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Guideline for the Management of Carbapenemase-Producing Enterobacteriaceae (CPE)

For Use in:	All areas within the Norfolk and Norwich University Hospital NHS Foundation Trust (NNUH)
By:	All areas within the Norfolk and Norwich University Hospital NHS Foundation Trust (NNUH)
For:	The assessment and prompt management of patients at risk of or found to be positive with CPE
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If Yes - does the strategy/policy deviate from the recommendations of NICE? If so why?	No deviation

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Version and Document Control:

Version No.	Date of Update	Change Description	Author
2.1	August 2019	Minor changes made to risk assessment form and a section on page 10. Extra box added to the flow chart.	IP&C
3	Nov 2021	Updated in line with PHE, Framework of actions to contain carbapenemase-producing Enterobacterales, 2020. Major changes are: Changed from serial admission screening [3 swabs] to single swab.	IP&C & Micro
3.1	March 2022	Changes to CPE risk assessment form to exclude screening if recent admission to 3 local trusts	IP&C
3.2	May 2022	Removed Risk assessment tool for isolating CPE-positive patients when isolation room capacity is limited. Updated appendix 1, NNUH risk assessment	IP&C

This is a Controlled Document

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Trust Guideline for the Management of Carbapenemase-Producing Enterobacteriaceae (CPE)

1. Contents page

Section		Page Number
1	Contents page	**3**
2	Definitions of Terms Used / Glossary	**4**
3	Quick Reference	**5**
	Flow Chart of IP&C measures to contain CPE	**6**
4	Objective	**6**
5	Duties and Responsibilities	**6**
6	Rationale	**9**
	6.1 Background of CPE and high prevalence internationally/UK	**9**
7	Processes to be followed	**11**
	7.1 Early recognition of individuals who may be colonised/have an infection	**11**
	7.2 Early isolation of suspected and laboratory-confirmed cases	**11**
	7.3 Prompt sampling to detect CPE	**11**
	7.4 Results of CPE screening/clinical samples	**12**
	7.5 Communication	**13**
	7.6 Early detection – screening contacts of confirmed cases	**13**
	7.7 Managing a patient with a CPE (colonisation/infection)	**14**
	7.8 Additional services, investigations and interventions	**16**
	7.9 Cleaning (Routine and Terminal Cleaning)	**17**
	7.10 Theatres	**19**
8	Monitoring compliance	**20**
9	Summary of development and consultation process undertaken before registration and dissemination	**20**
10	References	**20**
11	Appendices	**21**
	Appendix 1 NNUH Carbapenemase-producing Enterobacteriaceae (CPE) Risk Assessment Form to determine if swabbing required	**22**
	Appendix 2 Risk prioritisation of infection prevention and control measures, screening and isolation	**24**
	Appendix 3 Containing CPE in a paediatric setting	**25**
12	Monitoring compliance/effectiveness table	**27**

2. Definitions of Terms Used / Glossary

Carbapenemase - Enzymes (such as Klebsiella pneumoniae Carbapenemase (KPC), OXA-48 Carbapenemase, New Delhi Metalo-beta Carbapenemase and Verona integron-encoded metallo-β-lactamase (VIM)) produced by some bacteria which cause destruction of the Carbapenem antibiotics, e.g. Meropenem, thus resulting in resistance.

Close contact - Equivalent to a household contact (8 hours), i.e. a person living in the same house; sharing the same sleeping space (room or hospital multi occupancy bay).

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 (CAI) - An infection that is not related to a healthcare intervention in a hospital.

Confirmed case - A patient with final laboratory confirmation of CPE infection/ colonisation from the national reference laboratory.

Carbapenemase Producing Organism (CPO) – An organism (non-Enterobacteriaceae) that has the Carbapenemase resistance mechanisms. A patient with a CPO should be managed from an IP&C perspective in line with this guideline.

Healthcare-associated infection (HAI) - 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.

Infection - The presence of micro-organisms in the body causing adverse signs or symptoms.

Medical Tourism – A medical tourist "elects to travel across international borders to receive some form of medical treatment". Most commonly includes dental care, cosmetic surgery, elective surgery and fertility treatment, though it may span the full range of medical treatment.' OECD (2010)

Preliminary case – A patient with an initial laboratory confirmation of CPE infection/ colonisation. These samples are then sent to a reference laboratory for full confirmation.

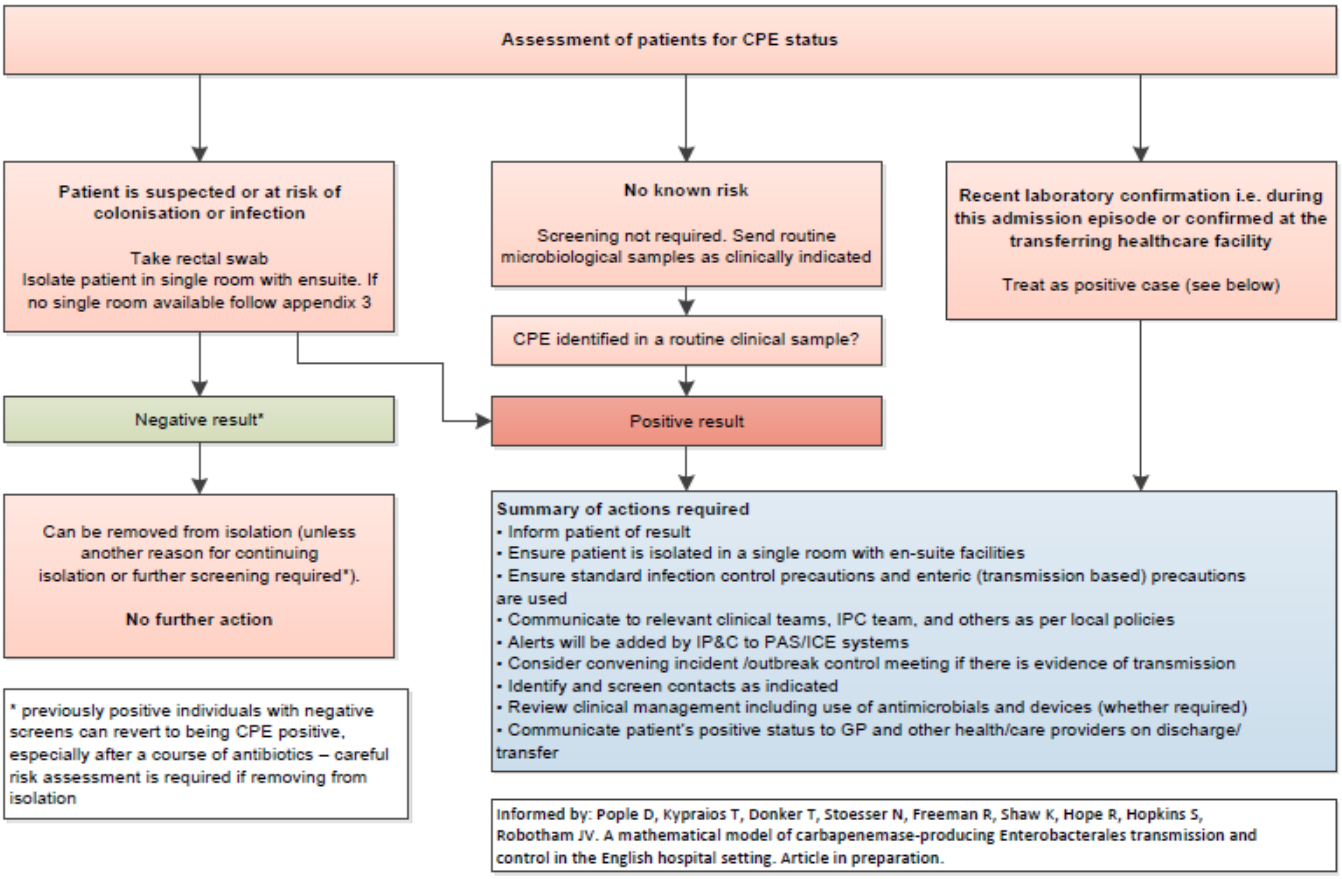
Rectal swab – A rectal swab is a specimen taken by gently inserting a plain swab inside the rectum 3-4cms beyond the anal sphincter, rotating gently and removing. Normal saline can be used to moisten the swab prior to insertion (screening instructions). The swab must have visible faecal material to enable organism detection in the laboratory.

Suspected case: Think RISK, Page: 6

3. Quick References

Links to Quick Reference Flowcharts and Documents Some of these documents can be printed and displayed for information To open link hold the Ctrl button on your keyboard and click the link with your mouse.
Priority Guideline for the Isolation of patients with an Infection
Enteric Precautions
WHO 5 moments - Patient in a bed
WHO 5 moments – Patient in a Chair
Laundry Poster
Clinical Clean Codes Poster
Actichlor Poster
Tristel Poster
CPE screening instructions for suspected patients
Carbapenemase-producing Enterobacteriaceae (CPE) Information Poster
Carbapenemase-producing Enterobacteriaceae (CPE) Risk Assessment Form
Associated Documents: Policy and Guideline Links
Chaperoning of Patients
Patient Flow Policy
Trust Policy for the Management of Isolation Procedures
Trust Policy for Cleaning and Disinfection
Trust Hand Hygiene Policy
Trust Guideline for Information Technology (IT) and Telecommunication Equipment Cleaning
Trust Waste Management Policy
Trust Guideline for Hospital Mattress Assemblies: Care and Cleaning
PHE Framework of actions to contain carbapenemase-producing Enterobacterales • (1) Risk prioritisation of infection prevention and control measures, screening and isolation Appendix: C, Page 62 • (2) Containing CPE in a paediatric setting Appendix G, Page 66
CPE Patient Information Leaflets
CPE Screening information leaflet
I am colonised/have an infection with CPE
I am a contact of someone who is a carrier/has an infection with CPE

Flow chart of infection prevention and control measures to contain CPE



4. Objective

This guideline has been written to prevent or reduce the spread of CPE infections within our healthcare setting at the Norfolk and Norwich University Hospital NHS Foundation Trust (NNUH).

The objective of this guideline is to inform staff about the toolkit and give guidance on implementing its advice into clinical practice within the Trust.

5. Duties and Responsibilities

All clinical staff as relevant - have a responsibility to:

- Understand, implement and abide by the information provided in this guideline.
- Be aware of the procedural documents which relate to their department/area of practice.
- Ensure they are up to date with mandatory IP&C training.

- Review patients continuing need for isolation daily in order to free up single rooms that are no longer required for isolation purposes.

- Keep the patient informed of their infection status regularly as necessary
- Pick up results and action them as per Trust guidelines.
- Attend incident management team meetings if a patient with CPE in their care.

Antimicrobial stewardship group/antimicrobial pharmacist

- Responsible for providing specialist input in antimicrobial management of CPE infection.

- Assist with developing and monitoring of Antimicrobial advice for patients with CPE infection/colonisation.

- Auditing antibiotic prescribing against Trust guidelines and policies.

- "Horizon scanning" for new antimicrobials.

Chief Executive –

Chief Executive has overall responsibility for ensuring there are effective procedures and resources in place to enable the implementation of this guideline.

Consultant Microbiologist/Microbiology Laboratory

- Alert IP&CT, clinical teams and ward areas of patient CPE result.
- Provide clinical specialist advice on the management of patients with CPE infection, surgical prophylaxis advice and advice/management of outbreaks.
- Provide help and advice for clinical staff.
- Review laboratory policies on screening, detection, and referral to reference laboratory.
- Ensure mandatory reporting is maintained.

DIPC

DIPC - is responsible for the development and implementation of strategies and policies on CPEs. The DIPC has responsibility to ensure;

- Mandatory reporting to Commissioners and Public Health England.
- Provision of performance report to Directorates, Senior management and clinical teams.

- Provide monthly reports to Trust Board, Clinical Safety committee, Clinical commissioning groups, NNUH clinical and operational staff.

Estates

Estates - are responsible for on-going maintenance of ventilation systems and general ward environments of the isolation room.

Infection Prevention & Control (IP&C) Team

To provide specialist IP&C advice and support with regards to isolation, practices and decontamination in management of patients with CPEs.

- Assist in developing and monitoring this guideline.
- Provide appropriate IP&C training to trust staff.
- Maintain a database of known CPE case and their contacts.
- Analyse data at least monthly to improve case finding within the organisation.
- Electronic system for alert organism surveillance.

Operations Centre Team

to help facilitate the isolation of patients with suspected/confirmed CPE infections or colonisation as soon as possible and at most within 2 hours of suspicion or confirmation. In any situations where safe placement cannot be achieved this will be escalated as appropriate to Executive on call and documented on the Situation Report under “IP&C issues”. The operation Centre is also responsible for resolving operational issues in outbreak situations.

Service Provider

Is responsible for cleaning to ensure all areas are cleaned accordingly to the agreed standard and that their staff follows NNUH IP&C guidelines.

Ward and departmental managers/matron

- Ensure all staff in areas of responsibility are aware of and comply with this guideline.
- To ensure that staff are up to date with mandatory IP&C training.
- Assist in monitoring the guideline.

- Facilitate isolation of patients with potential/known CPE infection/colonisation as soon as possible according to NNUH policy.
- Ensure daily review of patients continuing need for isolation in order to free up single rooms that are no longer required for isolation purposes.

Workplace health and wellbeing (WHWB) - to alert DIPC/IP&CT to any infection issue amongst Trust employees that may have an impact on patients. WHWB provide advice to staff with CPE infection/colonisation.

6. Rationale

This guideline is based upon the advice of PHE 2020 Framework of action to contain CPE. This document is an update of the Acute trust toolkit for the early detection, management and control of carbapenemase-producing Enterobacteriaceae and the Carbapenemase-producing Enterobacteriaceae: non-acute toolkit and provides a framework of actions for all health and social care providers in a simplified format. It sets out a range of measures, that if implemented well, will help health and social care providers minimise the impact of CPE.

In the UK, over the last five years, there has been a rapid increase in the incidence of infection and colonisation by multi-drug resistant Carbapenemase-producing organisms. A number of clusters and outbreaks have been reported in England, some of which have been contained, providing evidence that, when the appropriate control measures are implemented, these clusters and outbreaks can be managed effectively.

However, whilst we have seen clusters and outbreaks across England and are experiencing on-going persistent problems in the North West; we have not yet reached the escalated situation seen in other countries. Therefore, we have a small window of opportunity to learn from their experiences and prevent widespread problems in the UK.

6.1 Background of CPE and high prevalence internationally and in UK

Carbapenemase-producing Enterobacteriaceae (CPE) produce enzymes that can efficiently hydrolyse and confer resistance to most β-lactams, including the carbapenems. In addition, many CPE strains frequently carry additional genetic determinants that confer resistance to other non-β-lactam antibiotics, making these bacteria resistant to most antibiotics. The emergence and spread of CPE is a public health threat, especially because infections caused by CPE are associated with an increase of morbidity, mortality, and healthcare costs. Curbing the spread of CPE after their importation into healthcare facilities is important, as is controlling transmission in areas where they have become endemic, because they are associated with poor patient outcomes.

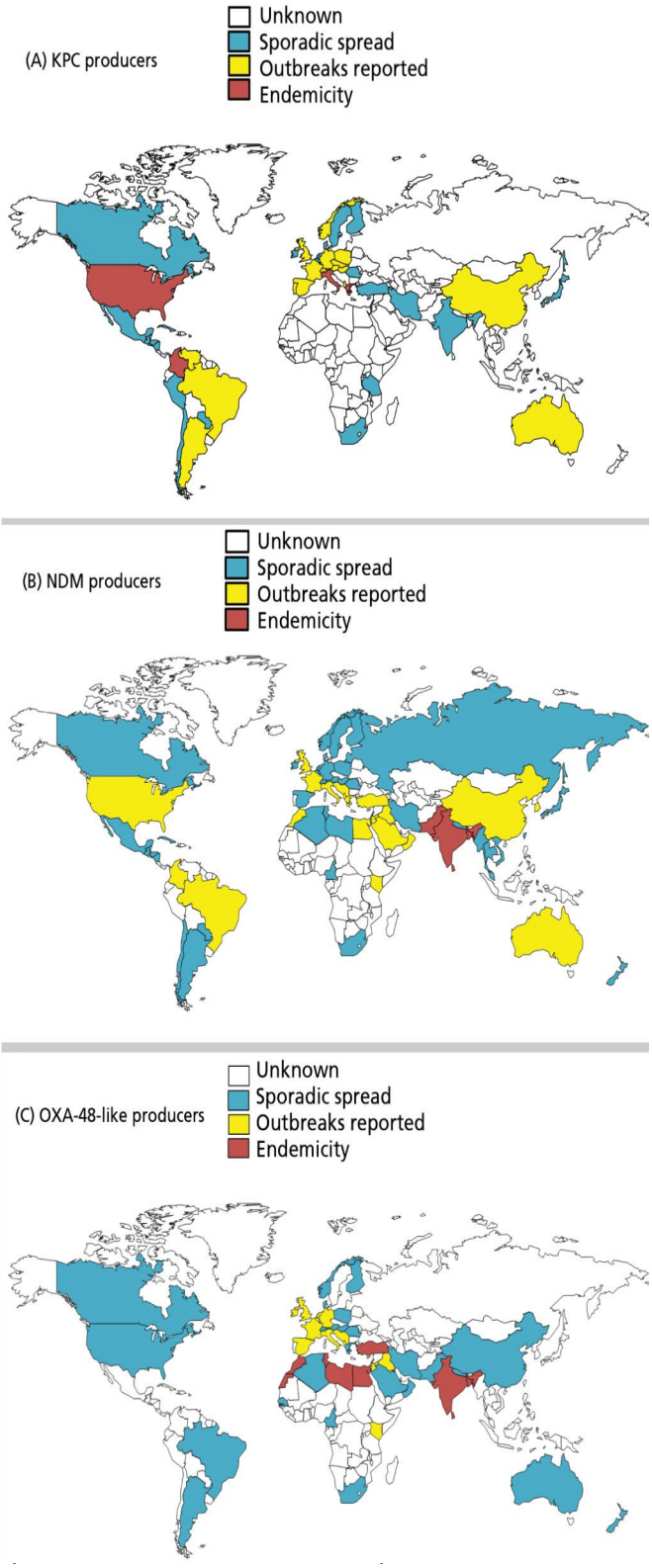
Worldwide distribution of carbapenemases

A) KPC producers in Enterobacteriaceae and P.aeruginosa.

B) NDM producers in Enterobacteriaceae and P.aeruginosa.

C) OXA-48 producers in Enterobacteriaceae.

Source: Clin Infect Dis.2018 Apr 3;66(8):1290-1297.doi:10.1093/cid/cix893



7. Processes to be followed

7.1 Early recognition of individuals who may be colonised/have an infection

This risk assessment must be used as part of the routine admission procedure to identify suspected cases of colonisation or infection with CPE.

Assess each patient at pre-assessment, admission and transfer/repatriation taking a thorough history and asking the "RISK" questions.

Check Patient Administration System (PAS)/ICE for an electronic alert as any patients with a positive CPE result previously known to NNUH should have an electronic alert in place. If the patient has any previous CPE positive result, isolate in a single en-suite room with enteric precautions and dedicated equipment. No screening is required but clinical samples should be sent if appropriate.

If the patient answers **no** to all RISK questions, document this in the patient care record or pre-assessment paperwork and manage as per standard protocols.

If the patient answers **yes** to any of the RISK questions, manage as per the risk assessment.

7.2 Early isolation of suspected and laboratory-confirmed cases

If the patient has already had a laboratory-confirmed infection or colonisation with CPE ***or*** meets the criteria for a suspected case then:

- Advise the patient (and relatives if appropriate) that they meet the criteria for screening due to the risk of CPE and your management plan – provide "CPE screening information leaflet" patient information leaflet.
- Immediately place the patient into a single room with en-suite facilities according to the priority of isolation guideline.
- Apply enteric precautions in all settings with dedicated equipment.
- The following factors will increase the transmission risks and need to be considered carefully:
  - Diarrhoea
  - Discharging wounds
  - Medical devices in situ
  - Incontinence (faeces or urine)
  - High risk of wandering /unable to comply with IP&C requirements
  - Ventilator support requirements

7.3 Prompt sampling to detect CPE

Screening sample for patients at risk of CPE should be collected on admission.

What samples to take and how often to screen?

- Take a rectal swab using a plain swab with informed consent and in conjunction with the Chaperoning of Patients policy.
- A rectal swab is the best sample type to achieve speedy and accurate results; to ensure detection of the organism there must be visible faecal material on the swab and then placed in the swab casing (screening instructions).
- A rectal swab may be contraindicated for haematology patients and those at risk of bleeding; discuss with clinician to confirm appropriate sampling method.

Or

- Collect a stool sample (ensure any delay in collection is clearly documented in the patient care record).

AND (using separate charcoal swabs)

- Swab skin lesions and wounds.
- In-dwelling devices e.g. PEG site (excluding peripheral cannula and long term intra vascular devices e.g. Hickman line unless clinical signs of infection).
- and/or urine sample, if catheterised.

Request a 'CPE Screen' on ICE under the microbiology tab. List the sample site and patient risk factors in the global clinical details section of the request.

7.4 Regular screening for augmented and high risk settings

Patients admitted to the following specialties should be screened on admission and every 6 months thereafter:

Augmented care/high-risk settings:

- severe immunosuppression
- transplant
- haematology/oncology
- critical care / renal dialysis
- extensive care needs e.g. liver and burns units
- Long Term Care Facilities where higher levels of interventional care are provided e.g. long-term ventilation

Results of CPE screening/clinical samples

Clinical teams are responsible for checking and acting on laboratory results. Clinicians are also responsible for informing the patient of their screening results.

If the patient is **positive** on screening/clinical samples for CPE a preliminary PCR report will be released followed by the culture result. The patient should be informed and offered a patient leaflet.

7.5 Communication

Effective communication is crucial to ensure that the risks of transmission and clinical infection are minimised.

- Patients must be informed of the screening process (leaflet available) and notified of their results (whether CPE is detected or not).
- CPE results to be included on nursing and medical handovers
- Notify receiving units and include information about positive result on all transfer/admission documents (if moved to another healthcare setting or referred for community care)
- CPE screening results must be included on all discharge letters for GP reference
- CPE electronic alerts will be added to PAS and ICE
- Notify IP&C team if any patients are transferred with a known CPE positive result or are being traced as potential contacts from another healthcare facility.

7.6 Early detection – screening contacts of confirmed cases

Screening of contacts (based on the likelihood of exposure) may be required if a patient is found to be positive for CPE and spent time in a multi occupancy bed space.

Screening will be directed by the IP&C team with the aim of identifying any further cases and instigate further control measures.

Provide information leaflet "I am a contact of someone who is a carrier/has an infection with CPE" **and** undertake screening for contacts of a positive case on the advice of the IP&C team based on the likelihood of exposure as follows:

- Screening of patient contacts of a positive case SHOULD be undertaken if the case had spent time (≥8 hours) or remained in an open ward or bay with other patients before (or despite) having a positive CPE result.

- Screening of household contacts and healthcare staff is NOT required. The main focus should remain on promotion of enteric precautions throughout, especially hand hygiene.

- It is not necessary to isolate contacts whilst awaiting screening results – cohort such contacts if possible and/or reiterate strict standard precautions, particularly hand hygiene for staff and patients and decontamination of shared equipment.
- Screen all patients in the bay (or ward, if patient has occupied more than one bay) on a weekly basis for a period of 4 weeks after the last case was detected.
- Restrict screening to patient contacts remaining in hospital. However, flagging of households can alert patients requiring screening on (re-)admission to hospital (PHE Framework of action to contain CPE, 2020, Page:19).

Should any contact screen positive, manage as positive case (see above), this will also require an assessment as per the Major and Limited Outbreak policy .

7.7 Managing a patient with a CPE (colonisation/infection)

Infection Prevention and Control key measures summary		
Precaution/ measure	**Yes/No or N/A**	**Comments**
Isolation	**Yes**	Isolate patient in a single room with enteric precautions if risk factor triggered. Positive (currently or previously) should remain isolated for the duration of their inpatient stay.
Can patients be cohort nursed? (multiple patients in one bay)	**On advice of IP&C**	Patients with same acquired carbapenemase enzyme and organism can be cohorted within one ward (or defined area of a ward) with dedicated bathroom facilities, equipment and staffing. Patients or residents with different mechanisms of resistance should not be cohorted together.
Gloves	**Yes**	Wash hands with soap and water after removing gloves. Change gloves and decontaminate hands when moving from contaminated site to a clean site of the same patient.
Aprons/Gowns	**Yes**	Where any part of staff uniform/clothing not covered by a standard apron is expected to come into contact with the patient, a **long sleeved disposable gown** should be used (e.g. when assisting movement for a dependent patient, bed bathing, wound dressing changes)
Mask & eye protection	**Risk assess**	If there is a risk of bodily fluids splashing/contaminating your face or undertaking an aerosol generating procedure.

Dedicated equipment	**Yes**	Dedicated observation equipment (blood pressure cuff, thermometer, and stethoscope). Non-dedicated equipment must be thoroughly disinfected after use.
Cleaning measures	**Yes**	Daily cleaning and disinfection with Trust approved disinfectant is a key control measure. Clinical clean code 2 for discharge cleaning (double clinical clean for positive CPE cases). Mattresses must be checked prior to cleaning and disinfecting. All basins, sinks and showers should be maintained so they drain efficiently.
Linen and Waste		Treat as 'infected' as per Linen bagging procedure and as clinical waste as per the Waste policy
Precautions in operating theatres	**Yes**	Requires careful planning & communication. Last on the theatre list to enable thorough post case clinical clean No. 2 Enteric precautions to be maintained.
Antibiotic Management	**Clinically assess**	If signs of infection, contact Duty Medical Microbiologist for clinical review and advice.
Visiting restrictions	**Risk assess**	Visitors must follow IP&C precautions (PPE & hand hygiene)
Patient/relatives information	**Yes**	CPE leaflets available for screening, contacts & positive results (See information leaflets section).
Inform Workplace Health & Wellbeing	**Risk assess**	Unless managing an outbreak in which staff screening is required as directed by the DIPC or a member of staff is found to be colonised/ infected with CPE.
Inform others	**Yes**	Ensure other departments/wards are notified of status and necessary precautions as appropriate when patient is transferred for diagnostic/ therapeutic purposes
Discharge	**Yes**	CPE patients can be discharged to community settings but their status must be clearly communicated in advance of the discharge and the GP notified in the discharge letter.
Decolonisation	**No**	Decolonisation of CPE positive patients is not recommended
Endoscopes	**No**	There are no extra decontamination requirements for endoscopes used on patients who are colonised or infected with CPE.

7.8 Additional services, investigations and interventions

All additional services, investigations and interventions will need to be risk assessed based on the clinical need and the CPE status of the patient. The IP&C team can assist in this risk assessment process if required.

Diagnostic tests

Should a patient who is colonised or has an infection require 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 clinically cleaned after use.

Outpatients

Known CPE positive patients (check PAS/ICE alerts) should be planned at the end of the clinic list to enable thorough environmental cleaning to be undertaken following the appointment. CPE colonised patients with diarrhoea pose a greater risk of transmission. Effective and thorough standard precautions, environmental and equipment cleaning must be followed strictly for all patients in these departments given the restrictions in identifying these patients prior to arrival in clinic. For all patients, if an admission is being planned, the risk assessment questions must be completed and the receiving ward/department must be notified of the need for isolation facilities with enteric precautions and the need for CPE samples as per this guideline.

Day/ambulatory care

Patients that meet the RISK criteria should be isolated in single room with en-suite facilities (or dedicated commode or WC) if possible until screening results available. If not possible to isolate in single room then nurse with strict emphasis on maintaining compliance with contact precautions and optimal environmental cleaning following discussion with IP&C team.

Renal dialysis patients:

The renal dialysis unit must actively risk assess and screen any patients who have lived/received healthcare in any other hospital in the UK or abroad. Patients who are coming to NNUH for temporary 'holiday' dialysis should be screened by their home unit prior to arrival and again on arrival at NNUH; these patients must be isolated until these results are reported negative. CPE samples may be required for our NNUH dialysis patients wishing to receive holiday dialysis at another unit, these should be collected to facilitate the holiday and repeat samples will be required on return.

Pre Assessment clinics/departments

Patients should be risk assessed based on the RISK criteria and clear documentation of this risk assessment and any subsequent actions (e.g. screening samples and need

for isolation) must be clearly recoded and handed over to the receiving/admitting ward or department to complete.

Therapy services

All therapy services will continue as clinical need dictates. The patient should be visited last, if practicably possible. All therapy staff will adhere strictly to the use of appropriate PPE, hand hygiene and the thorough decontamination of any equipment used during their assessment.

Non-essential services

Non-essential services including the following; Newspaper trolley, Library trolley, sweet trolley, hospital radio will not go into the CPE rooms but will continue on other areas of the ward not used for CPE patients. Patients requiring items can request that staff to go to the trolley on their behalf.

Porters

When moving patients on beds/wheelchairs to or from the isolation rooms, there is no requirement to wear gloves, aprons or other PPE unless there is a requirement to physically assist the patient in any way. Hands must be washed with soap and water when entering and leaving the patient's room. Trolleys and wheelchairs used to transfer patients must be thoroughly cleaned and disinfected after use for a patient transfer with a trust approved disinfectant.

Ambulance Transport

In a similar way to transporting any patient, standard precautions should be adopted and routine cleaning of trolleys and equipment between patients undertaken. If there is any contamination from a leaking wound or faecal contamination, a clinical clean of the vehicle will be required.

7.9 Cleaning (Routine and Terminal Cleaning)

Daily cleaning

Isolation rooms must be cleaned on a daily basis by domestic services using a Trust approved detergent and disinfectant as per the Cleaning and Disinfection Guideline.
The patient should be encouraged to minimise their belongings being stored on surfaces in the room to allow the domestic staff to clean the room effectively.
Scrupulous cleaning and disinfection of all surfaces is required with particular attention to those that may have had patient or staff hand contact.
Trust staff are responsible for cleaning and disinfecting the dedicated Trust equipment in the isolation room on a daily basis.

- Patient wash water, body fluids or secretions, must not be discarded down a clinical hand wash basin as this poses a high risk of environmental contamination.

- Pulse oximeters require normal cleaning and disinfection or single-patient use only.
- Blood pressure cuffs should be single-patient use only.
- Stethoscopes and thermometers should be single-patient use only.
- There are no extra decontamination requirements for endoscopes above the normal organisational procedures. Any additional attachments used must be single use or reprocessed through the endoscopy decontamination unit as per policy.
- Unused wrapped single-use items in the patient's immediate vicinity (that may have become contaminated by hand contact) should be discarded. The burden of this may be minimised by keeping limited stocks near the patient.
- Tubes of ointment and lubricant should be disposed.

Cleaning following discharge/transfer

Patients who remain "at risk of CPE" at the point of transfer /discharge should have their rooms, beds, mattresses and equipment cleaned using a code 2 clinical clean which must be signed off by a member of Trust staff.

Following discharge/ transfer of the patient found to be **positive for CPE**, the room and its contents should be cleaned and disinfected thoroughly **twice**. The room must be prepared and any clinical equipment must been decontaminated according to the Cleaning and Disinfection Guideline and the manufacturer's instructions.

A clinical clean No. 2 should then be ordered (via iSERCO or ext. 3333), this should be completed, checked and signed off by a member of Trust staff and then **after 1 hour** a second clinical clean should be requested, completed and signed off.

A double clean is required for any cases of confirmed CPE due to the risks of environmental contamination and the challenges of assurance with manual cleaning processes and visual quality check.

Special attention should be paid to removing all faecal soiling, and in particular to cleaning of furniture, toilets, commodes, call bells etc. fittings, and to horizontal surfaces.

- All mattress and pillow covers should be inspected (unzipped), cleaned and disinfected by clinical staff and replaced if torn or leaking as per the Hospital Mattress Assemblies: Care & Cleaning.
- Dynamic mattresses must be cleaned, bagged and then sent off site for thorough decontamination as per the protocol for infected mattresses.

- As part of the clinical clean all curtains must be removed from the bed space. Should curtains become soiled and require changing whilst the patient is in the room (request a curtain change via iSERCO/ ext. 3333).

- Trust staff must inspect and sign off all clinical cleans as per the Cleaning and Disinfection Guideline.

7.10 Theatres

Reducing the risk of introducing CPE into the theatre environment is crucial to minimise the risks of clinical infection and surgical site infection with these highly antimicrobial resistant organisms.

- Theatre staff must be notified in advance of a patient's CPE status (i.e. screen in progress/colonised /infected) which should be identified in pre-assessment or from the inpatient ward.
- The patient should be admitted directly to the theatre for their anaesthetic/preparation.
- PPE should be worn by all theatre/recovery personnel for all direct patient contact and hands decontaminated following PPE removal with soap and water.
- 'Do Not Enter' signs should be placed on the entrance doors to prevent staff entering unnecessarily and the telephone should be used to contact staff rather than opening theatre or anaesthetic room doors.
- The patient's bed must be clearly identified and stored securely to ensure it is not removed/ transferred to another patient.
- Numbers of personnel in theatre for infected cases should be kept to a minimum as is standard practice.
- Large items of equipment not in use should be removed from the theatre prior to the case commencing.

Theatre Recovery

Following the operative procedure the patient is recovered in a designated recovery area for 'infected patients'. The allocated recovery staff member must remain with that patient until s/he is returned to the ward.

If the patient has open wounds where containment of fluids is not possible or other transmission risks, i.e. burns they should be recovered in the theatre prior to transfer back to ward.

Theatre and recovery cleaning

It is preferable that patients with CPE or those "at risk of CPE" go at the end of morning or afternoon lists to allow staff time to undertake thorough clinical cleaning with Trust approved disinfectant to remove any potential contamination effectively from all equipment and surfaces.

The Theatre may be used after a CPE case. "There is no reason for a standard theatre to 'rest' for more than 15 minutes in terms of air exchange before a clean procedure is performed, however the cleaning and drying time will exceed this limit. (Hospital Infection Society Working Party 2002).

A double clean is required for any cases of confirmed CPE that attend theatres as per the rest of the Trust given the risks of environmental contamination and the challenges of a manual cleaning process and visual quality check.

Transfer of patients

It is not necessary for the theatre support worker to wear protective clothing when transferring the patient to/from the ward unless direct patient contact is required. Adequate protective clothing should be worn when transferring the patient to/from the operating table.

8. Monitoring compliance

Please refer to Monitoring Compliance/Effectiveness Table

9. Summary of development and consultation process undertaken before registration and dissemination

The authors listed above drafted this document on behalf of the IP&C Department who have agreed the final content.

During its development it has been circulated for comment to:

HICC members	Matrons and Senior Nurses
Operations Centre Team	Communications Team
Health and Safety Department	Ward Sisters and Charge Nurse
Workplace Health and Wellbeing	IP&C Link nurses
Infection Control Doctors for NNUH, James Paget University Hospitals NHS Trust (JPUH), Queen Elizabeth Hospital Kings Lynn NHS Trust (QEHKL)	Microbiology department

This version has been endorsed by the Hospital Infection Control Committee.

10. References

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11. Appendices

- Appendix 1 Appendix 1 NNUH Carbapenemase-producing Enterobacteriaceae (CPE) Risk Assessment Form to determine if swabbing required
- Appendix 2 Risk prioritisation of infection prevention and control measures, screening and isolation
- Appendix 3 Containing CPE in a paediatric setting

Appendix 1
Carbapenemase-producing Enterobacteriaceae (CPE) Risk Assessment Form

Name: DOB: Address: GP:	**To be completed for all patients at pre-admission, admission or incoming transfer to assess and manage the risk of CPE within the NNUH.**

Isolate in a single room with enteric precautions and dedicated equipment any patient who: has previously been identified as CPE positive

*Screen and isolate in a single room with enteric precautions and dedicated equipment any patient who has a **Yes** in sections I and/or K until result received*

QUESTIONS	Yes	No	Comments
R – Recent exposure to antibiotics Patients that have received the following antibiotics in the previous month are at increased risk of CPE carriage: • cephalosporins • piperacillin/tazobactam • fluoroquinolones • carbapenems			*e.g. write "not known" if that is the case*
I – In the last 12 months *Screen and isolate in a single room with enteric precautions and dedicated equipment any patient who:* • admitted to any hospital in the UK or overseas (excluding the 3 local Trusts NNUH, JPH or QEH) • went for medical tourism treatment abroad e.g. dental work, surgery or fertility treatment • had multiple hospital treatments outside of NNUH, JPH or QEH (e.g. haemodialysis or receiving cancer chemotherapy), *High risk admission can be risk assessed as no, if since the admission they have already had a negative CPE screen and <u>no</u> further high risk admissions since that negative screen.*			*Please document place and date of admission*
S – Specialty Patients admitted to the following specialties should be screened on admission and every 6 months thereafter: Augmented care/ high-risk settings: • severe immunosuppression			

• transplant • haematology/oncology • critical care / renal dialysis • extensive care needs e.g. liver and burns units • long term care facilities where higher levels of interventional care are provided e.g. long-term ventilation			
K - Knowledge of local CPE transmission Screen if patient has been in contact with a known case of CPE			*Please document details*
Name: DOB: Address: GP:	**To be completed for all patients at pre-admission, admission or incoming transfer to assess and manage the risk of CPE within the NNUH.**		

If the patient answers YES to any of the above <u>except</u> "R" *Recent exposure to antibiotics* and/or and or "S" S*peciality,* then manage the patient as a potential case of CPE until their screening results are reported.

Previously known positive cases will not need screening and will remain in isolation.

Clinical samples should be sent on any patient as appropriate.

Delays in isolation and sampling may lead to contact tracing, contact screening and an incident meeting if a positive case isn't identified promptly.

- Advise patient they meet criteria for screening & offer patient 'CPE Screening information' leaflet.
- Isolate in a single en-suite room with enteric precautions and dedicated equipment.

Send rectal swab (preferably) or stool sample asap for CPE screening immediately

Day 0 (On admission) Date: ……. Result: …….

- Refer to CPE guidelines for full management plan
- Notify IP&C team to enable accurate case tracking
- Include CPE risk in handover to receiving ward and relevant healthcare teams

Once results reported if result is CPE not detected, then CPE precautions can cease.

Name:	Signature:	Designation:	Date:

Guideline for the Management of Carbapenemase-Producing Enterobacteriaceae (CPE)

Appendix 2

Risk prioritisation of infection prevention and control measures. screening and isolation

It is best practice for any patient receiving care who has a risk factor for colonisation with carbapenemase-producing Enterobacterales to be isolated and managed in line with the *CPE framework of actions*. However, where risk prioritisation is required (due to competing priorities such as side room availability) the matrix below is intended as a guide to patient placement. This is a prioritisation tool, and while the high and medium risk groups of patients are recommended to be isolated in side rooms, it is recognised this is not always possible.

	Patient characteristic				
Care environment	Known CPE case	Direct transfer from hospital abroad	Epidemiological link	Hospitalisation last 12 months	Care dialysis/ chemotherapy
Admission to specialist/augmented unit					
Admission to general acute ward					
Day/ambulatory care	**	**	**	**	**
Outpatient clinic	**	**			
Care /Residential homes					

High risk	Isolate immediately in a single room with en-suite facilities (or dedicated commode or WC) and retain in isolation until screening results available
Medium risk	Isolate in single room with en-suite facilities (or dedicated commode or WC) if possible (see increased transmission risks) until screening results available. If not possible to isolate in single room then nurse with *strict emphasis* on maintaining compliance with contact precautions and optimal environmental cleaning following discussion with IPC team **For outpatients and day cases – provide appointment timed for end of clinic or list; consider caring for day case in single room dependent on degree of contact with body fluids eg endoscopic procedures would pose greater risk of transmission than an ophthalmology patient. Maintain compliance with standard precautions and optimal environmental cleaning. In an outpatient setting, contact precautions should be instigated based on a risk assessment and in discussion with IPC team.
Low risk	No action, other than be alert to change in risk-level in light of any further information relating to patient status. Maintain compliance with standard infection control precautions and optimal environmental cleaning.
The following factors increases the risk of CPE transmission and should be considered when prioritising side rooms. Patients with: • Diarrhoea, incontinence (urine or faeces), discharging wounds, medical devices in situ, ventilatory support requirements, high risk of wandering and poor hygiene	

For the purposes of this document, the patient groups in an augmented care/high risk settings include:

a. those patients who are severely immunosuppressed because of disease or treatment: this will include haematology/oncology and transplant patients and similar heavily immunosuppressed patients during high-risk periods in their therapy;
b. those cared for in units where organ support is necessary, for example critical care (adult, paediatric and neonatal), renal (including dialysis settings), respiratory or other critical care or intensive care situations;
c. those patients who have extensive care needs such as liver units and patients with breaches in their dermal integrity, such as in those units caring for burns.

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Guideline for the Management of Carbapenemase-Producing Enterobacteriaceae (CPE)

Appendix 3
Containing CPE in a paediatric setting

Advice from Infection Prevention and Control team
Seek advice from your IPC team, to assist with conducting a risk assessment appropriate for your environment/ hospital.

There are several considerations – the key one being that the parent(s) are also likely to be colonised with a CPE and therefore, ensure the baby (with resident mother) is placed in a room with an en-suite – for the mother, and their visitors to use. If an en-suite is not available, consider a dedicated toilet.

Food management
Food brought in from home is also a potential source of cross contamination of shared fridges. Food brought in by the family should be in wipe-able containers, this need to be wiped clean prior to placing in/back into the fridge. Containers or food that has come into the patient's environment should not be returned to the communal fridge.

Equipment management
The family are not to take any equipment/hospital items nappies, milk bottles, trays etc. out of the room. Equipment is only to be taken out of the room by a member of staff who will then clean according to the trust agreed protocol for this situation.

Used nappies
These should not to be taken out of the room - if weighing is required – weigh in the room. If this is not possible, they should be taken out in a nappy sack/container, by a member of the unit staff (not the parent/ carer) to the sluice room and weighed, then disposed of. Cleaning of the scales plus any surfaces that the nappy, or staff member has been in contact with should then be undertaken.

Breast pumps
It is preferable for a mother to use her own pump. This can stay in the room with the mother, the expressing kit will need decontaminating, this should be carried out by a HCW if coming out of the room. If the mother does not have her own pump, a dedicated breast pump is preferable to be used for her for the length of the baby's admission.

Management of expressed milk
- bottles should be cleaned by a HCW prior to storage in a communal fridge
- feeding bottles and equipment are disposed of in the room
- follow the local procedure for cleaning and decontamination of expressed kits, ensuring that surfaces are not left contaminated
- the mother & baby's clothing should be taken home to launder and the family given advice on washing clothes at a high temperature

- the family should be able to use communal areas with advice on maintaining hand hygiene after handling nappies and care of the baby

If the baby has or develops loose/ diarrhoea stool or has a stoma
If the family are involved with nappy care or with this aspect of care, then they should wear an apron to protect their clothing from contamination to prevent possible spread to communal areas. They should be reminded of the importance of hand hygiene to reduce cross transmission

Education and follow up
The family and visitors must be educated in hand hygiene, fridge management; equipment management, as necessary and follow up to ensure compliance.

Management of food trays
Food trays and crockery/cutlery/water jugs are only to be removed from the room by the ward staff. If possible clean the underside of the tray/item prior to leaving the room. In the kitchen ensure that the crockery cutlery and tray are placed directly in the dishwasher. The surface in the kitchen should be cleaned after contact.

Toys and play
Toys should be dedicated for the child with CPE for the duration of their stay. Those that are not cleanable should either go home with the child or be discarded.

School age children having teaching:

- this should occur in the child's room. Items that cannot be easily cleaned should not be used and should not be brought into the room
- education staff need to wear the same PPE as unit staff
- laptops etc. can be wiped clean by the Education team after use
- sibling visitors are not to use the play room or school areas or communal play areas in the trust. Minimise visitors

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12. Monitoring Compliance / Effectiveness Table

Element to be monitored *(For NHSLA documents this must include all Level 1 minimum requirements)*	***Responsible for monitoring*** *(Title needed & name of individual where appropriate)*	***Monitoring Tool/Method of monitoring***	***Frequency of monitoring***	***Lead Responsible for developing action plan & acting on recommendations***	***Reporting arrangements*** *(Committee or group where monitoring results and action plan progress are reported to)*	***Sharing and disseminating lessons learned & recommended changes in practice as a result of monitoring compliance with this document***
Communication of CPE positive cases	IP&C team	Discharge letter audit	Annual	IP&C team	Hospital Infection Control Committee (HICC)	HICC
Prompt isolation of patients with CPE positive results	IP&C team	IP&C database and Datix reports	Quarterly	Matrons and Operations Team,	HICC	

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Document Owner: Infection Prevention and Control Team