

**POLICY FOR PREVENTING TRANSMISSION OF
CARBAPENEM RESISTANT ENTEROBACTERIALES (CRE)
IN NON-ACUTE CARE SETTINGS IN MALTA
(INCLUDING RESIDENTIAL, REHABILITATION
AND LONG-TERM CARE INSTITUTIONS)**

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1. Executive summary

- People colonised with carbapenem resistant Enterobacteriales (CRE) have the same right to access health and social care as everyone else and should not suffer significant delays in transfer between LTC and non-acute care facilities and hospitals simply because they carry CRE.
- CRE control measures in nursing homes and non-acute care settings should be practical, undertaking all reasonable measures but also taking into account the lower risk of these settings, while respecting the need of residents to live in a reasonably home-like setting with opportunities for social contact
- Practically all cases of CRE colonised patients – with no evidence of infection – who are discharged from hospitals to nursing homes will not require a single room. They can be housed with other residents and managed through simple, basic precautions, primarily hand hygiene.
- A risk-based approach should be used to determine risk status of residents, level of personal protective equipment necessary and the frequency of rescreening.
- Residents may be allowed to join social activities and go to the dining room, when there are no symptoms of active infection and/or if body fluids and wound drainage can be contained
- If it is not possible to have separate bathrooms for residents with CRE, they can use a communal toilet with other residents. In such cases, the toilet must be flushed after every use with the toilet cover closed to reduce aerosols. The toilet seat should be cleaned and disinfected by staff immediately after use by a resident with CRE and before use by another resident. Residents who are colonised with CRE should be supported, and if necessary supervised, in carrying out proper hand hygiene and getting dressed after using the toilet.
- In normal circumstances, CRE poses no risks to visitors or family members, even though the resident may be still carrying the bacteria.
- In the same way that CRE poses no risks to healthy visitors, it follows that it is also not an issue for staff caring for colonised individuals, unless the member of staff is immunocompromised, in which case the direction of an infection control specialist should be sought.

2. Scope of this guidance

This guidance provides expert advice on the management of colonisation or infection due to CREs in non-acute care settings in Malta and Gozo (including residential, rehabilitation and long-term care facilities) in order to prevent or reduce transmission and spread. It applies to both residents and patients, who will be referred to collectively as residents. In drafting this document, an expert working group has utilised evidence-based guidelines from the European Centre for Disease Control (ECDC) and the Centre for Disease Control (USA) and through a Delphi process, reached a consensus in adapting these guidelines to fit local epidemiology, circumstances and capacities.

3. Carbapenem resistant Enterobacteriales (CRE)

Enterobacteriales are a large family of bacteria that usually live harmlessly in the gut of all humans and animals. They include species such as *Escherichia coli*, *Klebsiella* spp. and *Enterobacter* spp. These organisms are also some of the most common causes of opportunistic infections, especially those of the urinary tract, lung, abdomen and bloodstream. Carbapenems are third line antibiotics normally reserved for serious infections caused by ESBL-producing Gram-negative bacteria (including Enterobacteriales). They include meropenem, ertapenem and imipenem. Carbapenemases are enzymes that destroy carbapenem antibiotics, rendering the bacteria resistant to the antibiotic. Carbapenemases are produced by a growing number of Enterobacteriales strains especially *Klebsiella* and *Enterobacter*. There are different types of carbapenemases, of which NDM and OXA-48 enzymes are currently the most commonly isolated locally.

4. Local epidemiology

Over the last few years, a rapid increase in the incidence of colonisation and infection by CREs has been observed in Malta. The great majority of CRE cases are reported from acute care institutions, especially hospitals. However, this often reflects the frequency at which microbiology testing – both in clinical samples as well as for CRE colonisation – is undertaken, especially in Mater Dei Hospital. Therefore, if a non-acute care institution does not regularly screen its residents, it does not mean that it has no residents who are CRE colonized; it is simply not aware of them. A local study carried out in a long-term care institution identified that 3.6% of residents tested were colonised with CRE.

5. Implications of carbapenem resistance

CRE isolates carry resistance genes to a significant number of important antibiotic groups. This means that it is common to find CRE strains that are practically resistant to all available antibiotics. This has major implications for hospital care if patients are admitted with or acquire CRE. Without effective antibiotics, key interventions such as intensive care, cancer treatment and major surgery will be too risky to undertake. Unless action is taken now by preventing further transmission of CRE and using antibiotics appropriately, the rapid spread of CRE has great potential to pose an increasing threat to public health and modern medicine as we know it.

6. Risk factors for CRE colonisation

Healthy people are not normally at risk for CRE infection. These typically occur in hospitalised patients or residents in long term care facilities who have underlying diseases and risk factors. The major risk factor for acquiring CRE is admission to acute care hospital followed by treatment with second- and third-line antibiotics such as cephalosporins. These wide spectrum antibiotics disrupt the protective microbiome and bacterial flora in the large intestine. If the patient then ingests CRE from the contaminated hospital environment, these bacteria will be able to survive and multiply in the gut, resulting in colonisation. Risk factors, such as immunosuppression and the presence of invasive devices, predispose for the possible development of an infection if these bacteria gain access to body sites such as the bladder or bloodstream. This typically happens via medical devices such as urinary or intravenous catheters as well as through major wounds. Symptoms of infection vary depending on the site of infection and can also include general symptoms such as fever and chills

CRE also colonise the gastrointestinal tract without causing any symptoms or infection. Most CRE colonised individual do not develop an infection. However, both colonised and infected residents can transmit CRE. Spread mostly occurs through healthcare workers' hands or equipment, after coming into contact with infected or colonised persons, as well as from CRE shed by patients into the environment.

7. Acute vs non-acute care settings

Non-acute care settings, including rehabilitation and long-term care facilities, offer different logistical characteristics to hospitals (especially tertiary care institutions). Their residents normally have significantly lower risk factors for CRE spread since, in the majority of cases, they are not significantly immunocompromised, have less invasive devices and are not being treated by wide spectrum potent antibiotics. At the same time, they have different requirements and capacities for resident accommodation, especially in terms of single rooms.

8. Transfers of patients colonised or infected with CRE

Colonization or infection with CRE should never be a reason to compromise the level of care given to a patient. Therefore, the CRE status of a patient cannot be an impediment to a patient's transfer or a care plan that would otherwise be indicated or required if the patient was not colonized/infected. It is the responsibility of the receiving institution to take the necessary precautions to prevent cross transmission. As a result, CRE patients should not be refused admission or transfer on the premise of preventing potential cross transmission.

Infection prevention and control precautions for multi-resistant organisms are based on simple contact precautions, which are adapted to the intensity of medical care of the institution as well as the type of colonization/infection in the resident. This is particularly relevant in terms of requirements for single room accommodation; what may be appropriate for a patient with a major wound infection in a tertiary hospital but may not be equally applicable for a nursing home resident who is only colonized rectally. Therefore, a risk assessment needs to be done, on a case by case basis, which is evidence based and customized for the specific patient and institution.

9. Designated infection prevention individual

Every non-acute setting should identify an infection prevention and control focal point. In larger institutions, this would be an infection control nurse but in the case of smaller nursing home this could be the nurse in charge or another professional. The designated individual should undertake the necessary training and will then provide education to all staff members as well as information to residents and their relatives.

10. Identification of patients / residents who may be colonised or infected with CRE

- a. The accepting facility should request information on patients/residents being admitted, readmitted or transferred from another healthcare facility, asking specifically about the individual's CRE (and any other healthcare acquired) status.
- b. If the patient had CRE cultivated from a rectal screening sample or from any other clinical sample (e.g. pus, urine, wound) at the transferring healthcare institution, s/he should be regarded as CRE positive and a risk assessment undertaken. The same applies to patients with a history of CRE colonisation or infection in the past 12 months and who have not had three negative screens subsequently.

11. Risk assessment of CRE colonised residents

The risk for transmission of CRE depends on the site CRE was cultured from and the potential for dissemination from that site. A risk-based stratification tool is found in Table 1 to assist in this exercise. This table includes guidance as to where to place high, medium and low risk residents, the level of personal protective equipment necessary and the frequency of rescreening.

12. Decolonisation

Unlike MRSA, there is currently no available method for effectively decolonising individuals who are colonised with CRE. However, once the patient has been discharged from hospital and is no longer on antibiotics, the CRE bacteria in the gut tend to become replaced by normal bacteria ingested with food and from the environment. However, this process may take several weeks or even, in some cases, months.

13. Infection prevention and control precautions

It is the professional duty of all healthcare workers to clean their hands with alcohol hand rub, or wash with soap and water, before and after direct contact with the resident or his environment and additionally before handling any invasive lines/devices.

Staff should apply hand rub and wear gloves when caring for CRE residents; aprons or gowns are only needed when undertaking prolonged close care or therapy. Once the procedure is ready, the gloves are removed, followed by the apron and hands disinfected using the alcohol hand rub. Gloves and aprons may be discarded in the domestic waste stream. In all cases, education must be delivered to the resident and risk assessment should take into account the resident's ability to understand advice given.

13a. Table 1 – Resident accommodation, personal protective equipment and frequency of rescreening rescreening

*Risk Stratification	Risks and underlying conditions	Minimum accommodation requirements	Personal Protective Equipment		Frequency of rescreening for CRE
			Close prolonged contact (e.g. bathing)	Social contact (e.g. administering medication)	
HIGH RISK	Rectal CRE in a resident with heavy diarrhoea (>3 episodes per day)	Single Room or cohort with another CRE positive resident	Hand hygiene, Gloves, Gown	Hand hygiene, Gloves, Apron	In rehabilitation institutions Rescreen every six weeks until three negative screens are obtained, starting 6 weeks after last positive result Send faeces or rectal swab for CRE
	Sputum CRE in a resident with a tracheostomy in situ				
	CRE in exudating wound which is not contained by the dressing				
MEDIUM RISK*	Rectal CRE in a resident who has a diaper	May be placed in the same room as immuno-competent residents who are <u>not</u> receiving intravenous therapy and/or do not have urinary catheter, wounds, PEG tube, tracheostomy using indicated precautions	Hand hygiene, Gloves, Apron	Hand hygiene, Apron	Rescreening ONLY if resident becomes HIGH risk. Inform any hospital or institution to which the resident may be transferred.
	Rectal CRE in a resident who has a urinary catheter				
	Sputum CRE in a resident who is coughing heavily				
	Urine CRE in a resident with a urinary catheter or diaper				
	CRE in exudating wound which is contained by the dressing				
LOW RISK*	Rectal CRE in a resident who is continent of both urine and faeces	May be placed in the same room as any other resident, using indicated precautions, as long as the CRE colonised individual is able to understand and follow instructions.	Hand hygiene, Gloves, Apron	Hand hygiene	Do not rescreen. Inform any hospital or institution to which the resident may be transferred.
	CRE in non-exudating wound				
	Urine CRE in a continent resident				
	Resident with recent CRE infection in the blood				
	Sputum CRE in a resident who is not coughing.				

*If more than one resident in the institution have been diagnosed as a CRE carrier, they should ideally be cohorted together. If this is not possible, the indicated minimum accommodation requirements should be adopted.

14. Use of toilet by CRE positive residents

If it is not possible to have separate bathrooms for residents with CRE, they can use a communal toilet with other residents. In such cases, the toilet must be flushed after every use with the toilet cover closed to reduce aerosols. The toilet seat should be cleaned and disinfected by staff immediately after use by a resident with CRE and before use by another resident. Residents who are colonised with CRE should be supported, and if necessary supervised, in carrying out proper hand hygiene and getting dressed after using the toilet. The bathroom should be checked, cleaned and the contact surfaces disinfected regularly. There is no value in disinfecting the toilet bowl, other than to avoid build of limescale using generic toilet products.

Residents with CRE should have their own individual commode, bedpan or urinal if these are needed. These would ideally be cleaned and disinfected in a properly working bed pan washer. If a bedpan washer is not available, the cleaning and disinfection procedures in point 14 below should be followed. Residents with CRE should also have individual washing bowls dedicated for them.

15. Cleaning and disinfection

The room of CRE positive residents, especially those frequently touched surfaces, should be cleaned and disinfected daily. A general-purpose detergent, diluted according to the manufacturers' instruction, should be used for general cleaning in all clinical areas. After rinsing off, a hypochlorite solution, containing a free chlorine level of 1,000ppm, should be applied and allowed 3 minutes contact with the surface. Any unused hypochlorite solutions should be discarded after 24hours. Any equipment that needs to be used for other residents must be cleaned and disinfected immediately after use by CRE residents and before removing them from the room. Disinfection of these items and environmental cleaning can also be done by proprietary wipes, as long as they are proven effective against CRE. Any disposable items should be discarded in the room in domestic waste bin, unless heavily soiled with blood or body fluids; in such exceptional cases, they would be disposed as clinical waste in yellow bags.

16. Social interaction

Residents may be allowed to join social activities and go to the dining room, when there are no symptoms of active infection and/or if body fluids and wound drainage can be contained. If the resident suffers from urinary or faecal incontinence, the diaper must be clean before the resident leaves his/her room. Residents should be instructed to wash hands with soap and water or disinfected using the alcohol hand rub prior to leaving his room. Some residents may need assistance to do so. The resident's clothing should be clean and free from body fluids.

There may be situations where movement outside the room should be limited. These include, but are not limited to, the following situations whenever the resident has:

- a. episodes of diarrhoea
- b. a possibility of contaminating the surroundings with faecal matter
- c. signs and symptoms of active infection
- d. wound drainage which cannot be contained.

17. Linen and waste disposal

The resident's clothes and bed linen may be washed normally using a 40°C cycle. Dishes, plates and cutlery can also be washed as usual. All waste generated by CRE positive residents can be safely discarded in domestic waste. Waste (e.g. dressings) which is heavily contaminated and soaked with blood and body fluids should be discarded as clinical waste.

18. Residents' involvement in preventing transmission

Residents should clean their own hands using soap and water especially:

- a. Before preparing or eating food
- b. After using the bathroom
- c. After blowing their nose, coughing and sneezing.

19. Visitors

In normal circumstances, CRE poses no risks to visitors, even though the resident may still be carrying the bacteria. People in the community are usually fit and healthy so they are less likely to pick up CRE or be affected by it than hospitalised patients. Residents colonized with CRE can interact normally with friends and family, even with young children and babies. The institution should advise visitors, who are immuno-compromised, have a urinary catheter or are on chemotherapy, to contact the staff member with designated infection prevention duties within the facility for specific advice.

Visitors should be encouraged to wash their hands before and after visiting the resident, after using the toilet, before preparing meals and before eating. This will help to prevent the transmission of all organisms and not just CRE. Clear signage to this effect should be placed at appropriately visible locations.

20. Risk to staff

In the same way that CRE poses no risks to healthy visitors, it follows that it is also not an issue for staff caring for colonised individuals. Staff should undertake standard infection control precautions, such as hand hygiene, which are required for all resident contact irrespective of CRE colonisation status. However if members of staff suffer from chronic conditions such as diabetic wounds or are immuno-compromised due to disease or treatment, they should seek the advice of a doctor with expertise in infection control.

21. Antibiotic treatment

Antibiotics disrupt the bacteria in the intestines and cause diarrhoea and thrush. Antibiotics should always be used as sparingly as possible and according to national guidelines. However it is even more relevant in patients colonised with CRE. If antibiotic treatment cannot be avoided, narrow spectrum antibiotics should be used and for the shortest possible time.

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