between use if shared with other patients e.g. blood pressure and oximetry equipment.
- Visitors do not wear PPE but are encouraged to perform hand hygiene after visiting the patient.
- Patients should not use communal areas in the ward.
- Inform patients of importance of good hand hygiene.
- Terminal clean following discharge

Handling/disposing of body fluids

- Care when handling/disposing of body fluids is essential.
- Disposal in the dirty utility room poses a very high risk for environmental contamination.
- Ensure apron and gloves are worn and disposed of after use in hazardous waste in dirty utility room.
- Dispose of waste into sluice sink, taking care not to cause splashing.
- If possible, place the waste receptacle into the sanitiser immediately.
- Clean and disinfect sluice sink bench and sanitiser handle with CDHB & WCDHB approved disinfectant after disposing of body fluid regardless of whether any spillage occurs.
- Perform hand hygiene on removal of aprons and gloves.

Previously positive patients with ESBL producing organism

- An effective decolonisation regime for patients with ESBL producing organisms is not available so it is likely that a previously positive patient will remain positive during subsequent admissions.
- There is currently no nationally or internationally effective sustained clearance treatment.
- If previously positive patients are readmitted to hospital, obtain only those samples that are clinically indicated, e.g. if symptoms of urinary tract infection are present obtain a urine specimen. DO NOT rescreen.
- Readmitted positive patients with an ESBL producing organism should be re assessed using the *Multidrug Resistant Organisms (MDRO) Risk Assessment Patient Placement Flowchart* *(Appendix 2).*

Patients found positive with an ESBL-producing organism after admission

Following identification, the following steps should be implemented. The Infection Prevention and Control Service will provide further advice as required.

Step	Action
1.	Perform assessment determine isolation precautions required. Refer to: Multidrug Resistant Organisms (MDRO) Risk Assessment Patient Placement Flowchart (Appendix 2).
2.	Provide patient with patient information pamphlet, ESBL Patient Information and ESBL Information for parents is also available for parents of children who have an ESBL producing organism.
3.	If patient meets Medium or High-risk categories then undertake bed space cleaning and disinfection if moved from a multi-room. NB: Change privacy curtains if inpatient for ≥24 hours or for any patient who has open discharging wounds.
4.	Document ESBL status in the patient's notes.
5.	**Contact screening – to be only initiated by IPC nursing staff:** Contact screening of patients who have shared the same room as a Medium or High risk ESBL patient will be assessed and determined by the IPC Service.
6.	There is no requirement for staff screening.

Vancomycin-resistant Enterococci (VRE)

VRE risk assessment
Assess the patient for screening using the Multidrug Resistant Organisms (MDRO) Admission Assessment Flowchart (Appendix 1).

The following samples should be taken and 'VRE Screen' written on the request form:

- Rectal swab with visible faecal matter or preferably a faeces sample.
- Indwelling urinary catheter specimen of urine (CSU).
- Wound swab / abdominal drain sample.

Do **NOT** screen patients previously positive for VRE unless clinically indicated.

Care of the patient with VRE
Infection prevention and control measures for VRE are identical to CPE. Refer to *Multidrug Resistant Organisms (MDRO) Risk Assessment Patient Placement Flowchart* (Appendix 2).

Patients found VRE positive after admission
Following VRE identification, the following steps should be implemented. Staff from the Infection Prevention and Control Service will provide further advice as required.

Step	Action
1.	Inform patient and commence Contact Precautions in single room and dedicated toilet. Provide patient with patient information pamphlet, VRE Patient/Visitor Information (Ref: 2406).
2.	Document VRE status in the patient's notes.
3.	**Contact screening - will only be initiated by the IPC team:** Screen patients who have shared the same room and any other high-risk patients on the ward for VRE. Consult with the Infection Prevention and Control Service. Contacts should not be screened if less than 24 hours in the same room or ward as the index case. NB: contacts who have been screened do NOT require contact precautions while awaiting results.
4.	There is no requirement for staff screening.
5.	Undertake bed space disinfection if moved from a multi-room. NB: Change privacy curtains if inpatient for ≥24 hours or for any patient who has open discharging wounds.

Known VRE positive patients

- Effective decolonisation regimes for patients with VRE are not available so it is likely that a previously positive patient will remain positive during subsequent admissions therefore these patients should be managed with transmission-based precautions.
- If previously positive patients are readmitted to hospital, obtain only those samples that are clinically indicated, e.g. if symptoms of urinary tract infection are present obtain a urine specimen.
- Care of previously positive patient will be the same as above if readmitted.
- On occasions nursing staff from the IPC Service may review a VRE case regarding ongoing requirements for Contact Precautions.

Other MDRO of concern

Other MDRO of concern include the following:

1. Plasmid Amp-C (an enzyme giving antimicrobial resistance) producing coliforms.
2. Multi-drug resistant gram-negative organisms:
   - *Pseudomonas aeruginosa*
   - *Acinetobacter baumannii*

Identification of other MDRO

- These MDRO will be identified by the laboratory during testing and culture of routine clinical isolates and/or screening for ESBL, VRE & CPE.

Care of the patient with other MDRO

- Contact Precautions with own toilet facilities (if ensuite not available, allocate own commode chair in room or dedicated toilet).
- Single room.
- Use of PPE for visitors is decided on a case-by-case basis. Seek advice from IPC Service

Carbapenem-resistant *Acinetobacter baumannii* (CRAB)

Admission risk assessment and screening for carbapenem-resistant *Acinetobacter baumannii* (CRAB) is recommended for patients from overseas hospitals where the patient has spent time in an Intensive Care Unit during their overseas admission (this is in addition to other screening requests for MDRO (i.e. ESBL,VRE,CPE).

Please ensure swabs/samples are taken from the following sites and provide full clinical details on the laboratory request form including history of recent hospitalisation and the request for CRAB screening:

- Groin swab
- Faecal swab
- Tracheal aspirate or sputum (as applicable)
- IDC urine (if applicable)
- Wounds
- There is strong evidence of transmission via droplet transmission as well as via contact transmission on hands and contaminated surfaces
- CRAB in patient's oral/respiratory secretions creates risk of transmission via droplet e.g. cough, dribble CRAB in patient's GI tract or wounds creates risk of transmission when handling body fluids e.g. gastric aspirate, faeces or wound ooze
- The type of transmission based precautions will be determined by site of colonisation or infection e.g. respiratory tract will require Droplet Precautions; whereas GI Tract would require Contact Precautions .Sometimes both Droplet and Contact Precautions will be needed. If unsure, discuss with IPC Team or Microbiologist.

Effective topical decolonisation treatments for patients with CRAB are not available, therefore these patients can only be managed with transmission-based precautions.

Appendix 1: MDRO Admission Assessment Flowchart

Multi Drug Resistant Organisms (MDRO) Admission Assessment Flowcharts

UNKNOWN MDRO Status (QUESTIONS 1-3 MUST BE ASKED)

QUESTION 1:
In the last 12 months has the patient been admitted for >24 hours and/or had an invasive procedure* in:
- An overseas hospital**

→ **Yes** → **Screen for MDRO and MRSA** Single Room (pending results) Contact Precautions

→ **No** (go to Question 2)

QUESTION 2:
Carbapenemase-Producing Enterobacteriaceae (CPE)
- In the last 12 months has the patient travelled within the Indian sub-continent or SE Asia ***
- Has the patient been in contact with a known CPE case
- Admitted/transfer from long term care facility

→ **Yes** → **Screen for CPE and ESBL** MDRO Risk Assessment for patient placement (go to Question 3)

→ **No** (go to Question 3)

QUESTION 3:
In the last 12 months has the patient been admitted for >24 hours and/or had an invasive procedure* in:
- Any DHB hospital in New Zealand excluding CDHB & West Coast hospitals

→ **Yes** → **Screen for MRSA and ESBL** Standard Precautions – no isolation required pending results

→ **No** → Standard Precautions

KNOWN MDRO Status POSITIVE (MRSA, ESBL, VRE, CPE)

MRSA	ESBL	VRE & CPE
Refer to MDRO Risk Assessment for patient placement **DO NOT RESCREEN UNLESS ADVISED BY IPC**	Refer to MDRO Risk Assessment for patient placement **DO NOT RESCREEN**	Single room Dedicated toilet facilities Contact precautions **DO NOT RESCREEN**

DEFINITIONS

*Invasive procedure includes the following:
- Endoscopy
- IDUC
- Minor surgery
- Intravenous procedure **excluding** phlebotomy

**Direct transfer from an overseas hospital where time was spent in an ICU - additional screening for Carbapenem Resistant Acinetobacter Baumanii (CRAB) is required. Please contact IPC for advice.

*** Indian sub-continent or SE Asia includes:
India, Pakistan, Sri Lanka, Bangladesh, Nepal, Bhutan, Afghanistan, Vietnam, Thailand, Cambodia, Myanmar, Laos, Indonesia

MRSA – Methicillin Resistant Staphylococcus aureus
ESBL – Extended Spectrum Beta Lactamase producing bacteria
VRE – Vancomycin Resistant Enterococci
CPE – Carbapenemase-Producing Enterobacteriaceae
CRAB – Carbapenem Resistant Acinetobacter Baumanii

Lab requisition form: Please include clinical details / travel and hospital stays

SCREENING REQUIREMENTS

MRSA SCREEN – nose, groin, perineum + wound, stoma or catheter urine – moisten swab in media prior to taking specimen – write MRSA on lab requisition form. (If previously MRSA positive, indicate this on the requisition form)

ESBL SCREEN – rectal swab with visible faecal matter present or faecal specimen – write ESBL on lab requisition form

MDRO SCREEN – rectal swab with visible faecal matter present or faecal specimen – write ESBL, CPE, VRE on lab requisition form

CPE SCREEN – rectal swab with visible faecal matter present or faecal specimen – write CPE on lab requisition form

CRAB – for screening contact IPC for advice

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Appendix 2: Multidrug Resistant Organisms (MDRO) Risk Assessment Patient Placement Flowchart

MDRO Risk* Assessment for patient placement

What transmission Risk Factors does the patient have? (see box below)

HIGH RISK

These patients must be in contact precautions in a single room with dedicated toilet facilities

- CRAB (Carbapenem Resistant Acinetobacter Baumanii) - please contact IPC for further isolation advice
- VRE known
- CPE known
- ESBL Klebsiella (or other non E.Coli ESBL) known with one or more transmission risk factors
- Patient screened due to overseas hospital admission pending results

Isolation & Precautions Required

- Contact precautions for all direct patient care
- Single room
- Ensuite or dedicated toilet/ commode
- Dedicated equipment or clean/ disinfect when leaving the room
- Discuss with patient the importance of good hand hygiene
- Patients should not use communal areas

MEDIUM RISK

These patients must be in contact precautions in a multi bedded or single room with dedicated toilet facilities

- ESBL E. Coli known with one or more transmission risk factors
- ESBL Klebsiella (or other non E.Coli ESBL) known with no transmission risk factors
- MRSA positive with one or more transmission risk factors
- Transfer from long term care facility with one or more transmission risk factors, pending results
- Patient screened for VRE/CPE/ESBL pending results (except for patients being screened due to overseas hospital admission)

Isolation & Precautions Required

- Can be placed in multi bedded if no single rooms available with bedspace isolation
- Contact precautions for all hygiene, wound and toileting cares
- Dedicated toilet/commode
- Dedicated equipment or clean/disinfect after use
- Discuss with patient the importance of good hand hygiene

LOW RISK

Use standard precautions

- Known MRSA with no transmission risk factors
- Known ESBL E. Coli with no transmission risk factors
- Transfer from Long Term Care Facilities with no transmission risk factors

Precautions Required

- Standard precautions
- Discuss with patient the importance of good hand hygiene
- Reassess if patient risk factors change e.g. diarrhoea

TRANSMISSION RISK FACTORS

- Diarrhoea
- Faecal or urinary incontinence
- Uncontained wounds
- On antibiotics

If unsure, please contact IPC for further advice.

DISPOSAL OF BODY FLUIDS AND ENVIRONMENTAL CLEANING

- Increase environmental cleaning eg. touch points
- Ensure apron and gloves are worn when disposing of infectious waste in dirty utility room
- Dispose of body fluids into sluice, taking care not to cause splashing
- If possible, place the waste receptacle into the sanitiser immediately
- Clean and disinfect sluice bench and sanitiser handle with CDHB approved disinfectant after disposing of body fluid regardless of whether any spillage occurs
- Remove and dispose of apron and gloves in dirty utility room, then perform hand hygiene.

*Risk *refers to the risk of spread to other patients in the healthcare setting. To be used in conjunction with CDHB IPC Guidelines for Control of MDRO*

Contact IPC Service for further assistance as required. *Ext 86966*

Afterhours contact on-call microbiologist via hospital switchboard.

West Coast – District Health Board – Te Poari Hauora a Rohe o Tai Poutini
Canterbury District Health Board Te Poari Hauora ō Waitaha

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Appendix 3: Guidelines for Use of Burwood Hydrotherapy Pool for Inpatients with ESBL/VRE/CPE Colonisation

Patients who are undertaking rehabilitation at Burwood Hospital have access to a hydrotherapy pool which is used as a tool for the physiotherapy service. There may be a risk of cross infection through the use of the pool by a person colonised or infected with ESBL/VRE/CPE.

When an inpatient colonised or infected with ESBL/VRE/CPE and in Contact Precautions has been assessed as needing to use the hydrotherapy pool, the Infection Prevention & Control Service will be consulted by the Physiotherapy Service to determine if the patient meets the risk assessment criteria for using the pool. This risk assessment will be done on a case by case basis.

The following criteria shall apply to the patient:

- No current infection with ESBL/VRE/CPE
- No draining or uncovered wound
- No diarrhoea or vomiting for two weeks after last episode
- Continent of urine and faeces
- If an indwelling device is present, this needs to be spigotted and the insertion site covered with an occlusive waterproof dressing
- The patient will not use the changing or showering facility at the pool
- Patient must be encouraged to use ensuite toilet prior to visit to the pool. If the toilet at the pool is used by the patient, it will require disinfection.

The risk of cross infection with ESBL/VRE/CPE is minimised through the management of the chlorine levels in the water. This is undertaken by Maintenance and Engineering and will be arranged by the Physiotherapy Service prior to patient session:

- The free available chlorine (FAC) level of the pool needs to be tested immediately prior to the patient's session; the level of FAC must be a minimum of 2ppm.
- The FAC needs to be tested immediately after the session, if less than 2ppm, the level of chlorine needs to be adjusted upward to 2pm.

Policy measurement

IPC Service Surveillance Reports will be reviewed by CDHB & WCDHB Operational Team members and IPC Executive Committee members to identify trends and determine management plans

Associated material

Controlled documents

- *Transmission Based Precautions Isolation Guidelines - 2400389*
- *MDRO Admission assessment flowchart - 2404773*
- *Extended Spectrum Beta Lactams (ESBL) Parent Information - 2406243*
- *Methicillin Resistant Staphylococcus aureus (MRSA) Parent Information - 2404537*
- *Carbapenen resistant Acinetobacter baumanii (CRAB) - 2406304*
- *Carbapenem resistant Acinetobacter baumannii (CRAB) - 2406305*

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