Health Protection Scotland

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Toolkit for managing carbapenemase-producing Enterobacteriaceae (CPE) in Scottish non-acute care settings

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Abbreviations

CPE	Carbapenemase-producing Enterobacteriaceae
CRA	Clinical Risk Assessment
HIIAT	Hospital Infection Incident Assessment Tool
HPT	Health Protection Team
ICM	Infection Control Manager
ICD	Infection Control Doctor
IMT	Incident Management Team
IPCT	Infection Prevention and Control Team
NIPCM	National Infection Prevention and Control Manual
PHE	Public Health England
PPE	Personal Protective Equipment
SICPs	Standard Infection Control Precautions
TBPs	Transmission Based Precautions

Contents

1 Introduction

1.1 Aims and scope

This toolkit focuses on the management and control of carbapenemase-producing Enterobacteriaceae (CPE) for use in the Scottish non-acute care settings. It has been adapted from Public Health England (PHE) "Toolkit for managing carbapenemase-producing Enterobacteriaceae in non-acute and community settings".[1]

Whilst this toolkit focuses on CPE, consideration for other carbapenemase-producing organisms with demonstrable carbapenemase activity is also important. The Healthcare Infection Society guidelines "Prevention and control of multi-drug-resistant Gram-negative bacteria: recommendations from a Joint Working Party" found that that there was insufficient evidence to mandate routine admission screening of all patients for these and other multi-drug resistant Gram negative organisms, however, recommends screening for these organisms during the management of outbreaks.[2]

1.2 For whom is this toolkit intended?

This toolkit provides practical advice for health and social care staff working in non-acute care settings.

Infection Prevention and Control (IPC) interventions described in this document are evidence based Standard Infection Control Precautions (SICPs) and Transmission Based Precautions (TBPs) as detailed in the National Infection Prevention and Control Manual[3] (NIPCM) for Scotland which is intended to be used by all those involved in care provision.

The advice in this toolkit is applicable to the NHS (such as Health Protection Teams (HPT), District Nursing (DN) or care/hospital at home services) the independent and adult social care sectors, in which settings many service users may reside or receive care, often following discharge or transfer from an acute care setting. These will include, but are not limited to:

- community hospitals; including community mental health and learning disability;
- intermediate care settings;
- hospices;
- care homes (residential and/or nursing) including dementia care and learning disability;
- community rehabilitation;
- prisons/detention centres;
- domiciliary care/sheltered housing/care at home;
- day centres.

The guidelines set out in this toolkit are the minimum recommended for the management and control of CPE. Local Infection Prevention and Control Teams/Health Protection Teams (IPCT/HPT) may choose to extend the scope of their own local policy based on local risk assessment.

If additional information and/or advice are required, please discuss with your local HPT, General Practitioner (GP) or Consultant Microbiologist.

Information leaflets are provided for affected individuals, their families and carers in Appendix 1, and can be accessed at: http://www.hps.scot.nhs.uk/pubs/detail.aspx?id=3347

1.3 What are CPE?

Enterobacteriaceae are bacteria that usually live harmlessly in the gut of humans. This is called 'colonisation' (a person may be referred to as a 'carrier'). These bacteria include common pathogens such as *E. coli*, *Klebsiella* sp., *Proteus* sp. and *Enterobacter* sp.. However, if the bacteria get into the wrong place, such as the bladder or bloodstream they can cause infection. These organisms are some of the most common causes of infections such as urinary tract infections, intra-abdominal infections and bloodstream infections, which can, in some circumstances, be life-threatening.

CPE are a type of bacteria which has become extremely resistant to carbapenems. Doctors rely on carbapenems, which are, a powerful group of antibiotics, to successfully treat certain complicated infections when other antibiotics have failed. These bacteria carry a gene for a carbapenemase enzyme that breaks down carbapenem antibiotics. The spread of these resistant bacteria can cause problems to vulnerable patients in hospitals (acute care settings) and non-acute care settings, because there are so few antibiotics available to treat the infections they cause.

Over the last decade CPE have spread throughout the world and are now regularly found in healthcare facilities in many countries.[4] In the UK, over the last five years, we have a seen a rapid increase in the incidence of infection and colonisation by multi-drug resistant carbapenemase-producing organisms.[7;8] Until recently, most cases in the UK were introduced by people who had been in hospital abroad. However, there are already hospitals in England where CPE can be considered endemic. There is a real risk that CPE could also become endemic across Scottish healthcare settings.

In Scotland cases of CPE have been reported in patients who have received healthcare in non-acute care settings.[7] The occurrence of these cases in the community is concerning and guidance for managing CPE in these settings in essential to prevent transmission in these environments.

1.4 Why does carbapenem resistance matter?

Carbapenem antibiotics are a powerful group of β-lactam (penicillin-like) antibiotics used in hospitals. Until now they have been the antibiotics that doctors could rely upon to treat certain complicated infections caused by Gram-negative bacteria when other antibiotics failed. Due to the lack of new antibiotics under development, carbapenems may be regarded as drugs that should only be used as a last resort, and a critically important group of agents whose effectiveness must be preserved. The spread of these resistant bacteria can cause problems to vulnerable patients in hospitals and other non-acute care settings, because there are so few antibiotics available to treat the infections they cause. Unless action is taken now, the rapid spread of carbapenem-resistant bacteria has great potential to pose an increasing threat to public health and modern medicine as we know it.

1.5 Do individuals colonised with CPE need to be treated?

If an individual is colonised, (a carrier) they do not need to be treated with antibiotics. If the resistant bacteria cause an infection then treatment, including antibiotics, will be required. These infections are difficult to treat due to their resistance to carbapenem antibiotics.

1.6 How is CPE spread?

Individuals who have these bacteria living in their gut can contaminate their hands when they go to the toilet. The toilet and immediate care environment may also be contaminated. CPE is spread through direct contact with the individual or indirectly from their immediate care environment (including care equipment), when SICPs such as hand hygiene, equipment and environmental decontamination are not carried out correctly and at appropriate times. Because of this, there is a risk that the bacteria can survive in the environment and potentially spread to other people.

1.7 Who is at risk of acquiring CPE?

Individuals who have been an inpatient in a UK hospital known to have had problems with spread of CPE or those who have been an inpatient in a hospital abroad or received holiday dialysis outside of Scotland are at higher risk of acquiring carbapenemase-producing Enterobacteriaceae. Individuals who have had close contact with someone who is colonised or infected with CPE are also at higher risk of acquiring CPE.

1.8 What is the risk to those being cared for in non-acute care settings?

Most people will be unaware that they are colonised and, in general, the chance of developing an infection from the bacteria is low. However, immunocompromised individuals and those receiving complex care in the community with frequent hospital admissions, or who have indwelling devices, will be more vulnerable of developing an infection. These individuals are at greater risk of colonisation and of suffering more serious consequences should they develop an infection. Colonised individuals with invasive devices in situ such as catheters, ventilators, enteral feeding equipment, or with wounds or lesions may be at greater risk of developing an infection.

Whilst the level of risk for infected or colonised individuals is lower than that in acute care settings, if the levels of hygiene in care settings are inadequate, resistant bacteria may spread among individuals who more commonly congregate together, or use communal facilities or equipment such as bathrooms or hoists or commodes, such as in a care home.

It is worth noting that whilst invasive procedures are not performed in the non acute care settings in the same way as in the acute care setting, specific environmental factors (e.g. soft furnishing, carpets, shared communal areas) within non acute care settings may contribute to the spread of microorganisms.

1.9 How can spread of CPE be prevented?

The spread of CPE can be minimised by consistently applying SICPs and TBPs, specifically contact TBPs[3], for all individuals receiving care. It is important that individuals who are colonised with CPE are also scrupulous about their own personal hygiene, especially after using the toilet. Maintenance of a clean environment is another important infection prevention and control measure.

Well informed, trained and competent staff are essential in preventing the spread of CPE. It is also important to have regular audit of infection prevention and control practices, along with regular feedback to direct care providers. Induction training and routine updates for all care and domestic staff should be undertaken to enable high levels of understanding and compliance with SICPs and TBPs. Domiciliary carers should be reminded of their responsibility to maintain effective IPC measures to prevent spread within the individual's home or to other service users on their case list. Information for contacts and family members of colonised individuals can be found in Appendix 1.

1.10 Factors that increase the risk of transmission of CPE- Information for managers and carers

The following factors increase the spread of CPE.

The individual who has confirmed colonisation/infection and:

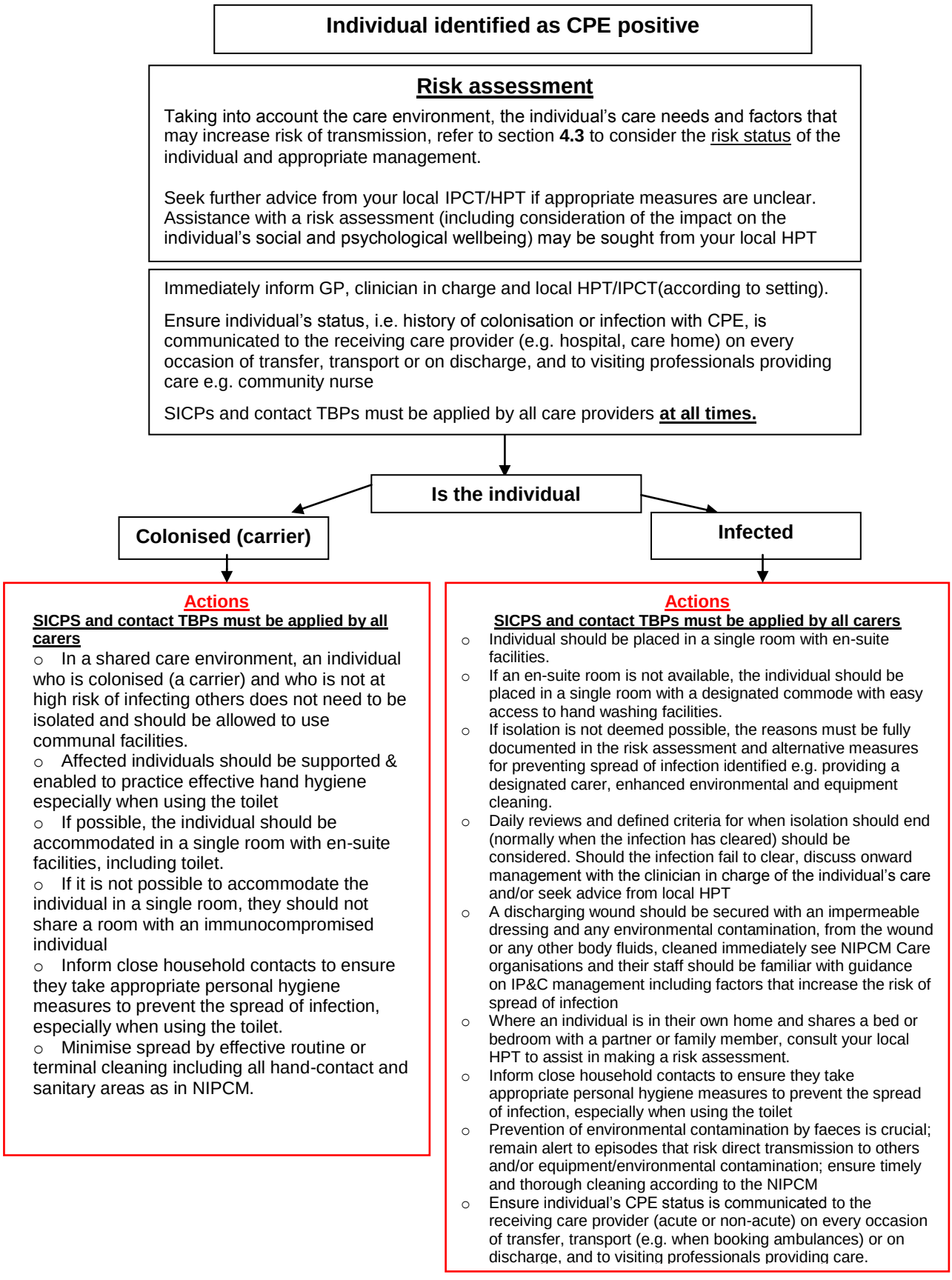
- lives or socialises in a shared care environment where individuals are congregated and are cared for in close proximity to one another
- they and their family have not yet received information on how to best manage the infection and prevent the spread of these bacteria
- has invasive device(s) in situ
- has a discharging wound or oozing from an infected area
- has faecal or urinary incontinence
- has diarrhoea or contaminates the environment with faeces
- has confusion or dementia, which may impact on their capacity to maintain adequate personal hygiene
- requires physical rehabilitation or assistance with washing, dressing, going to the bathroom/using a commode or bedpan.

AND

- lack of compliance with SICPs and TBPs as described in the NIPCM.

2 Infection prevention and control of CPE

2.1 Flow chart: Management of individuals positive for CPE (colonisation or infection)



In any care setting, full attention should be given to preventing spread. A discharging wound should be secured with an impermeable dressing and any environmental contamination, from the wound or other body fluids, cleaned immediately according to your IPC policy.

Care organisations and their staff should be familiar with guidance on IPC management including factors that increase the risk of spread of infection. In addition to this toolkit, a number of key documents are available that can be used to understand and embed high quality practices in non-acute care settings for example the NIPCM.

2.2 Where an outbreak or cluster is suspected

In the event of a second individual within the same care setting being identified with an infection or becoming colonised with CPE, immediately contact the local HPT or community IPCT and advise the clinician/GP in charge of the individuals care (as appropriate to the setting). This will assist in making an assessment of whether spread is likely to have occurred in the care setting or from elsewhere and will support the most appropriate management of the affected individuals. Until otherwise advised, care for the individuals affected should be managed as a confirmed case of CPE.

The local HPT/IPCT may request screening of individuals in non-acute care settings if an outbreak is suspected. Screening helps to understand if there has been spread of carbapenemase-producing Enterobacteriaceae and what the source of this might be. A rectal swab is the best sample type to achieve speedy results and is preferential to a stool sample. If present a wound swab and/or catheter urinary specimen may be requested.

2.3 Keeping the environment clean

It is important that cleaning of the environment is thorough and that local policies and procedures, as set out in the NIPCM (http://www.nipcm.hps.scot.nhs.uk/), are consistently adhered to.

As SICPs alone may be insufficient to prevent cross transmission of specific infectious agents, additional TBPs are required to be used by staff. SICPs and TBPs can be found in the NIPCM Chapter 1 and Chapter 2, respectively;
http://www.nipcm.hps.scot.nhs.uk/chapter-1-standard-infection-control-precautions-sicps/

http://www.nipcm.hps.scot.nhs.uk/chapter-2-transmission-based-precautions-tbps/

SICPs must still be applied with these additional considerations.

- Hand hygiene measures can help prevent the contamination of unused equipment, items and the environment. Staff hand hygiene after contact with a colonised or infected individual is essential. Particular attention should also be given to hand touch surfaces, such as bed rails and door handles, and bathrooms.

- Avoid having extraneous equipment or large quantities of disposable items in the individual's room.
- Use a designated cleaning sink (not a hand wash basin) to discard patient wash water, body fluids or secretions, or when cleaning/disinfecting equipment.
- If a designated cleaning sink is not available, such as in the domiciliary setting, disposal of patient wash water, body fluids or secretions should be down the toilet rather than kitchen sink or wash hand basin.
- Where possible close the toilet seat lid before flushing the toilet to reduce possible aerosol spread.

For further advice and information on environmental decontamination, consult your local IPC policy, NIPCM or ask your usual HPT or community IPCT about which to use, e.g. hypochlorite.

3 Communications

3.1 Internal and inter-care communications

Good communication is essential. If a patient is being transferred from an acute care facility to a non-acute care setting, the family and/or care facility to which the patient is to be discharged to should be provided with an explanation of risk in a non-acute care setting along with IPC management advice.

Internally, it is essential that an individual's status, i.e. history of colonisation or infection with CPE, is communicated to visiting professionals providing care e.g. community nurses and GPs.

In addition, inter-care communications (within and between settings and carers) are central to prevent and control the spread of CPE. An inter-care transfer form (Appendix 2) should be used to notify the receiving care provider in advance (e.g. hospital, care home) on every occasion of transfer, transport or on discharge of an individual who is colonised or infected with CPE.

This form can also be used for the transfer of individuals with other multi-drug resistant organisms.

3.2 Individual and family communications

It is important that individuals (and/or their families) play a role in preventing spread of CPE, having a full understanding of their status and of the IPC measures needed. Advice leaflets to assist with this can be found in Appendix 1 or from the Acute Toolkit

(http://www.hps.scot.nhs.uk/guidelines/detail.aspx?id=1661). *Screening of household contacts and healthcare staff* is NOT required – there is no compelling evidence to suggest that screening the household or healthcare staff to check for colonisation will provide additional benefit in controlling spread in the healthcare setting.

There is no need for restriction of visitors or for visitors or household contacts to use PPE.

Please note: There is no reason for non-acute care settings to refuse admission or readmission of service users on the grounds that they are colonised with CPE.

4 Risk assessment & management

4.1 Management advice for differing care needs

Multiple measures and interventions are required to address the variety of care needs and settings in the non acute care setting. The risk assessment (section 4.3) is intended to assist care providers in assessing what is required in their care setting and with their individual service users. Using the risk assessment, providers should classify the affected individual according to their care needs and then match to this the IPC measures that are most appropriate to their setting along with care need.

4.2 Assessing level of management

There will be occasions where additional measures will be needed following a local risk assessment. The 'Toolkit for the early detection, management and control of carbapenemase-producing Enterobacteriaceae in Scottish acute settings' may be helpful on some occasions; section 8.3 of the acute toolkit includes a planning checklist for hospital IPCT for the management of an outbreak, suspected outbreak or cluster of cases. When in doubt you can seek further advice from your usual IPCT or local HPT. The Acute Toolkit can be accessed via http://www.hps.scot.nhs.uk/haiic/amr/publicationsdetail.aspx?id=55186.

In addition, Chapter 3 'Healthcare Infection Incidents, Outbreaks and Data Exceedance' within the NIPCM, provides support in the early recognition of potential infection incidents and to guide IPCT/HPTs in the incident management process within care settings: http://www.nipcm.hps.scot.nhs.uk/chapter-3-healthcare-infection-incidents-outbreaks-and-data-exceedance/

4.3 Guidance for undertaking a risk assessment on managing individuals positive for CPE (colonisation or infection)

This information is designed as a guide only, and is not exhaustive advice for all settings or care needs. A risk assessment is based on the individual's care needs. Multiple measures and interventions may be required to address the variety of care needs and settings in the community. Using the guidance, the affected individual should be classified according to their care needs and then matched to this the infection prevention and control measures that are most appropriate.

At all risk levels ensure the following:

- **standard infection control precautions are maintained at all times (NIPCM: chapter 1)**
- **effective environmental hygiene:** prevention of faecal and environmental contamination is crucial; remain alert to episodes that risk direct transmission to others and/or environmental contamination; ensure timely and thorough cleaning
- **hygiene advice to individual and family/contacts***:* it is important to inform individuals and those around them to ensure they take appropriate personal hygiene measures to prevent the spread of infection, especially when using the toilet

Risk assessments must include consideration of the care environment, eg health and/or social care setting, specialist or general rehabilitation, haemodialysis unit, dementia care unit, community hospital or hospice, community mental health in-patient, learning disability, residential care, domiciliary care or detention centre/prison.

If the individual is colonised: single room with en-suite facilities including toilet or designated commode is recommended; no curtailment of communal activities is required where standard precautions and effective environmental hygiene are being maintained and there is no risk of infecting others.

If the individual is infected: conduct a risk assessment with your local HPT to discuss possible isolation (with defined end-of-isolation criteria, see flowchart 2.1); consider the mental and physical health and wellbeing of the individual when deciding to isolate.

Always communicate the positive status of an individual appropriately when transferring the individual between care settings (Appendix 2).

CARE NEEDS		GUIDANCE FOR RISK ASSESSMENT

HIGH RISK	*e.g.* patient has: diarrhoea, discharging wound, long term ventilation, confusion/dementia, device(s) in situ, undergoing invasive procedures, smearing or 'dirty protests'	• identify if there is an **immediate risk of infecting others**
		• discuss management with GP/clinician in charge, IPC nurse
		• consider the mental and physical health and wellbeing of the individual
		• consider if the individual requires supervision
		• consider options to facilitate terminal cleaning and disinfection and minimise the risk of spread of infection where possible by:
		  • giving individuals an end of list appointment
		  • using mobile equipment away from others

MEDIUM RISK	*e.g.* patient requires: assistance with hygiene, mobility or physical rehabilitation	• **no immediate risk of infecting others** identified • standard precautions are maintained (NIPCM, chapter 1) • hygiene advice is provided to individual and family/contacts as appropriate (Appendix 1) • effective environmental hygiene (Section 2.3) • if unsure, contact your local HPT
LOW RISK	*e.g.* patient is independent and self-caring	

5 Frequently Asked Questions

The following frequently asked questions are aimed to assist in the application of this toolkit. Further advice can be sought from your local HPT/IPCT.

Why do you advise a different approach for managing CPE in non acute care settings to that for acute care?

Patients in an acute care setting often have multiple intensive interventions which restrict daily life and are concentrated together with many other vulnerable patients. In contrast, most individuals in the community are in their own home or another non acute care setting. Generally, but not always, they are more likely to be more mobile and undergo fewer clinical procedures or interventions.

Risk of spread in non acute care settings is lower than that in acute care.

Why is screening of high risk individuals recommended for acute care but not for other care settings?

To manage patients effectively, acute hospital clinicians need to have a full understanding of the patient's CPE status, achieved through screening. This will allow them to plan the care for that individual and those around them in a safe and effective manner.

Are staff at risk of taking this home to their families, particularly where they may have a vulnerable relative at home?

Effective hand hygiene and adherence to SICPs and TBPs are the most effective ways to prevent indirect spread to others, including family members. Staff should carry on as normal at home without any changes to their activities of daily living.

In order to alleviate concerns, care organisations should ensure that all staff are well informed and have appropriate education, training and knowledge about CPE and measures aimed at preventing spread.

Should staff caring for individuals colonised or infected with CPE be screened to see if they have become colonised themselves?

Currently, there is no evidence to support screening of staff as part of routine IPC measures. Adherence to SICPs and contact TBPs in the workplace at all times are the key measures to prevent spread.

What happens if the individual needs to go into hospital or to another care setting?

When transferring an affected individual to another care setting, senior staff should ensure that the destination hospital or setting has been supplied with a completed copy of the inter-care transfer form (if used)– 'notification of an individual colonised or infected with a CPE or other multidrug-resistant organism' (Appendix 2) to inform the receiving facility of the individual's positive status.

Direct verbal communication of the individual's status to the receiving staff and the IPC team may be helpful in assisting them to make an appropriate risk assessment (as long as confidentiality requirements can be maintained).

How long does an individual carry CPE?

There is no definitive answer to how long a person may carry the bacteria. The length of time could be anything from a few days to indefinitely. Treatment with certain antibiotics (for any infection) may also affect length of carriage.

What about family members or visitors who are pregnant?

The placenta is an effective barrier in preventing bacteria such as CPE from crossing from the mother to the baby, therefore the unborn baby is not at risk in the womb. The affected individual should practice (and advise family and carers of) good hand hygiene practices, especially after visiting the toilet (as this bacteria is mainly carried in the gut) to minimise transmission of CPE.

Is it safe for the service user to share a bed with their partner?

There is a chance that the bacteria could be passed onto the partner, particularly if the affected individual has a discharging infected wound. However, good personal hygiene, regular laundering of bedding and covering of wounds with an impermeable dressing and appropriate maintenance of any invasive devices will reduce the risk of transmission.

When ambulance staff transport a patient, are any extra precautions required?

No, the ambulance staff should adhere to the same standards set out in the NIPCM. If there is any contamination from a leaking wound or faecal contamination, terminal cleaning of the vehicle will be required.

What about affected individuals who have companion animals?

Companion animals, for example cats, dogs and horses, can become colonised or infected with CPE. There is some evidence to suggest the transmission of CPE from affected humans to companion animals, and rare evidence of transmission between companion animals in veterinary hospitals. Good hand hygiene practice using soap and water when handling companion animal faeces, before handling food for companion animals and maintaining a clean environment can minimise the risk of transmission.

If the toolkit does not cover the scenario we are dealing with, where can we get further advice?

If the advice in this toolkit is not relevant to your situation, please seek further advice from the GP/clinician in charge of the individuals care or contact the local HPT or IPCT (according to setting).

6 Non-acute and community-based scenarios

The following scenarios are intended to support the application of this toolkit using practical examples.

Scenario 1:

I am a manager of a residential care home and we have had two confirmed cases of CPE, one of which was confirmed in hospital. We are unsure where the other resident acquired the bacteria as the gentleman has not been outside of the home. All of our residents have single rooms but there are some shared facilities, including bathrooms and toilets. Please will you advise whether or not we need to screen all of the residents, to check whether anyone else is colonised?

Scenario 1 response: seek advice from your local HPT or community IPCT who can work with you and your IPC advisor to establish whether it is likely that there has been spread within the home. When spread is suspected, selective screening may be recommended e.g. screening residents who have had closest contact with the affected individual(s) or who shared the same carer(s). The most common specimens for screening tests are a rectal swab or stool sample. If present a wound swab and/or catheter urinary specimen may also be requested.

Should more residents confirm positive on screening (or there is no obvious smaller group to select for screening) your HPT may recommend:

- That all residents in the home be screened.
- Communication on every occasion to receiving care providers for all transfers and discharges of residents, and to visiting clinicians such as GPs and district nurses that you have a number of cases in the home.
- A thorough investigation e.g. root cause analysis, should be undertaken.
- All staff (including carers, domestics and other ancillary staff) should be gathered together to review and establish that practices and procedures within the home are in line with this toolkit, and SICPs and TBPs as outlined in the NIPCM or within your own IPC Policy.

Scenario 2:

A hospice has admitted a patient who is positive for CPE. The hospice has not developed a plan as they are unsure whether the acute or non-acute/community toolkit is more applicable to the setting.

Scenario 2 response: assess whether your service users and care setting would fit those generally identified in the risk assessment guidance (Figure 2). You should work on this with your local HPT and clinical colleagues to establish a common understanding of the risks. However, there may be organisational elements of the acute toolkit, particularly in section 6, which you will find helpful. If unclear, seek advice from your local HPT, or community IPCT, once you have a draft plan.

Scenario 3:

A patient colonised with CPE needs to attend our stroke rehabilitation sessions with other patients. Also, they require a patient transport vehicle to transport them to and from the rehabilitation centre. Please can you advise how the individual should be managed?

Scenario 3 response: With some small (but important) measures, the individual should continue life as normal, including receiving transport to and from and attending their rehabilitation sessions. The individual should be advised about the importance of and supported to practice good personal and hand hygiene in preventing transmission. Transport and rehabilitation Unit staff should be informed that the individual is colonised (carrier) and should be advised to maintain and adhere to SICPs and contact TBPs. If possible, when attending communal rehabilitation sessions (as an inpatient or an outpatient), the individual should be allocated separate equipment and receive care from an allocated member of staff. A thorough clean of the allocated area should be undertaken straight after use (and after any body fluid contamination) in line with the NIPCM or organisation's policy. Staff should ensure that SICPs and TBPs are maintained and adhered to at all times including hand hygiene between caring for different service-users.(see Appendix 11 of the NIPCM[3]). Should the patient develop symptoms of infection which cannot be contained, e.g. a discharging wound, or develop diarrhoea, they should stay away until the infection or diarrhoea has resolved.

Scenario 4:

We are a regional rehabilitation unit and have started to decline admission of patients who are positive for CPE as we don't wish to expose other patients to the risk of spread of these bacteria e.g. through use of communal facilities. Do you think this is the right approach?

Scenario 4 response: It is important that an individual's health and wellbeing is not compromised by their positive status. Care can be provided with effective infection prevention and control measures by informed and educated staff. For inpatients, it is recommended that they are accommodated in a single room with en-suite facilities. If possible, when attending communal rehabilitation sessions (as an inpatient or an outpatient), the individual should be allocated separate equipment and receive care from an allocated member of staff. A thorough clean of the allocated area should be undertaken straight after use (and after any body fluid contamination) in line with the NIPCM . As normal, staff should ensure that SICPs and TBPs are followed at all times including hand hygiene between caring for different service-users.

Scenario 5:

An elderly lady in our community hospital has been identified as being positive for CPE six days after admission. The lady was in a six-bedded rehabilitation ward with two other elderly patient contacts. She also used shared rehabilitation facilities. Do the other two contacts need to be screened?

Scenario 5 response: As a community hospital is not an acute care setting, the complexity of care is generally less, so a pragmatic approach should be considered which balances the health and wellbeing of those receiving care with the risk of infection. Nonetheless, the risk of transfer of the microorganisms is real and investigation should be started without delay, especially where decontamination of the environment in the non-acute setting may be more difficult (where there may be soft furnishing for example). However, as the two contacts have spent a considerable amount of time in the same bay, sharing the same facilities as the lady, screening may well be indicated. It could be that one of the contacts was actually the source of CPE.

It is important that you seek advice from your local HPT or IPCT, who support community hospitals in your area, to assist with making a risk assessment. Additionally, it is important to speak to your local IPCT who can work with you to decide whether screening is required.

Scenario 6:

We have recently received a prisoner into our prison, transferred directly from hospital. The Consultant Microbiologist at the hospital has informed our medical staff that the prisoner is colonised with CPE. Does the prisoner need isolating?

Scenario 6 response: No. However, where possible, a single cell with a toilet is preferable. That said, prisoners who are colonised should not share cells with prisoners who are considered to be immunosuppressed. While prison staff are not required to take additional IPC measures, hand, equipment and environmental hygiene in line with the NIPCM, as would normally be adopted for any individual in a similar multi-occupied setting, should be reinforced. The prisoner should be advised to maintain good hand hygiene, especially after using the toilet. Additionally, should the prisoner develop diarrhoea or an infection which cannot be contained, such as leaking discharge from a wound, they should be placed in a single cell with a toilet until the diarrhoea or infection has resolved.

7 Glossary

Standard Infection Control Precautions (SICPs)	SICPs are the basic infection prevention and control measures necessary to reduce the risk of transmission of infectious agent from both recognised and unrecognised sources of infection. Sources of (potential) infection include blood and other body fluids secretions or excretions (excluding sweat), non-intact skin or mucous membranes and any equipment or items in the care environment that could have become contaminated. To be effective in protecting against infection risks, SICPs must be used continuously by all staff.
Transmission Based Precautions (TBPs)	SICPs may be insufficient to prevent cross transmission of specific infectious agents. Therefore additional precautions (TBPs) are required to be used by staff. SICPs must still be applied with these additional considerations. TBPs should be applied when caring for: • patients with symptoms of infection; • asymptomatic patients who are suspected or incubating an infection; or • patients colonised with an infectious agent. Contact precautions are used to prevent and control infections that spread via direct contact with the patient or indirectly from the patient's immediate care environment (including care equipment). This is the most common route of cross-infection transmission.
acute care setting	A healthcare setting, usually a hospital, that provides short-term treatment or care for an illness, urgent medical condition, injury or surgical procedure
carbapenemases	Enzymes (such as KPC, OXA-48, NDM and VIM) produced by some bacteria which cause destruction of the carbapenem antibiotics, resulting in resistance

colonisation	The presence of micro-organisms living harmlessly on the skin or within the bowel and causing no signs or symptoms of infection
community-acquired infection	An infection that *is not* related to a healthcare intervention in a hospital
healthcare-associated infection	An infection that occurs following or during a healthcare intervention undertaken either in the community (including the patient's home) or in a healthcare setting
hospital-acquired infection	An infection that occurs following or during a healthcare intervention in a hospital
infection	The presence of micro-organisms in the body causing adverse signs or symptoms
non-acute care setting	Usually applies to healthcare settings that provide non-acute care, such as in care homes and community mental health, also rehabilitation and palliative care services including hospices

8 Appendices

All appendices listed in this toolkit are also available for individual download at:

http://www.hps.scot.nhs.uk/pubs/detail.aspx?id=3347

1) Primary care quick reference guide
2) Inter-care transfer form
3) Leaflets
    a. For individuals
    b. For contacts
    c. For family

8.1 Appendix 1a – Leaflets for individuals

Toolkit for managing carbapenemase-producing Enterobacteriaceae in non-acute and community settings

Appendix 3: Advice Leaflet

Advice for individuals receiving care at home or in the community who have an infection with, or are colonised by carbapenemase-producing Enterobacteriaceae (CPE)

What are 'Carbapenemase-Producing Enterobacteriaceae'(CPE)?

The gut of every normal, healthy human contains bacteria called Enterobacteriaceae. While they are in the gut, they cause no harm and help us digest our food. This is called colonisation. However, if these bacteria get into the wrong place, such as the bladder or bloodstream, they can cause infection.

Carbapenemase-Producing Enterobacteriaceae (CPE) are a strain of these Enterobacteriaceae. They have developed a resistance to a powerful group of antibiotics called carbapenems. Carbapenems are an important group of antibiotics that doctors often rely on to fight infections where treatment with other antibiotics has failed. It's important that we stop the spread of CPE in our hospitals. This will make sure that these antibiotics continue to be available to treat infections in the future

Why does carbapenem resistance matter?

Carbapenem antibiotics can only be given in hospital directly into the bloodstream. Until now, doctors have relied on them to successfully treat certain 'difficult' infections when other antibiotics have failed to do so. Therefore, in a hospital or other care setting, where there are many vulnerable patients, spread of these resistant bacteria can cause problems.

Does carriage of CPE need to be treated?

No, not normally. People who have CPE in their body do not need to be treated as these bacteria live harmlessly in the gut, without causing problems. However, if you have an infection caused by CPE, you will need antibiotics to treat it. . Please ask your doctor or care worker to explain your situation to you in more detail if you are unsure.

How can the spread of CPE be prevented?

The most important thing you can do is to wash your hands well with soap and water, especially after going to the toilet. You should make sure hands are clean before touching any medical devices or tubes (such as your urinary catheter tube or other medical tubes or lines) if you have any, particularly at the point where it is inserted into the body or skin.

As you are receiving care in your own home, you should not restrict your lifestyle in any way; however a few sensible measures will prevent spread to others. As well as effective hand hygiene, keeping toilet and bathroom areas clean, and using separate towels, are the best ways to prevent spread. Bed linen, clothes, and other laundry can be washed as normal.

If you need to go into hospital or another healthcare environment, it is important that you let the staff caring for you know that you have had an infection with, or are colonised by CPE, or have been in the past. This will make sure that you receive the best care you need.

You should expect that any care workers, who need to visit you, will clean their hands on arrival, before and after providing direct care, and on leaving. Disposable aprons and gloves will be worn by care workers to prevent the spread of CPE to other vulnerable patients whom they will visit next.

What about my family and visitors?

There is no need for you to advise visitors that you are a carrier or have an infection, as long as hygiene measures are adequate. If you have an infection, it is important to work with your healthcare worker to ensure that any discharge from a wound, for example, is contained within an appropriate dressing to prevent contamination of clothes or soft furnishings. There is no need for a family carer to wear gloves and apron. If a relative or friend is helping care for you at home, it is essential that they wash their hands with soap and water before and after they give care to you.

Where can I find more information?

If you have any concerns or questions you can speak to your healthcare worker or contact your GP for advice. Alternatively, further information can be found in the HPS leaflet Patient Screening for Carbapenemase Producing Enterobacteriaceae (CPE) - Leaflets for Healthcare Workers and Patients http://www.hps.scot.nhs.uk/guidelines/detail.aspx?id=1661

If you require this leaflet in other languages please contact HPS on: NSS.HPSInfectionControl@nhs.net

8.2 Appendix 1b – Leaflets for contacts

Toolkit for managing carbapenemase-producing Enterobacteriaceae in non-acute and community settings

Appendix 3: Advice Leaflet

Advice leaflet for contacts of a carbapenemase-producing Enterobacteriaceae (CPE) carrier

What are 'Carbapenemase-Producing Enterobacteriaceae'?

The gut of every normal, healthy human contains bacteria called Enterobacteriaceae. While they are in the gut, they cause no harm and help us digest our food. This is called colonisation. However, if these bacteria get into the wrong place, such as the bladder or bloodstream, they can cause infection.

Carbapenemase-Producing Enterobacteriaceae (CPE) are a strain of these Enterobacteriaceae. They have developed a resistance to a powerful group of antibiotics called carbapenems. Carbapenems are an important group of antibiotics that doctors often rely on to fight infections where treatment with other antibiotics has failed. It's important that we stop the spread of CPE in our hospitals. This will make sure that these antibiotics continue to be available to treat infections in the future

Why does carbapenem resistance matter?

Carbapenem antibiotics can only be given in hospital directly into the bloodstream. Until now, doctors have relied on them to successfully treat certain 'difficult' infections when other antibiotics have failed to do so. Therefore, in a hospital, where there are many vulnerable patients, spread of resistant bacteria can cause problems.

Does carriage of CPE need to be treated?

No, not normally. People who have CPE in their body do not need to be treated as these bacteria live harmlessly in the gut, without causing problems. However, if you have an infection caused by CPE, you will need antibiotics to treat it.

How are CPE spread?

CPE is spread through direct contact with the person or indirectly from the person's immediate environment including through care equipment.

In a hospital or care setting (including care received at home) where a patient is carrying this bacterium, the environment can become contaminated and the bacterium can spread to others. It is important that the care environment e.g. equipment used for care, toilets, furniture, is kept clean and that good hand hygiene is used including before and after coming contact.

What does being a contact of a carrier mean?

This means that you have been in the same ward or care environment as a person who is a carrier of carbapenemase-producing Enterobacteriaceae.

Do I need screening?

As a contact of a carrier, if you are admitted to hospital you may be offered screening for carbapenemase-producing Enterobacteriaceae. This screening is offered as there is a *slight* chance that you could have picked up the bacteria and are carrying it too.

Do I need treatment?

Carrying carbapenemase-producing Enterobacteriaceae is not a risk to healthy people. The most important measure to take is to maintain good hand hygiene, washing hands with soap and water, especially after going to the toilet. Good hygiene such as keeping toilet and bathroom areas clean and using separate towels are the best ways to prevent the spread. Clothes and laundry should be washed normally at the hottest temperature advised on the label.

Where can I find more information?

If you have any concerns or queries you may wish to speak to your healthcare worker or contact your GP for advice. Alternatively, further information can be found in the HPS leaflet Patient Screening for Carbapenemase Producing Enterobacteriaceae (CPE) - Leaflets for Healthcare Workers and Patients http://www.hps.scot.nhs.uk/guidelines/detail.aspx?id=1661.

If you require this leaflet in other languages please contact HPS on: NSS.HPSInfectionControl@nhs.net

8.3 Appendix 1b – Leaflets for Family

Toolkit for managing carbapenemase-producing Enterobacteriaceae in non-acute and community settings

Appendix 3: Advice Leaflet

Advice for the family of a person who is a carrier of carbapenemase-producing Enterobacteriaceae (CPE)

What are 'Carbapenemase-Producing Enterobacteriaceae' (CPE)?

The gut of every normal, healthy human contains bacteria called Enterobacteriaceae. While they are in the gut, they cause no harm and help us digest our food. This is called colonisation. However, if these bacteria get into the wrong place, such as the bladder or bloodstream, they can cause infection.

Carbapenemase-Producing Enterobacteriaceae (CPE) are a strain of these Enterobacteriaceae. They have developed a resistance to a powerful group of antibiotics called carbapenems. Carbapenems are an important group of antibiotics that doctors often rely on to fight infections where treatment with other antibiotics has failed. It's important that we stop the spread of CPE in our hospitals. This will make sure that these antibiotics continue to be available to treat infections in the future

Why does carbapenem resistance matter?

Carbapenem antibiotics can only be given in hospital directly into the bloodstream. Until now, doctors have relied on them to successfully treat certain 'difficult' infections when other antibiotics have failed to do so. Therefore, in a hospital, where there are many vulnerable patients, spread of bacteria resistant to carbapenems can cause problems.

Does carriage of CPE need to be treated?

No, not normally. People who have CPE in their body do not need to be treated as these bacteria live harmlessly in the gut, without causing problems. However, if you have an infection caused by CPE, you will need antibiotics to treat it.

How are CPE spread?

CPE is spread through direct contact with the person or indirectly from the person's immediate environment including through care equipment.

In a hospital or care setting (including care received at home) where a patient is carrying this bacterium, the environment can become contaminated and the bacterium can spread to others. It is important that the care environment e.g. equipment used for care, toilets, furniture, is kept clean and that good hand hygiene is used including before and after coming contact.

Are family at risk of contracting CPE?

CPE are not a risk to healthy people. The most important thing that family members can do is to maintain good personal hygiene, including washing hands with soap and water, especially after going to the toilet. Good hygiene such as keeping toilet and bathroom areas clean and using separate towels are the best ways to prevent the spread. Clothes and laundry in the household should be washed normally at the hottest temperature advised on the label.

Will close family have to be screened for CPE if admitted to hospital?

If admitted to hospital, tell a member of hospital staff that a member of your household is or has been a carrier of CPE. You may be screened for CPE as part of the admission procedure.

Where can I find more information?

If you have any concerns or queries you may wish to speak to your family member's healthcare worker or contact your GP for advice. Alternatively, further information can be found in the HPS leaflet Patient Screening for Carbapenemase Producing Enterobacteriaceae (CPE) - Leaflets for Healthcare Workers and Patients http://www.hps.scot.nhs.uk/guidelines/detail.aspx?id=1661

If you require this leaflet in other languages please contact HPS on: NSS.HPSInfectionControl@nhs.net

8.4 Appendix 2: Inter-care transfer form template

<table>
<tr><td colspan="4">Notification of a patient colonised or infected with a CPE or other multidrug-resistant organism (For local adaptation: for use in conjunction with full discharge/transfer planning)</td></tr>
<tr><td colspan="2">Patient / client details: (insert label if available)

Name:

Address:

Date of birth:

CHI:</td><td colspan="2">Consultant:

Specialty:

Contact no:

GP:

Contact no</td></tr>
<tr><td colspan="2">Transferring facility (hospital, ward, care home, other)

Contact Name:

Contact No:</td><td colspan="2">Receiving facility (hospital, ward, care home, district nurse [if applicable], GP)

Contact Name:

Contact No:</td></tr>
<tr><td colspan="2">Diagnosis: (confirmed organism)</td><td colspan="2">Infection: YES / NO

Colonisation: YES / NO</td></tr>
<tr><td colspan="4">Microbiological identification (specimen results):</td></tr>
<tr><td>Specimen & Results</td><td>Specimen Type</td><td>Date</td><td>Result</td></tr>
<tr><td>Screen / diagnostic</td><td></td><td></td><td></td></tr>
<tr><td>Confirmatory</td><td></td><td></td><td></td></tr>
<tr><td>Other</td><td></td><td></td><td></td></tr>
<tr><td colspan="4">Treatment Information (if appropriate): (including type of medication, dose and duration)</td></tr>
<tr><td colspan="4">Infection prevention & control precautions required / in place:</td></tr>
</table>

Other information relevant to patient's care
Is the patient / client aware of their colonisation / infection status? YES / NO (if no, give reason)
Has ambulance service been informed? YES / NO (if no, give reason)
Has patient received information about their status? (Patient leaflet) YES / NO
Name of staff member completing form: **PRINT NAME:** **CONTACT NUMBER:**

8.5 Appendix 3: Primary care quick reference guide

What are carbapenemase-producing enterobacteriaceae (CPE)?	• Enterobacteriaceae are Gram-negative bacteria (including *Escherichia coli*, *Klebsiella* spp. and *Enterobacter* spp.) which naturally colonise the gut of humans and animals • They commonly cause opportunistic urinary tract, intra-abdominal and bloodstream infections • Carbapenemases are enzymes eg KPC, OXA-48, NDM and VIM, that destroy carbapenem antibiotics, thereby conferring resistance • Carbapenem antibiotics, include meropenem, ertapenem, imipenem and doripenem, which are normally reserved for serious infections caused by drug-resistant Gram-negative bacteria • Colonisation with CPE is more common than infection; the duration of colonisation is unclear

High risk groups ie at increased risk of being colonised/infected	• Those with a history of:
	  • hospitalisation abroad, particularly those having received intensive care or undergone invasive treatment such as haemodialysis
	  • hospitalisation in UK hospital with a high prevalence of carbapenemase-producing Enterobacteriaceae
	  • being previously confirmed as a case or contact of a case
	  • health tourism, seeking cosmetic or elective surgery abroad

What is required from primary care?	• On receipt of a positive result, inform and advise the patient (and/or family as appropriate) and care setting • Prompt your local Health Protection Team/Community Infection Prevention and Control Team (HPT/IPC) to undertake risk assessment in relation to the patient and prevention of transmission (Section 4.3) • Seek advice from a local medical microbiologist for the management of infection (see below if colonised only); refer to secondary care for the management of severe infections • Communicate status to any receiving health/social care providers (Appendix 2)
Screening and early detection (only if requested)	• Not routinely used in community. If required, rectal swab by competent practitioner (stool sample second choice); swabs from wounds and device-related sites may provide additional information if requested.
Decolonisation	Neither skin nor gut decolonisation are recommended. There is no effective equivalent for CPE, of the topical suppression used to reduce shedding of MRSA, in the healthcare environment. Attempts at eradication of MDR Gram-negative organisms from the gastrointestinal tract have not been successful.

Treatment of infection	If an infection is due to CPE, discuss treatment with a microbiologist. If a patient with previous CPE colonisation or infection presents with a suspected infection that is likely to be caused by a Gram-negative organism and requires empirical antibiotics, a microbiologist should be contacted for advice on antibiotic choice.
Infection prevention and control	In your surgery, standard infection control precautions (SICPs) will minimise the spread of this organism. SICPs should be rigorously implemented but no additional infection control precautions are required. Seek advice from your local community HPT/IPC team if needed; where infection exists refer to risk assessment guidance for recommended measures to prevent the spread of infection (Section 4.3).
Communication	Include patient CPE status in all communications and within the patient record. It is crucial to communicate patient CPE status during referrals and inter-care patient transfer (Appendix 2).
References	• PHE: Toolkit for managing carbapenemase-producing Enterobacteriaceae in non-acute and community settings • HPS: Toolkit for the early detection, management and control of carbapenemase-producing Enterobacteriaceae in Scottish acute settings http://www.hps.scot.nhs.uk/guidelines/detail.aspx?id=478 • NICE standard principles of prevention and control of infections in primary and community care available at http://bit.ly/NICE_StandardPrinciples_PrimaryCommunityCare

9. Reference List

(1) Public Health England. Toolkit for Managing Carbapenemase-producing Enterobacteriaceae in Non-acute and Community Settings. 2015 https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/439801/CPE-Non-AcuteToolkit_CORE.pdf

(2) Wilson APR, Livermore DM, Otter JA, Warren RE, Jenks P, Enoch DA, et al. Prevention and control of multi-drug-resistant Gram-negative bacteria: recommendations from a Joint Working Party. Journal of Hospital Infection92:S1-S44.

(3) Health Protection Scotland. National Infection Prevention and Control Manual. [cited may 2017];Available from: http://www.nipcm.hps.scot.nhs.uk/

(4) ECDC. Techinical Report. Carbapenemase-producing bacteria in Europe:Interim results from the European survey on carbapenemase-producing *Enterobacteriaceae* (EuSCAPE) project 2013. European Centre for Disease Prevention and Control; 2013 Nov 15.

(5) ECDC. Risk assessment on the spread of carbapenemase-producing Enterobacteriaceae (CPE) through patient transfer between healthcare facilities, with special emphasis on cross-border transfer. ECDC; 2011.

(6) WHO. Antimicrobial Resistance. Global Report on Surveillance. WHO 2014 April [cited 2015 Mar 17];Available from: URL: http://www.who.int/iris/bitstream/10665/112642/1/9789241564748_eng.pdf?ua=1

(7) Health Protection Scotland. Healthcare Associated Infection Annual Report 2014. 2015 May 26.

(8) Public Health England. English surveillance programme for antimicrobial utilisation and resistance (ESPAUR) 2010- 2014: report 2015. 2014 Oct 10.