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# **Guidelines for the Prevention & Control of Carbapenemase Producing Enterobacterales (CPE) in Patients on Haemodialysis Treatment**

## **CPE Expert Group**

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### **Scope of Guidance**

This document is intended to provide information for patient who receive haemodialysis treatment in a renal haemodialysis centre and for the staff working in renal haemodialysis services regarding Carbapenemase Producing Enterobacterales (CPE). The document should support healthcare workers and patients in understanding and managing the risks related to CPE in the context of renal haemodialysis.

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## Summary of Recommendations

1. All patients on haemodialysis treatment should be provided with information regarding the risk of acquiring antimicrobial-resistant organisms (AMRO) in healthcare settings and the practical steps that they can take to reduce their risk.
2. All patients on haemodialysis should normally be provided with hand hygiene training unless they are unable to participate in or benefit from this training.
3. All patients should be facilitated and encouraged to perform hand hygiene after using the toilet and before eating.
4. On the completion of haemodialysis, all patients should be facilitated and encouraged to perform hand hygiene, before leaving the haemodialysis centre.
5. CPE screening is required for people undergoing haemodialysis for the first time in a haemodialysis unit, periodically during haemodialysis treatment (preferably every three months but not less than every six months), and on return from haemodialysis elsewhere, especially abroad. This is part of a comprehensive screening programme for infectious agents including blood borne viruses and other antimicrobial resistant organisms required in haemodialysis services.
6. The principles of the application of **Standard Precautions** and **Contact Precautions** in haemodialysis services are similar to other aspects of acute hospital services. However, their application occurs in a particular context that may be challenging.
7. In so far as is practical, people who are CPE colonised and CPE Contacts, should undergo haemodialysis treatment in single patient rooms.
8. For most patients undergoing haemodialysis, **Contact Precautions** can be applied in an open area if single patient room accommodation is not available.
9. Implementing **Contact Precautions** in an open space in a haemodialysis unit, in particular donning and doffing long sleeve gowns, may be stigmatising and may compromise patient confidentiality. An approach to managing this risk is outlined below.
10. The patient's bed space should undergo terminal cleaning and decontamination after the patient with CPE has completed haemodialysis.
11. People colonised with CPE or other gut colonising microorganisms may generally travel in the same vehicle as other patients to and from haemodialysis services.
12. If there is evidence of transmission of CPE in a haemodialysis service an outbreak control team should be convened and the Medical Officer of Health notified in conformance with legislation. In the context of evidence of transmission there is a requirement for enhanced infection prevention and control precautions.

## Background

Antimicrobial resistant organisms (AMRO) are a major challenge to healthcare delivery systems in Ireland and throughout the world. Control of antimicrobial resistance is based on the improved use of antimicrobial agents (**antimicrobial stewardship**) and better control of the spread of antimicrobial resistant organisms through infection prevention and control (IPC).

The most fundamental element of managing the risk of spread of microorganisms is the consistent application of **Standard Precautions** in all healthcare settings and with all people all the time. **Standard Precautions** are critical because there is no system that will immediately and consistently identify all people colonised or infected with AMRO.

Additional steps may also help to manage the risk. These include screening people to identify those carrying AMRO (including CPE) and the application of additional **Transmission-Based Precautions**, such as **Contact Precautions** which are used with people who are known to have, or who are considered at high risk, of having colonisation or infection with AMRO.

**Transmission-Based** precautions are applicable to the delivery of in-patient care in the acute hospital setting. The approach taken in the acute-care setting is not applicable in the context of delivery of care in most out-patient and day-care settings, and furthermore is not generally considered necessary as the risks to patients of acquiring serious infections are much less. However, specific precautions in addition to **Standard Precautions** may occasionally be advised for staff delivering care in the out-patient and day-care settings in specific circumstances.

In all settings measures to manage the risk of transmission associated with AMRO must be balanced with the imperative of delivering appropriate care to people in a timely, sensitive and compassionate manner, while respecting the right of people to visit relatives and friends in hospital.

For practical purposes it is useful to distinguish between skin and nose surface colonising AMRO (MRSA) and gut colonising AMRO (CPE, ESBL and VRE).

### Skin and Nose Colonising AMRO

For those AMRO that colonise the skin and nose the risk of environmental and hand contamination is more persistently present as contact of hands with the face and nose are frequent behaviours, and they are more common when the person has a respiratory tract infection or nasal discharge or drip. In many cases it may be possible to eradicate or minimise surface colonisation with MRSA through the application of a decontamination protocol if there is a clinical indication for doing so.

## Gut-Colonising AMRO

This group of bacteria include a number of antibiotic resistant bacteria that have been a problem for many years including vancomycin-resistant enterococci (VRE) and extended-spectrum beta-lactamase (ESBLs) producing bacteria. It also includes a major new concern, namely Carbapenemase-Producing Enterobacterales (CPE). There is more detail on CPE below.

Gut colonising AMRO spread from person-to-person through the faecal-oral route, that is to say that they are shed in faeces. Traces of faeces that are often invisible, can be transferred to hands and to other surfaces by touch. The organisms can then be transferred from hand and surfaces to the mouth either directly or from contamination of food or utensils.

It follows from the above that for those with gut colonising AMRO the principal issue is about managing the risk of faecal contamination of hands and surfaces. Provided the person is continent, fully dressed, has no behavioural disturbance and is supported as necessary in performing correct hand hygiene and dressing after visiting the toilet, the risk of person-to-person spread and environmental contamination is low. There is no established protocol internationally for decolonisation of the gut of people with AMRO.

Regardless of known or suspected AMRO status, a person who has diarrhoea or who is incontinent of faeces must be prioritised for immediate care in the appropriate setting, to ensure dignity and respect as well as for IPC purposes.

## What is CPE?

CPE is the latest major wave of antimicrobial resistant organisms that is spreading throughout the world, including in Ireland. At the moment the spread of CPE is mainly a problem in the acute hospital setting.

The gut or bowel of every normal, healthy human contains bacteria including a group of bacteria called Enterobacterales. This group of bacteria includes *E. coli* and *Klebsiella pneumoniae*. When Enterobacterales get into the bladder, kidney or bloodstream, they can cause infection (cystitis, pyelonephritis, sepsis/bloodstream infection or bacteraemia) that may sometimes be severe and life-threatening.

CPE is a particular variant of these common gut bacteria that have become resistant to a critical group of antibiotics, the carbapenems. They are often also resistant to many other antibiotics. Although they are resistant to many antibiotics, in most other respects they are like other Enterobacterales bacteria as they are harmless when they are in the gut.

## What is CPE Colonisation?

A person who carries CPE in the gut but who has no clinical symptoms or illness related to the CPE is said to be colonised. People may also have asymptomatic CPE colonisation of urine, leg ulcers or indwelling devices. Colonisation with CPE (no clinical evidence of infection) should not be treated with antibiotics. Antibiotics do not clear the colonisation from the gut and in fact are likely to make the colonisation more intense and last longer.

When people colonised with AMRO including CPE develop clinical evidence of infection more often than not the infection that they have is not caused by the AMRO, i.e. the CPE. For example, upper respiratory tract infection, bronchitis, pneumonia, sinusitis, skin infection and cellulitis are unlikely to be caused by CPE even in a person colonised with CPE but are likely to be caused by well recognised and common organisms that cause the same infections in those without CPE colonisation. In a person colonised with CPE just as in everyone else these are most likely to be due to viral infection (upper respiratory tract and bronchitis) or the usual bacterial suspects for pneumonia (pneumococcus) and cellulitis (*Staphylococcus aureus* or Group A Streptococcus).

CPE in the gut do not cause diarrhoea, vomiting or abdominal pain. In a small number of people colonised with CPE in the gut, the CPE may subsequently cause cystitis, pyelonephritis or sepsis. In this case many of the antimicrobial agents commonly used in the community do not work, however, there are some antibiotics that are effective.

If a person colonised with CPE develops clinical evidence of infection they may need treatment directed towards the CPE and consultation with a Consultant Microbiologist or Infectious Disease Physician is strongly advised. If treatment directed towards CPE is required, in so far as it is appropriate given the person's overall care plan, transfer to an acute hospital is generally appropriate. See guidance on treatment of CPE infection at <https://www.hpsc.ie/a-z/microbiologyantimicrobialresistance/strategyforthecontrolofantimicrobialresistanceinireland/sari/carbapenemresistantenterobacteriaceae/cre/guidanceandpublications/>

## What do we mean by a CPE Contact?

A **CPE Contact** is a term used to refer to a person who has been identified by an infection prevention and control (IPC) team or public health doctor as having had significant exposure to a person colonised or infected with CPE and as a result of this exposure, this person is at higher risk of being colonized with CPE than people who are not contacts. The criteria for identifying a person as a CPE contact are specified in national guidance documents. Identification of a person as a CPE contact generally relates to exposure to CPE in the acute hospital setting.

CPE contacts should be given a small plastic card to show to healthcare workers to tell them that are a **CPE contact**. In the community healthcare setting, **Standard Precautions** is generally all that is required with respect to IPC precautions, for a CPE Contact.

When CPE contacts are admitted to an acute hospital they are offered testing for CPE and special precautions are taken in their care pending their test results. Additional information on CPE including Fact Sheets is available at [www.hse.ie/infectioncontrol](http://www.hse.ie/infectioncontrol).

## CPE and Haemodialysis

### Infection Prevention and Control Challenges Especially Associated with Chronic Haemodialysis.

Chronic haemodialysis poses particular IPC challenges. Patients undergoing chronic haemodialysis have frequent relatively intense contact with healthcare services over months or years. This results in very frequent, relatively brief but intense contacts with other patients, healthcare workers and healthcare environments that can act as sources for transmission of infectious organisms, including CPE. In general, haemodialysis services in Ireland operate from predominantly multi-bed open space rooms with limited numbers of single rooms and often limited toilet facilities. Haemodialysis patients are more vulnerable to infection than most people because of the renal failure and because of requirements for permanent vascular access to support renal replacement therapy. Patients may undergo renal transplantation which is supported by immuno-suppressive therapy that may also increase their vulnerability to infection with AMRO acquired when on haemodialysis treatment.

In addition to the risks associated with their primary haemodialysis centre, haemodialysis patients are exposed to risks of acquisition of AMRO when they require access to haemodialysis services in other parts of Ireland and outside of Ireland when they travel.

The requirement to access other haemodialysis services is associated with a risk that if an AMRO becomes established in one haemodialysis centre that centre may serve as a focus for dissemination of the organism to other centres carried by patients who have visited that centre.

A further issue in relation to haemodialysis services is the potential for the transfer of organisms from person-to-person in the context of shared transport between home and haemodialysis centres.

## Infection Prevention & Control Requirements in Haemodialysis.

This guidance reflects and summarises previous guidance from the CPE Expert Group. The fundamental requirement in relation to the control of the spread of CPE and other AMRO in haemodialysis services as in all other services is adherence to **Standard Precautions** with all patients all of the time. Additional IPC measures are always in addition to **Standard Precautions**.

Because of the duration and intensity of contact with healthcare services, patient education is of particular value in renal haemodialysis settings. All haemodialysis patients should be provided with information regarding the risk of acquiring AMRO in healthcare settings and the practical steps that they can take to reduce their risk. All haemodialysis patients should be provided with hand hygiene training unless they are unable to participate in or benefit from this training. All patients should be supported in performing hand hygiene after using the toilet and before eating. On completion of haemodialysis all patients should be supported in performing hand hygiene before leaving the haemodialysis centre.

An information leaflet is available at the link below and is reproduced below as Appendix 1 for convenience.

<https://www.hse.ie/eng/about/who/healthwellbeing/our-priority-programmes/hcai/hcai-amr-information-for-patients-and-public/patient-leaflets/patient-leaflets.html>

Other relevant documents are available at the following link

<https://www.hpsc.ie/a-z/microbiologyantimicrobialresistance/strategyforthecontrolofantimicrobialresistanceinirelandsari/carbapenemresistantenterobacteriaceae/>

The following documents are of particular relevance

*Guidance Relating to Carbapenemase Producing Enterobacterales (CPE): Interventions for Control of Transmission of CPE in the Acute Hospital Sector*

*Hospital Out-Patient and Day Care for people colonised with Antimicrobial Resistant Organisms (AMRO) including Carbapenemase Producing Enterobacterales (CPE)*

*Requirements for Screening for Carbapenemase Producing Enterobacterales (CPE) [2019]*

## Screening for CPE in Haemodialysis Patients

CPE screening is required for people undergoing haemodialysis for the first time in a haemodialysis unit, periodically during haemodialysis treatment (preferably every three months but not less than every six months), and on return from haemodialysis elsewhere, especially abroad. This is part of a comprehensive screening programme for infectious agents including blood borne viruses and other antimicrobial resistant organisms required in haemodialysis services.

## Transmission Precautions for People Colonised with CPE in the Context of Haemodialysis



**Transmission Based** precautions encompass **Contact, Droplet and Airborne Precautions**. **Contact Precautions** are the aspect of **Transmission Based Precautions** that are relevant to control of spread of CPE.

The principles of application of **Contact Precautions** in haemodialysis services are as in other aspects of acute hospital services but their application occurs in a particular context that may be challenging. In particular, there may be limited access to single patient rooms that are suitable for all patients.

In so far as is practical, people who are CPE colonised and CPE Contacts, should undergo haemodialysis treatment in single patient rooms. This is particularly important with patients that have diarrhoea or other conditions or behaviours that make containment of faecal matter particularly difficult with the likelihood of significant contamination of the healthcare environment.

For most patients undergoing haemodialysis, **Contact Precautions** can be applied in an open area if single patient room accommodation is not available.

Implementing **Contact Precautions** in an open space in a haemodialysis unit, in particular donning and doffing long sleeve gowns, may be stigmatising and may compromise patient confidentiality. The risk may be managed as follows

The person(s) primarily responsible for care of the patient may wear a scrub suit while the patient in question is undergoing haemodialysis.

Where there is not likely to be close physical contact between the healthcare worker and the patient, it is sufficient for the healthcare worker to wear a patient plastic apron and gloves when performing tasks that require patient contact. Performance of hand hygiene as per **Standard Precautions** is necessary after removal of apron and gloves.

After the patient in question has finished their haemodialysis session or sooner in the event of unanticipated close physical contact with the patient, the healthcare worker should discretely change into a clean scrub suit/uniform.

The patient's bed space should undergo terminal cleaning and decontamination after the patient has completed haemodialysis.

### Travel to and from Haemodialysis Services

People colonised with CPE or other gut colonising microorganisms may generally travel in the same vehicle as other patients to and from haemodialysis services.

## Evidence of Transmission of CPE in a Haemodialysis Service

Regular screening of all haemodialysis patients for CPE as recommended above is critical to ensure the transmission of CPE associated with a haemodialysis service is detected rapidly and this in turns facilitates interventions to minimise subsequent spread.

In the event of evidence of transmission of CPE in a haemodialysis service an outbreak control team should be convened and the Medical Officer of Health notified in conformance with legislation. In the context of evidence of transmission there is a requirement for enhanced IPC precautions.

## Appendix 1. Patient Information Leaflet Content

### Be infection aware

#### Reducing the risk of getting an infection in hospital or when you go home

##### Who is at risk?

People who need treatment in a hospital or clinic are often more vulnerable to infection than most other people. This may be because the illness they have or the treatment they need has weakened their resistance.

A 'healthcare-associated' infection is an infection that you pick up after having contact with a healthcare service. Most often, this happens if you have had treatment in a hospital. It can also happen after treatment in outpatient clinics, nursing homes and other healthcare settings.

Any patient in any hospital or healthcare facility in the world is at risk of picking up a new infection when they are there.

##### What causes the bugs and infections?

Some of these new healthcare-associated infections are caused by your own bacteria (bugs). They are usually harmless for healthy people. Others are caused by antibiotic-resistant hospital bugs – 'superbugs'. You can pick them up in hospital from contact with other patients, or from contact with hospital staff and equipment. In a big hospital looking after very sick people, about 1 in 20 patients has a healthcare associated infection.

##### Can bugs and infections be stopped?

No hospital in the world can stop all these infections from happening. Some can be stopped by putting strong systems in place to prevent hospital superbugs from spreading from one patient to another. Keeping your hands clean and keeping equipment clean is important in stopping hospital superbugs from spreading.

If the hospital knows that a patient has a superbug, they will take extra care of that person to help stop the bug from spreading. For example, a patient with a superbug will usually be given their own room and their own toilet if that is possible.

## How do I know if I have a bug?

The only way to know if a person is carrying a superbug is to take a sample (swab) and test it in the laboratory. When we test for superbugs, we ask you if we can take a 'swab' from your nose, a wound, your skin or back passage (bum). This is a simple procedure where we rub the swab – like a cotton bud – on your skin. It is important to know if you are carrying a superbug, as it can help your doctors to choose the best antibiotic treatment for you if you develop an infection in hospital. If you are carrying a superbug, you will notice that the hospital staff take extra precautions when caring for you, such as wearing gloves, aprons or gowns. This helps to reduce the risk of the bugs spreading to other patients. If you know you are carrying a superbug it is important to tell a member of staff when you come to hospital.

Many patients are tested for superbugs when they come into hospital. If you test positive, a doctor or nurse will tell you about the result. They will give you information that you can read and take home with you.

## What can I do to protect myself?

These are some things you can do to protect yourself from picking up an infection or superbug while you are in hospital:

- Clean your hands regularly and use the hand sanitizer gel. Always do this after you go to the toilet and before you eat
- Do not share your personal things with other patients – for example, your phone, your earphones, and so on
- Keep away from other patients' beds
- Do not let anyone sit on your bed, and don't sit on another patient's bed
- It's OK to remind staff to clean their hands
- It's OK to tell a staff member if you see anything that is not clean

Sometimes, the hospital does not know that a person is carrying a superbug until after they have gone home. If we find out that you are carrying a superbug after you go home, we will write to you or tell you about it at a follow-up appointment. We will also let your GP know. If you have any questions about hospital infection or superbugs, please ask your doctor or nurse.

## Further information

You can get further information on hand hygiene and watch a short video on proper hand washing on [www.hse.ie/infectioncontrol](http://www.hse.ie/infectioncontrol)

**This information is approved for use by the HSE's Antimicrobial Resistance and Infection Control national programme. Text awarded Plain English mark from the National Adult Literacy Agency.  
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