MULTI-RESISTANT GRAM NEGATIVE BACILLI  
(Including ESBLs and Acinetobacter)

Compiled by: The Infection Control team

In consultation with: Control of Infection Committee

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<th>Policy Author</th>
<th>Infection Control team</th>
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1. INTRODUCTION

There are many bacteria that are found in hospitalised patients. Not all are resistant to antibiotics and not all will cause serious illness. Species of bacteria commonly seen include *Escherichia coli* (*E. coli*), *Klebsiella*, *Proteus*, *Pseudomonas*, *Enterobacter* and *Acinetobacter* spp. Collectively these bacteria are sometimes referred to as Gram-negative bacilli (GNBs). These bacteria, under certain circumstances can become resistant to antibiotics and may require infection control management.

(N.B. *Acinetobacter* is a common environmental bacterium that lives in water and damp conditions but can survive in dust. It has minimal growth requirements, is capable of surviving for long periods in the environment and is relatively resistant to usual cleaning methods and drying).

2. PURPOSE

The purpose of the policy is to ensure staff have an understanding of these organisms and understand how to manage these patients.

3. GRAM NEGATIVE BACILLI (GNBs)

GNBs are commonly found in the gastro-intestinal tract, in water and soil. In hospitalised patients colonisation of the gastro-intestinal tract and oropharynx with GNBs is common.

GNBs can be part of the transient flora on the hands of healthcare workers. Hand hygiene is therefore important in the prevention of spread.

Multi-resistant bacteria are seen more frequently in areas that have high usage of broad spectrum antibiotics and where patients have diminished immunity e.g. critical care and oncology units.
GNBs commonly achieve antibiotic resistance by producing an enzyme (e.g. beta-lactamase) that counters the effects of specific antibiotics. Additionally, some GNBs especially Escherichia coli contain powerful beta-lactamases (Extended Spectrum Beta Lactamases or ESBLs) that can destroy/inactivate even broad spectrum antibiotics such as cefuroxime and cefotaxime.

Many hospitals in England are encountering problems with multi resistant Acinetobacter. This is defined as an isolate that is resistant to any aminoglycoside (e.g. gentamicin) and to any 3rd generation cefalosporin e.g. ceftazidime. Some strains are also resistant to carbapenems e.g. meropenem. These are termed RAB-C. Multi resistant pseudomonas species are resistant to at least two of the following: ceftazidime, piperacillin/tazobactam, aminoglycoside (e.g. gentamicin) or ciprofloxacin. Some are also resistant to carbapenems (e.g. meropenem).

Small numbers of carbapenem – resistant Gram negative bacilli are now found in the UK. These include Klebsiellas with KPC (klebsiella pneumonia carbapenemase) and NDM (New Delhi Metallo-beta-lactamase)-producing E. coli, Klebsiella and Enterobacter (Enterobacteriaceae) species. These are very difficult to treat as they are usually resistant to all commonly-used antibiotics.

GNBs have been implicated in outbreaks of infection in ICUs, neonatal and oncology units. They can cause urinary tract infections, pneumonia, surgical site infections and meningitis (in neuro-surgical patients).

4. MANAGEMENT OF PATIENTS WITH MULTI-RESISTANT GNBS

In many cases a patient may be colonised rather than infected with multi-resistant bacteria faecal carriage of multi-resistant GNBs. It should be noted that colonisation of a patient with an organism will not cause them harm, however action may be necessary to prevent spread e.g. strict handwashing, aseptic technique, standard precautions. Isolation on higher risk areas e.g. ITU is advised.

Infection control management of a patient from whom multi-resistant GNB has been isolated must be based on risk assessment (i.e. assessment of the risk of multi-resistant GNB spread from that patient).

Staff caring for the patient should complete a risk assessment. Help and advice is available from Infection Control Nurses / Consultant Microbiologist.

The factors that need to be taken into account when assessing the risk of transferring multi-resistant GNB to other patients include:

- The site or specimen from which a multi-resistant GNB has been isolated (e.g. wound swab, sputum etc.) Examples of higher risk include: leaking wounds, drains in situ, exfoliating skin problems, coughing and expectorating patients (sputum producing) or those with the organism present in their urine and experiencing incontinence.
• Whether the patient has an infection (i.e. has associated symptoms) or is colonised (i.e. is asymptomatic).

• The environment in which the patient is being managed (i.e. medical, surgical, ITU).

Part of the risk assessment process includes the assessment of the risk of cross infection to other patients. Outbreaks of multi-resistant GNBs have been linked to poor hand hygiene therefore staff should ensure they decontaminate their hands after contact with patients or their immediate environment (see Hand Hygiene Policy). To assist this assessment we have categorised patient areas into the following risk groups:

1. High risk – ITU, SDU, MHDU, Orthopaedic, NICU
2. Medium risk – “surgical” in-patient wards e.g. gastro-intestinal surgery
3. Low risk – general “medical” or care of the elderly wards and outpatient areas

Depending on the outcome of the risk assessment the patient will either need to be in Source Isolation (see Isolation Policy) or may be managed using Standard Precautions (see Standard Precautions Policy) in the general ward environment. Patients with GNB who are transferred to other wards or to other healthcare settings must be informed of the patients infection status on the transfer/discharge form.

Examples of risk assessments (NB these are only examples – every case will need individual assessment)

1. A patient with multi-resistant GNB in sputum who is coughing and expectorating would present a high risk of transferring the organism to others and will need to be isolated in any acute care environment.

2. A patient with multi-resistant GNB in urine who isn’t catheterised and is continent with no symptoms is very unlikely to present a risk to others and would not need isolating except in very high risk areas e.g. ITU.

3. A patient who has a superficial wound infection which is leaking slightly and requires dressing presents a moderate risk to others and may be isolated depending on the care environment e.g. isolation would be required in a “surgical” or critical care environment but not necessarily in a “medical” environment.

4. Patients who have been shown to have an unusually resistant organism e.g. a carbapenem-resistant coliform or Acinetobacter or fully resistant pseudomonas should be isolated as requested by the Infection Control Team even if not in high risk for other reasons. N.B. contact tracing may need to be undertaken (see Appendix 1).
5. DISSEMINATION AND IMPLEMENTATION

The policy has been written by the Infection Control Team, been agreed by the Control of Infection Committee and ratified by the Clinical Governance Committee. The policy will be available on TrustNet.

Infection control training sessions include multi resistant organisms including GNB’s and the management of these patients.

6. PROCESS FOR MONITORING COMPLIANCE WITH THE EFFECTIVENESS OF POLICIES

The Infection Control Team monitor multidrug resistant organisms daily. Where there is more than two isolates of the same strain on a ward, especially Acinetobacter or Pseudomonas this is defined as an outbreak and an investigation undertaken. Increased numbers identifying onward transmission or outbreak situation would be identified early. Screening should only be undertaken on the direction of the Infection Control Team.

7. EQUALITY IMPACT ASSESSMENT

The Trust has a statutory duty to carry out an Equality Impact Assessment (EIA) and an overarching assessment has been undertaken for all infection control policies.

8. ARCHIVING ARRANGEMENTS

This is a Trust-wide document and archiving arrangements are managed by the Quality Dept. who can be contacted to request master/archived copies.

9. REFERENCES

1. Interim working Party Guidance on the Control of the multi-resistant Acinetobacter. PHE website


A.1 Acute trust – patient admission flow chart for infection prevention and control (IP&C) of carbapenemase-producing Enterobacteriaceae

As part of the routine admission procedure, assess all patients on admission for carbapenemase-producing Enterobacteriaceae status.1

- No known risk: Screening not required. Send routine clinical microbiological samples as clinically indicated.
- Carbapenemase-producing Enterobacteriaceae identified in a routine clinical sample?
  - No further action
  - YES, therefore...

Recent laboratory confirmation is during this admission episode or confirmed at the transferring healthcare facility. Treat as positive case (see below)

- Patient is suspected case of colonisation or infection.
  - Take rectal swab & isolate patient (with en-suite). Apply strict standard precautions.

Result: Presumptive positive
- Result Negative

Laboratory: Save isolate and send to AMR/RAI reference laboratory.

- Confirms positive? Yes
  - All samples negative but previously ‘known’ positive?
    - YES
      - Can be removed from isolation (unless another reason for continuing isolation).
    - NO
      - No further action

Note: previously positive individuals with subsequent negative screen can revert to a positive state, especially after a course of antibiotics – careful risk assessment is required if removing from isolation.

1. A suspected case is defined as a patient who, in the last 12 months, has been (a) an inpatient in a hospital abroad or (b) an inpatient in a UK hospital which has problems with spread of carbapenemase-producing Enterobacteriaceae (if known) or (c) a ‘previously’ positive case (see 1.5 and Card A.2).

2. There should be visible faecal material on the swab. Alternative is stool sample (see Card A.4).


4. Except if it is a repeat isolate of same species with same antimicrobial (see SOP reference Card B.1).

5. Should any sample test positive, treat as positive.

6. See Section C for patient information leaflets.

7. Refer to template (see Card B.1).

8. See Card B.3 for outbreak checklist.

9. Screen any current inpatient contacts who shared an open ward / bay with non-isolated case (see Card A.4).

10. See Card B.4 for Inter-healthcare transfer form.