ANTIBIOTIC-RESISTANT BACTERIA POLICY

Including GRE (glycopeptide-resistant Enterococci) and multiresistant Gram-negative bacteria: ESBL-producing *Enterobacteriaceae*, AmpC-producing *Enterobacteriaceae*, CPE (carbapenemase-producing *Enterobacteriaceae*), multiresistant *Pseudomonas aeruginosa* and multiresistant Acinetobacter spp

Policy Type	Clinical Infection prevention and control
Directorate	Corporate Nursing
Policy Owner	Chief Nurse including Midwifery and Allied Health Professionals
Policy Author	Infection Prevention & Control Doctor
Next Author Review Date	1st July 2023
Approving Body	Clinical Standards Group 29th January 2021
Version No.	3.0
Policy Valid from date	1st January 2021
Policy Valid to date:	~~31st December 2023~~ **Extension Approved: 31 March 2024**

This policy will be reviewed in line with the Document Control Policy, please read the policy in conjunction with any updates provided by National Guidance.

DOCUMENT HISTORY

(Procedural document version numbering convention will follow the following format. Whole numbers for approved versions, e.g. 1.0, 2.0, 3.0 etc. With decimals being used to represent the current working draft version, e.g. 1.1, 1.2, 1.3, 1.4 etc. For example, when writing a procedural document for the first time – the initial draft will be version 0.1)

Date of Issue	Version No.	Date Approved	Director Responsible for Change	Nature of Change	Ratification / Approval
26 Nov 13	2.2	26 Nov 2013	Executive Director Nursing and Workforce/DIPC	Approved at	Policy Management Group
11 Oct 2016	2.2	26 Nov 2013	Executive Director Nursing and Workforce/DIPC	Extension approved at	Corporate Governance & Risk Sub-Committee
March 2017	2.3		Executive Director Nursing/DIPC	Revision	
28/04/17	2.3		Executive Director Nursing/DIPC	For ratification	Clinical Standards Group
09/05/17	2.3	13th June 2017	Executive Director Nursing/DIPC	For Approval	Corporate Governance & Risk Sub-Committee
3/12/20	2.4		Director of Nursing/DIPC	For approval	Infection Prevention & Control Committee
29/01/21	2.4	13th June 2017	Chief Nurse including Midwifery and Allied Health Professionals	12 month blanket policy extension due to covid 19 applied with author review date set 6 months prior to Valid to Date.	Quality & Performance Committee
29/01/21	3.0	29th Jan 2021	Chief Nurse including Midwifery and Allied Health Professionals	Policy approved at	Clinical Standards Group
12/05/21	3.0	29th Jan 2021	Chief Nurse including Midwifery and Allied Health Professionals	Policy uploaded and linked back with new cover sheet	Corporate Governance
12/05/21	3.0	29th Jan 2021	Chief Nurse including Midwifery and Allied Health Professionals	Policy extended whilst review underway	Corporate Governance

NB This policy relates to the Isle of Wight NHS Trust hereafter referred to as the Trust

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1 Executive Summary

This policy provides evidence-based standards on isolation and best practice measures to prevent spread of antibiotic resistant bacteria in healthcare settings. It includes;

- Guidance on isolation care practice and contact precautions (at all times in addition to standard precautions, not replacing them).
- Guidance on patient placement and use of side rooms for isolation care depending on clinical risk area. (For standards for isolation care practice, also cross-refer to the Trust Isolation Policy).
- Guidance on recognition and management of outbreaks caused by multiresistant organisms in Intensive Care Units (ICUs).

2 Introduction

The purpose of this policy is to provide robust, evidence based guidelines on management of multiresistant bacteria in high clinical risk settings (especially ICU, NICU, CCU and acute care wards).

Compliance with this policy will protect patients, staff and other persons against risk of healthcare associated infections (HCAI) caused by multiresistant bacteria and to ensure patients identified with infection or carriage of antibiotic resistant microorganisms (glycopeptide-resistant Enterococci (GRE) and multiresistant Gram-negative bacteria) are promptly identified and managed according to best clinical practice to reduce risk of transmission of infection to susceptible patients.

This policy does not include guidance on management of meticillin-resistant *Staphylococcus aureus* (MRSA), which can be found in the Trust MRSA Policy, or multidrug-resistant *Mycobacterium tuberculosis* (MDR-TB) which can be found in the TB Diagnosis and Management Policy.

3 Definitions

AmpC Antibiotic resistant enzyme

CPE Carbapenemase-producing *Enterobacteriaceae*

ESBL Extended Spectrum Beta-Lactamase

GRE Glycopeptide-resistant Enterococcus

HCAI HealthCare Associated Infection

IPCT Infection Prevention & Control Team

MDR-TB multidrug-resistant *Mycobacterium tuberculosis*

MR- Multiresistant

PPE Personal Protective Equipment

spp. Species

4 Scope

Applies to the care of all hospital inpatients and to all healthcare staff working in inpatient ward areas throughout the organisation.
Isolation care techniques are not usually necessary in outpatient, residential care and community healthcare settings. Full compliance with standard precautions will prevent cross-infection in these settings.

5 Purpose

This document gives best practice guidance on diagnosis, management and treatment of patients with infections caused by antibiotic-resistant organisms.

6 Roles and Responsibilities

All healthcare staff have a duty of care to comply with this and other Trust policies for prevention and control of HCAI.

Clinical healthcare staff of all grades must apply the policy to workplace practice and must follow advised precautions; failure to do so would represent a serious breach of good practice and duty of care.

Clinical leaders, Matrons and Ward Sisters/Charge Nurses have a key role for implementing, monitoring and overseeing policy implementation and compliance with best practice in their clinical area of responsibility. They also need to monitor practice and regularly review audit findings of compliance with practice and are responsible for ensuring that action is taken to increase compliance and improve practice standards where necessary.

The Infection Prevention and Control Team (IPCT) are responsible for providing support and advice in developing and implementing this policy in line with best practice standards.

Microbiology laboratory staff are responsible for identification of the antibiotic resistant bacteria specified in this policy; Medical Microbiologists for liaison with and reporting to clinicians.

The Executive Director of Nursing/Director of Infection Prevention and Control (DIPC) is responsible for the development and organisation wide implementation of this policy.

7 Policy detail/Course of Action

7.1 PREVENTING TRANSMISSION OF MULTIRESISTANT BACTERIA

Multiresistant bacteria such as GRE are spread by contact, e.g. via staff hands and the environment. Preventing transmission of multiresistant bacteria in acute care settings requires CONTACT PRECAUTIONS, in addition to standard precautions.

'Standard precautions' refer to the routine infection control measures which should be used for all patient contact, i.e. optimal hand hygiene performance and use of appropriate personal protective equipment (PPE) when likely to be in contact with blood/body fluids or contaminated items.

'Contact precautions' means additional PPE use (i.e. gloves and aprons/gowns) for contact with the patient or environmental surfaces and items in the patient room. There is also a requirement for high standards of cleaning and particular attention to cleaning and decontamination of patient care equipment.
The patient may also require single room isolation care, depending on the clinical risk area and risk assessment. Occasionally, cohorting of patients with the same multiresistant organism may be required in an outbreak situation but should only be performed on the specific direction of the IPCT.

Additional equipment decontamination may be necessary to reduce the reservoirs of infection in certain settings involving multidrug-resistant bacteria, e.g. multiresistant *Pseudomonas aeruginosa* and Acinetobacter spp. in intensive care. The Infection Prevention and Control Team (IPCT) will advise when such measures should be implemented.

Please refer to the Isolation Policy and PPE in the Direct Care of Patients Policy for additional information on precautions, including guidance for visitors to patients in isolation.

Table showing summary of measures to prevent transmission

Organism	**Policy applies to**	**Single room isolation care needed?**	**Measures to prevent spread (in addition to standard precautions)**
Glycopeptide-resistant Enterococci (GRE)	All acute areas	Yes if high clinical risk area*; Other areas base on risk assessment (seek advice from IPCT)	Contact precautions Sole use equipment En-suite toilet/own use (high clinical risk area)
Extended spectrum beta-lactamase (ESBL)- or cephalosporinase (AmpC)-producing *Enterobacteriaceae*	All acute areas	Yes where possible if high clinical risk area*; Other areas base on risk assessment (seek advice from IPCT)	Contact precautions Sole use equipment
Carbapenemase-producing *Enterobacteriaceae* (CPE)	All acute areas	Yes, all areas	Contact precautions Sole use equipment En-suite toilet/own use commode
Multiresistant (MR) *Pseudomonas aeruginosa*	All acute areas	Yes if high clinical risk area*; Other areas base on risk assessment (seek advice from IPCT)	Contact precautions Sole use equipment or as advised by Infection Prevention & Control Team
Multiresistant (MR) Acinetobacter spp.	All acute areas	Yes if high clinical risk area*; Other areas base on risk assessment (seek advice from IPCT)	Contact precautions Sole use equipment or as advised by Infection Prevention & Control Team

*ICU, NICU, CCU and acute surgical wards

7.2 ANTIBIOTIC RESISTANT BACTERIA: LABORATORY IDENTIFICATION

A patient will most often be identified as having GRE, ESBL-producing coliform or other multiresistant (MR) Gram-negative bacterium because the organism has been isolated from a clinical sample such as blood culture, sputum, urine or a wound swab.
Similarly, but less commonly, isolates of Acinetobacter spp. may be identified from patient isolates (high clinical risk settings).
Microbiology laboratory staff will normally inform the duty Medical Microbiologist of glycopeptide-resistant Enterococci (GRE), ESBL- or AmpC-producing *Enterobacteriaceae*, carbapenemase-producing *Enterobacteriaceae* (CPE), other multiresistant Gram-negative organisms including MR *P. aeruginosa* and MR Acinetobacter spp. Where necessary, isolates will be referred to a Reference laboratory for confirmation of sensitivities and further testing (possibly including additional antibiotics).

7.3 GLYCOPEPTIDE-RESISTANT ENTEROCOCCI (GRE)

7.3.1 Introduction

Enterococci are bacteria commonly found in the bowel of normal healthy individuals. They can cause a range of illnesses including urinary tract infections (UTI), bloodstream infections (BSI) and infective endocarditis (IE). The two most common species of Enterococci are *E. faecalis* and *E. faecium*. All Enterococci are inherently resistant to cephalopsorins. *E. faecium* is resistant to all beta-lactam antibiotics.

During the mid-1980s enterococci with resistance to glycopeptide antibiotics such as vancomycin and teicoplanin emerged, termed glycopeptide-resistant Enterococci (GRE). Most GRE are *E. faecium*.

The risk for acquisition of GRE is proportional to the length of hospital stay and also antimicrobial use (e.g. use of cephalosporins and vancomycin). There is currently no recommended decolonisation regimen.

7.3.2 Prevention of transmission

Where GRE have been isolated, the patient may have infection with GRE or may simply be colonised (this will depend on the site and clinical context).
The duty Microbiologist will inform the IPCD (Infection Prevention and Control Doctor) (if not the duty Microbiologist) and IPCNs (Infection Prevention and Control nurses). IPCD and/or duty Microbiologist will normally advise clinicians and ward staff that the patient has GRE and requires additional isolation care precautions to prevent transmission.

Isolation care should be implemented for patients in high risk clinical areas (Intensive care units, surgical wards, CCU) who have wound carriage/infection, exfoliating skin conditions or are faecally incontinent. Patients in non- high risk clinical areas may be nursed in corner bed in bay with strict standard precautions in place if a side room is not available.

7.4 MULTIRESISTANT GRAM-NEGATIVE ORGANISMS

7.4.1 Introduction

The term 'Gram-negative organisms' refers to many different types of bacteria which all produce a pink colour on the Gram stain, one of the commonly used tests in the microbiology laboratory. Antibiotic resistance in Gram-negative organisms is increasing, making infections with such organisms harder to treat and a significant threat to human health. Effective infection control procedures, in conjunction with antimicrobial stewardship, are therefore essential to minimise the spread of such organisms.

Important examples of Gram-negative organisms which have the potential to be resistant to multiple antibiotics include:

- *Enterobacteriaceae*
- *Pseudomonas aeruginosa*
- Acinetobacter spp.

7.4.2 ESBL- or AmpC-producing *Enterobacteriaceae*: Characterisation

Enterobacteriaceae (sometimes referred to as 'coliforms') is a family of Gram-negative bacteria which form part of the normal gastrointestinal tract flora. They are common causes of urinary tract infections (UTI), intra-abdominal infections (IAI) as well as bloodstream infections (BSI) and can cause many other types of infection. *Escherichia coli*, *Klebsiella pneumoniae* and *Proteus mirabilis* are the species most commonly isolated from clinical specimens.

These organisms can become resistant to beta-lactam antibiotics (e.g. penicillins) via the production of enzymes known as beta-lactamases. Extended spectrum beta-lactamases (ESBLs) are a group of these enzymes which are of particular concern due to their generation of resistance to the broader spectrum 3rd generation cephalosporins e.g. ceftriaxone and ceftazadime, as well as penicillins. Resistance to other antibiotic classes, e.g. aminoglycosides and fluoroquinolones, is also often found in organisms producing ESBL enzymes. ESBL production can be transferred easily between bacteria (gene transfer via plasmids), therefore making ESBL-producers a higher infection control priority.

Due to carriage in the gastro-intestinal tract if a patient acquires resistant *Enterobacteriaceae* they will remain colonised for long periods of time, meaning that infection control precautions are relevant throughout the patient's admission and beyond. There is currently no recommended decolonisation regimen.

7.4.3 ESBL- or AmpC-producing *Enterobacteriaceae*: Prevention of transmission

Increased risk for spread of ESBL producing Enterobacteriaceae occurs in patients who are incontinent, catheterised or have diarrhoea and these patients must be isolated. Patients in high risk clinical areas (intensive care, surgical wards, CCU) should be isolated to reduce risk for transmission to other vulnerable patients.

In low risk clinical areas, continent patients may be nursed in corner bed in bay with strict standard precautions in place if a side room is not available. In non-acute settings isolation care may not be necessary if the patient is fully continent and able to practice effective hygiene; advice should be sought from the Infection Prevention and Control Team.

7.4.4 Carbapenemase-producing *Enterobacteriaceae*: Characterisation

(See also Appendix B: Carbapenemase-producing *Enterobacteriaceae*: Procedure for Infection Control Precautions in the Acute Setting.)

Carbapenemase-producing *Enterobacteriaceae* express a certain type of beta-lactamase enzymes which are able to destroy most of the beta-lactam antibiotics including carbapenems, e.g. meropenem (which are usually reserved for treatment of serious infections with multiresistant organisms). There are several different types of carbapenemases, including KPC, OXA-48, NDM and VIM enzymes. Some of these isolates have become resistant to all available antibiotics, as multiple antibiotic resistance mechanisms are often present. Over the last decade, isolates of carbapenemase-producing *Enterobacteriaceae* have been slowly increasing in the UK and have also become endemic in many parts of the world, including Bangladesh, Cyprus, Greece, India, Israel, Italy, North Africa, Malta, Middle East, Pakistan, Turkey and the USA. Patients who have previously been admitted to hospitals outside the UK are therefore at increased risk of acquiring such organisms. Outbreaks have also been reported in Northwest England and London but effective infection control precautions can prevent the spread of such organisms. There is currently no recommended decolonisation regimen.

7.4.5 Carbapenemase-producing *Enterobacteriaceae*: Prevention of transmission – single case acquired outside Trust

The patient should be isolated in a single room with ensuite facilities (or own commode). Strict contact precautions must be adhered to including the wearing of a gown and gloves to enter the patient room. These precautions should be adhered to throughout the patient's admission.

7.4.6 Carbapenemase-producing *Enterobacteriaceae*: Prevention of transmission – suspected or confirmed Trust acquired case(s)

Isolation and contact precautions as per **6.4.9** should be implemented for all affected patients. Cohorting of patients with the same isolate may be indicated depending on the number and characteristics of patients involved and available facilities; this should only be on the advice of the IPCT.

The duty Microbiologist will inform IPCD if not already aware (or should deputise for IPCD during periods of absence).

IPCD (or deputy) together with IPCNs (or deputy), will assess and review information; will inform the DIPC and advise on appropriate actions. If DIPC/IPCT consider indicated, an outbreak group will be convened to assess in accordance with OUTBREAK POLICY.

Screening of patients within the affected ward or department will be advised upon by the IPCT.

7.4.7 Multiresistant (MR) *Pseudomonas aeruginosa*

P. aeruginosa is a Gram-negative bacterium which is wide spread in the environment and is able to cause a wide range of infections, including pneumonia, wound infections, urinary tract infections (UTI), catheter-related infections and bloodstream infections (BSI). These are most often hospital-acquired infections and/or occur in immunocompromised patients. This organism is inherently resistant to many commonly used antibiotics, but can also acquire resistance mechanisms to the antibiotics which are usually active, resulting in very limited treatment options.

The most important anti-Pseudomonas antibiotics are piperacillin/tazobactam (Tazocin®), gentamicin, ciprofloxacin, ceftazidime and meropenem.

Multiresistant strains of *P. aeruginosa*, for which additional infection control measures including isolation are required, are defined as those resistant to three classes of anti-pseudomonal antibiotics (the microbiology consultant will advise when such strains have been isolated and when additional precautions or isolation is required). It is important to note that meropenem-resistance in *P. aeruginosa* is normally not mediated by carbapenemase-production (but via different non-enzymatic mechanisms); therefore meropenem-resistance does not necessarily indicate resistance to all anti-Pseudomonas beta-lactam antibiotics in *P. aeruginosa*.
There is currently no recommended decolonisation regimen.

7.4.8 Multiresistant (MR) Acinetobacter spp.: Characterisation

Acinetobacter spp. are Gram-negative bacteria found throughout the environment including drinking and surface waters & soil. Acinetobacter spp. are also commonly found as harmless colonisers on the skin of healthy people and usually poses very few risks.

While Acinetobacter spp. generally pose few risks to healthy individuals, a few species, particularly *Acinetobacter baumannii*, can cause serious infections - mainly in very ill hospitalised patients in intensive care settings. The most common Acinetobacter infections include pneumonia, catheter-related infections and bloodstream infections (BSI). Multiresistant Acinetobacter spp. 'MRAB' are resistant to any aminoglycoside (e.g. gentamicin) AND to any third generation cephalosporin (e.g. ceftazidime, cefotaxime).

Isolates additionally resistant to imipenem and/or meropenem (carbapenems, broad spectrum antibiotics which should be reserved for the treatment of multiresistant organisms) are designated 'MRAB-C' and are particularly hard to treat. Most MRAB-C are strongly clonal and belongs to a South East clone established in multiple hospitals in London and southeast England. Carbapenem-resistant Acinetobacter are also associated with acquisition in healthcare facilities abroad, e.g. Greece, Turkey and the Middle East. (See section 7.6 regarding screening). There is currently no recommended decolonisation regimen.

7.4.9 Multiresistant (MR) Acinetobacter spp.: Prevention of transmission - Single patient found to be colonised or infected

Isolation care for patients in high risk clinical areas (Intensive care units, surgical wards, CCU). Liaise with Infection Prevention and Control Team for advice on individual cases in other areas and duration of isolation.

The Microbiologist (and/or IPCD) will normally perform a risk assessment and review to see if other patients on the Unit are colonised (results of clinical specimens from other patients on the same ward/unit will be reviewed to inform whether screening of other patients indicated).

7.4.10 Multiresistant (MR) Acinetobacter spp.: Prevention of transmission - More than one patient isolate of a similar antibiogram on the same unit (i.e. suspected outbreak)

Duty Microbiologist will inform IPCD if not already aware (or should deputise for IPCD during periods of absence).
IPCD (or deputy) together with IPCNs (or deputy), will assess and review information; will inform the DIPC and advise on appropriate actions. If

DIPC/IPCT consider indicated, an outbreak group will be convened to assess in accordance with OUTBREAK POLICY.
If an outbreak group is convened, the IPCD/IPCNs will advise on management and in accordance with Working Party Guidance on the Control of multiresistant Acinetobacter Outbreaks[3].

7.5 DURATION OF ISOLATION CARE/CONTACT PRECAUTIONS

Duration is for the duration of stay in high clinical risk area or as advised by IPCT. Patients with carbapenemase-producing *Enterobacteriaceae* require isolation and contact precautions for the entire in-patient stay.

7.6 SCREENING OF HIGH RISK GROUPS

Screening for GRE and multiresistant Gram-negative bacteria is not routinely indicated for in-patients unless advised by IPCT (e.g. in hospital outbreak incidents).

Patients admitted from healthcare facilities outside of the UK should undergo screening for multiresistant Gram-negative bacteria (in addition to MRSA screening which all emergency admissions should undergo) in view of the high risk of acquiring such organisms in many parts of the world.

Patients transferred from healthcare facilities within the UK where there is an outbreak of carbapenem-resistant Gram-negative organisms should also undergo screening for multiresistant Gram-negative bacteria.

Whilst screening results are awaited, the patient should be isolated with contact precautions if transferred from a facility with increased risk of carbapenem-resistant Gram-negative organisms.

7.7 PROPHYLAXIS FOR SURGICAL PROCEDURES

Seek expert advice from Consultant Microbiologist before procedure, if patient is known to be colonised with GRE, ESBL producing or other multiresistant Gram-negative bacteria.
In most clinical scenarios the patient will not be identified as having GRE or a multiresistant Gram-negative organism until the post-operative period. However, if known beforehand, seek expert advice before surgical procedures requiring antibiotic prophylaxis.

7.8 TREATMENT OF INFECTIONS

Seek expert advice from Consultant Microbiologist.
Only patients with active infections will require antibiotic therapy. Patients colonised with multiresistant bacteria without any clinical evidence of infection should not receive antibiotics, as this will encourage the generation of further antibiotic resistance.

Therapeutic options for treatment of infections with multiresistant bacteria are often limited. Treatment with a 'restricted' antibiotic is likely to be needed. This will require discussion between the clinician responsible for the patient and the Microbiologist on duty. The antibiotic regimen will be determined by the infecting organism(s), susceptibility testing results, individual patient clinical circumstances and the nature and type of infection.

Treatment recommendations are beyond the scope of this policy and expert advice should be sought.

7.9 MANAGEMENT OF OUTBREAKS AND CLUSTERS OF INFECTION

Follow Advice from IPCT and/or Medical Microbiologist/IPCD.
If an outbreak or cluster of cases (multiresistant 'alert' organisms) is identified, the DIPC will be informed and an Outbreak Group convened. See OUTBREAK POLICY.

8 Consultation

This revision document will be produced by the Infection Prevention and Control team and circulated to stakeholders for consultation and comments prior to approval at Infection Control Committee.

9 Training

Teaching about infection prevention and control measures to prevent transmission of organisms and isolation practice, including policy awareness, forms part of infection control training provided for clinical healthcare staff.
Laboratory surveillance schemes will monitor incidence of 'alert' organisms such as GRE and multiresistant Gram-negative infections.

This policy does not have a specific mandatory training requirement, but clinical staff must undertake the mandatory Infection Prevention & Control training requirement which is detailed in the organisation mandatory training matrix and is reviewed on a yearly basis.

10 Monitoring Compliance and Effectiveness

Laboratory surveillance schemes will monitor incidence of 'alert' organisms such as GRE, ESBL- or AmpC-producing *Enterobacteriaceae*, carbapenemase-producing *Enteroacteriaceae*, multiresistant *Pseudomonas aeruginosa* and multiresistant Acinetobacter spp.
These monitoring processes will be reviewed by the IPCT and reviewed at Infection Control Committee.

11 Link to other Organisational Documents

Use of Personal Protective Equipment in the Direct Care of Patients Policy
Clean Patient Environment Policy
Hand Hygiene policy
Isolation policy
Outbreak policy
MRSA policy
TB Diagnosis and Management Policy

12 References

Advisory committee on Antimicrobial resistance and Healthcare Associated Infection 4th Annual Report Feb 12-March 14. Advice on Carbapenemase Producers: Recognition, infection control and treatment. Health Protection Agency. Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/256479/ARHAI_Annual_Report_2012-2013.pdf

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13 Appendices

Appendix A CARBAPENEMASE-PRODUCING *ENTEROBACTERIACEAE*: PROCEDURE FOR INFECTION CONTROL PRECAUTIONS & PATIENT MANAGEMENT IN THE ACUTE SETTING

Appendix B Financial and Resourcing Impact Assessment on Policy Implementation

Appendix C Equality Impact Assessment (EIA) Screening Tool

Appendix A

CARBAPENEMASE-PRODUCING *ENTEROBACTERIACEAE*: PROCEDURE FOR INFECTION CONTROL PRECAUTIONS & PATIENT MANAGEMENT IN THE ACUTE SETTING

1) Introduction: What are carbapenemase-producing *Enterobacteriaceae*?

Enterobacteriaceae is a large family of bacteria that usually live harmlessly in the gut of all humans and animals. However, these organisms are also some of the most common causes of opportunistic urinary tract infections, intra-abdominal and bloodstream infections. They include many species such as *Escherichia coli*, *Klebsiella pneumoniae* and *Proteus mirabilis*. Carbapenemase-producing *Enterobacteriaceae* express a certain type of beta-lactamase enzymes which are able to destroy most of the beta-lactam antibiotics including carbapenems, eg. meropenem (which are usually reserved for treatment of serious infections with multiresistant organisms). There are several different types of carbapenemases, including KPC, OXA-48, NDM and VIM enzymes.

Some of these isolates have become resistant to all available antibiotics, as multiple antibiotic resistance mechanisms are often present. Stopping the spread of these organisms is essential to preserving antibiotic effectiveness. Over the last decade, isolates of carbapenemase-producing *Enterobacteriaceae* have been slowly increasing in the UK and have also become endemic in many parts of the world, including Bangladesh, Cyprus, Greece, India, Israel, Italy, North Africa, Malta, Middle East, Pakistan, Turkey and the USA. Patients who have previously been admitted to hospitals outside the UK are therefore at increased risk of acquiring such organisms. Outbreaks have also been reported in Northwest England and London but effective infection control precautions can prevent the spread of such organisms.

2) Identification of patients colonised or infected with carbapenemase-producing *Enterobacteriaceae*

Patients can be identified as colonised or infected with carbapenemase-producing *Enterobacteriaceae* in the following ways:

- Any clinical samples taken for culture identify suspicious isolates:
- Notification from a previous trust elsewhere to the clinical team/infection control team
    - patient has had a positive sample for carbapenemase-producing *Enterobacteriaceae*,
    - patient has had a potential contact with a carrier of carbapenemase-producing *Enterobacteriaceae*

3) Specific infection control precautions for patients suspected or known to be colonised or infected with carbapenemase-producing *Enterobacteriaceae*

a) Isolation in a side room with ensuite facilities or own commode.

- The patient should remain in isolation for the duration of their hospital stay
- If the patient requires a diagnostic test or procedure which cannot be undertaken in the patient's room the procedure should be planned at the end of the day's list and the room and equipment terminally cleaned after use.
- In an outbreak situation then cohorting of affected patients may be necessary

b) Stringent standard precautions must be practiced, including:

- Good hand hygiene with soap and water

- The patient should also be advised /supervised to practice good hand hygiene and assistance provided to patients where effective hand hygiene is in doubt.
- Use of gloves and aprons/gowns whilst in patient's room –
    - where any part of staff uniform/clothing, not protected by an ordinary apron, is expected to come into contact with the patient, a long-sleeved disposable gown should be used
- If risk of splashing with body fluids, face (surgical mask) and eye protection should be worn.
- Environmental cleaning and decontamination, with an enhanced focus on frequent cleaning of hand contact areas. No special type of disinfectant is required, please follow the Clean Patient Environment Policy.
- Aseptic technique in all procedures
- Laundry management (discuss with IPC team)
- Safe use of sharps
- Waste disposal (especially faeces)

c) Scrupulous infection control practices when using and caring for devices/equipment e.g:
    - central and peripheral venous access devices
    - urinary catheters
    - ventilators
    - renal dialysis equipment
    - enteral feeding equipment
    - colostomy or ileostomy
    - any re-usable diagnostic equipment

d) Decontamination of equipment:
    a. Routine but stringent decontamination of equipment is required after use with an affected patient, especially when it may be shared with other patients
    b. There are no extra decontamination requirements for endoscopes above the normal organisational procedures. Any attached cameras / equipment that cannot be sterilised should be protected
    c. Dedicated / single-patient or single-use equipment is preferable:
        - Pulse oximeters - require normal cleaning and disinfection or single patient use only
        - Blood pressure cuffs - single patient use only
        - Stethoscopes and thermometers – single patient use only
        - Privacy curtains - On patient discharge removed and laundered or single-use only
        - Unused wrapped single-use items in the patient's immediate vicinity (that may have become contaminated by contact with staff hands) should be discarded on patient discharge. The burden of this may be minimised by keeping limited stocks near the patient.
        - Tubes of ointment and lubricant should be disposed of on patient discharge

e) Terminal decontamination of patient environment
    - No special type of disinfectant is required, please follow the Clean Patient Environment Policy
    - Surface cleaning and hand-touch / contact areas:

- Scrupulous cleaning and disinfection of all surfaces is required with particular attention to those that may have had patient or staff hand contact
- Mattresses:
  - Conventional mattress covers should be cleaned and disinfected
  - Low air-loss mattresses should be disassembled, cleaned and disinfected – usually by specialist external contractors or in specialist facilities within the hospital

4) Treatment of infection in patients suspected or known to be colonised or infected with carbapenemase-producing *Enterobacteriaceae*

The management of infection in patients suspected or known to be colonised or infected with carbapenemase-producing *Enterobacteriaceae* should be discussed with the duty consultant microbiologist.

5) Screening for carbapenemase-producing *Enterobacteriaceae* colonisation

- Screening samples would be indicated if the patient:
  - Had had contact with a known carbapenemase-producing *Enterobacteriaceae* carrier
  - Is on a ward where transmission of carbapenemase-producing *Enterobacteriaceae* has been identified/suspected.
  - If the patient is transferred from a healthcare facility
    - abroad
    - A UK healthcare facility where there is a current outbreak of carbapenemase-producing *Enterobacteriaceae*

- Screening is performed on a rectal swab, or, if this cannot be obtained, a stool sample. A rectal swab can be collected by gently inserting the swab inside the rectum 3-4cms beyond the anal sphincter, rotating gently and removing – normal saline can be used to moisten the swab prior to insertion. A total of 3 rectal swabs must be taken on Day 1, Day 3 and Day 5 to provide appropriate CPE screening.

6) Readmission, discharge and transfer of a patient colonised with carbapenemase-producing *Enterobacteriaceae* colonisation

Colonisation with these organisms should not delay discharge of these patients where discharge is clinically appropriate.
If being transferred, or likely to attend health care facilities elsewhere in the future then Microbiologists and IPC teams in the other facilities should be informed by the IPC team/microbiologist here. Any receiving organisation (including care homes) should be informed well in advance of transfer about the patient's status to enable liaison with the infection control team/microbiologist regarding the appropriate precautions. If the patient is being discharged into the community, the patient's GP should be informed of the infection status.

The patient (or carer) should understand on discharge:

- Their current status e.g. infection cleared but may still be a carrier, and the need for good hand hygiene
- If they are readmitted then isolation and enhanced infection control precautions will need to be implemented again (further management e.g. screening should then be discussed with the IPCT or consultant microbiologist). Carbapenemase-producing *Enterobacteriaceae* will be introduced as an alert flag by the IPCT on the patient's electronic records.

- If a close contact of the affected patient be admitted to hospital / healthcare setting for any reason, they need to inform healthcare staff of their exposure

Appendix B

Financial and Resourcing Impact Assessment on Policy Implementation

NB this form must be completed where the introduction of this policy will have either a positive or negative impact on resources. Therefore this form should not be completed where the resources are already deployed and the introduction of this policy will have no further resourcing impact.

Document title	**ANTIBIOTIC-RESISTANT BACTERIA POLICY** Including GRE (glycopeptide-resistant Enterococci) and multiresistant Gram-negative bacteria: ESBL-producing *Enterobacteriaceae*, AmpC-producing *Enterobacteriaceae*, CPE (carbapenemase-producing *Enterobacteriaceae*), multiresistant *Pseudomonas aeruginosa* and multiresistant Acinetobacter spp.

Totals	WTE	Recurring £	Non Recurring £
Manpower Costs	NA	NA	NA
Training Staff	NA	NA	NA
Equipment & Provision of resources	NA	NA	NA

Summary of Impact:

Risk Management Issues:

Benefits / Savings to the organisation:

Equality Impact Assessment

- Has this been appropriately carried out? YES/NO
- Are there any reported equality issues? YES/NO

If "YES" please specify:

Use additional sheets if necessary.

Please include all associated costs where an impact on implementing this policy has been considered. A checklist is included for guidance but is not comprehensive so please ensure you have thought through the impact on staffing, training and equipment carefully and that ALL aspects are covered.

Manpower	WTE	Recurring £	Non-Recurring £
Operational running costs			

Totals:	NA	NA	NA

Staff Training Impact	**Recurring £**	**Non-Recurring £**
Totals:	NA	NA

Equipment and Provision of Resources	**Recurring £ ***	**Non-Recurring £ ***
Accommodation / facilities needed		
Building alterations (extensions/new)		
IT Hardware / software / licences		
Medical equipment		
Stationery / publicity		
Travel costs		
Utilities e.g. telephones		
Process change		
Rolling replacement of equipment		
Equipment maintenance		
Marketing – booklets/posters/handouts, etc		
Totals:	**NA**	**NA**

- Capital implications £5,000 with life expectancy of more than one year.

Funding /costs checked & agreed by finance:	
Signature & date of financial accountant:	
Funding / costs have been agreed and are in place:	
Signature of appropriate Executive or Associate Director:	

Appendix C

Equality Impact Assessment (EIA) Screening Tool

Document Title:	**ANTIBIOTIC-RESISTANT BACTERIA POLICY** Including GRE (glycopeptide-resistant Enterococci) and multiresistant Gram-negative bacteria: ESBL-producing *Enterobacteriaceae*, AmpC-producing *Enterobacteriaceae*, CPE (carbapenemase-producing *Enterobacteriaceae*), multiresistant *Pseudomonas aeruginosa* and multiresistant Acinetobacter spp.
Purpose of document	**Provision of information and IPC guidance on antibiotic resistant bacteria**
Target Audience	Clinical staff
Person or Committee undertaken the Equality Impact Assessment	Dr Emily Macnaughton

1. To be completed and attached to all procedural/policy documents created within individual services.

2. Does the document have, or have the potential to deliver differential outcomes or affect in an adverse way any of the groups listed below?

If no confirm underneath in relevant section the data and/or research which provides evidence e.g. JSNA, Workforce Profile, Quality Improvement Framework, Commissioning Intentions, etc.

If yes please detail underneath in relevant section and provide priority rating and determine if full EIA is required.

		Positive Impact	Negative Impact	Reasons
Gender	Men			
	Women			
Race	Asian or Asian British People			
	Black or Black British People			
	Chinese people			

	People of Mixed Race			
	White people (including Irish people)			
	People with Physical Disabilities, Learning Disabilities or Mental Health Issues			
Sexual Orientation	Transgender			
	Lesbian, Gay men and bisexual			
Age	Children			
	Older People (60+)			
	Younger People (17 to 25 yrs)			
Faith Group				
Pregnancy & Maternity				
Equal Opportunities and/or improved relations				

Notes:
Faith groups cover a wide range of groupings, the most common of which are Buddhist, Christian, Hindus, Jews, Muslims and Sikhs. Consider faith categories individually and collectively when considering positive and negative impacts.

The categories used in the race section refer to those used in the 2001 Census. Consideration should be given to the specific communities within the broad categories such as Bangladeshi people and the needs of other communities that do not appear as separate categories in the Census, for example, Polish.

3. Level of Impact

If you have indicated that there is a negative impact, is that impact:			
		YES	**NO**
Legal (it is not discriminatory under anti-discriminatory law)			
Intended			

If the negative impact is possibly discriminatory and not intended and/or of high impact then please complete a thorough assessment after completing the rest of this form.

3.1 Could you minimise or remove any negative impact that is of low significance? Explain how below:

3.2 Could you improve the strategy, function or policy positive impact? Explain how below:	
3.3 If there is no evidence that this strategy, function or policy promotes equality of opportunity or improves relations – could it be adapted so it does? How? If not why not?	
Scheduled for Full Impact Assessment	Date: 26/11/20
Name of persons/group completing the full assessment.	Dr Emily Macnaughton
Date Initial Screening completed	