NHS Grampian Staff Guidance For Optimising Use Of Alert (Restricted) Antimicrobials

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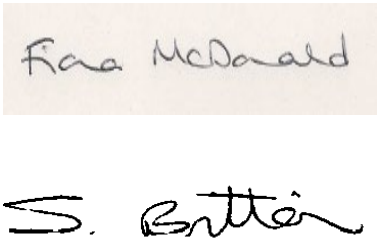
Signature: 	**Signature:** 	**Signature:** 

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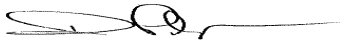
Executive Sign-Off:

This document has been endorsed by the Director of Pharmacy and Medicines Management



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Group/Individual responsible for this document:	Specialist Pharmacists – Antibiotics
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Sector General Managers, Medical Leads and Nursing Leads
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Revision History:

Revision Date	Previous Revision Date	Summary of Changes (Descriptive summary of the changes made)	Changes Marked* (Identify page numbers and section heading)
October 2019	May 2017	**Throughout document –** On call Medical Microbiologist changed to Duty Medical Microbiologist.	
		Main recommendations – Added - off-label/unlicensed use must be under ID/microbiology guidance.	p2
		Added note that alert status is highlighted on Medusa.	p2
		Use in primary care – details of authorising specialist added to requirements in letter to GP. 'Where an alert antimicrobial is considered appropriate to be initiated in primary care this is detailed in the individual drug monograph' added.	p3
		Aztreonam injection – added as an alternative to gentamicin in the treatment of high risk patients with neutropenic sepsis and CrCl < 30mL/min (CKD≥4) **or** known or suspected AKI in previous 48 hours (≥50% increase in baseline serum creatinine or oliguria > 6 hours).	p7
		Cefotaxime injection – added as a treatment for suspected sepsis in primary care prior to hospital admission.	p8
		Ceftazidime injection – 'Second line' removed from Endophthalmitis (intravitreal)	p9

Revision Date	Previous Revision Date	Summary of Changes (Descriptive summary of the changes made)	Changes Marked* (Identify page numbers and section heading)
		Ceftriaxone injection - Treatment of acute bacterial skin and skin structure infections (ABSSSI) in adults suitable for Outpatient Parenteral Antibiotic Therapy (OPAT) and epiglottitis (under ENT advice) added.	p9
		Clindamycin - Diabetic foot infection as per the Scottish Diabetes Foot Action Group guideline (endorsed by SAPG) added. Paediatric indications updated to Second-line for appendicitis, peritonitis, penetrating abdominal trauma, pilonidal abscess, perianal abscess, acute osteomyelitis, septic arthritis, acute discitis, deep myositis, orbital cellulitis, pre-septal cellulitis, quinsy, cellulitis, post-operative wound infections for children and infants with penicillin allergy. Toxic shock Syndrome in children and infants. 'Treatment may be initiated in primary care' added.	p9
		Dalbavancin – wording amended to match formulary restrictions.	p10
		Fidaxomicin oral – link to local guideline removed and link to Health Protection Scotland guidance added. Updated for use only on the advice of a Medical Microbiologist or Infection Specialist.	p11
		Fosfomycin oral sachets – removed as included in WHO access list	
		Meropenem injection - Febrile neutropenia, in accordance with haematology or oncology sepsis protocol or NHS Grampian empirical antimicrobial guidelines added as an approved indication without specialist advice.	p12
		Ofloxacin tablets – first line for epididymitis suspected gram-negative enteric organisms plus Chlamydia trachomatis (low risk for N gonorrhoea) Treatment may be initiated in primary care added.	p13
		Piperacillin/tazobactam injection – the following indications are removed for use without specialist advice: 2) pseudomonal infection in cystic fibrosis patients; 3) spontaneous bacterial peritonitis in patients with chronic liver diseases;	p13

Revision Date	Previous Revision Date	Summary of Changes (Descriptive summary of the changes made)	Changes Marked* (Identify page numbers and section heading)
		4) Acute upper GI haemorrhage in patients with decompensated liver disease if IV co-trimoxazole is unavailable. *Add* - Severe diabetic foot infection in 'non antibiotic naive patients as per the Scottish Diabetes Foot Action Group guideline (endorsed by SAPG). **Pivmecillinam** - removed as included in WHO access list. **Rifaximin tablets** – removal of second line status as neomycin no longer used. 'Treatment may be initiated in primary care' added. **Teicoplanin injection** removed. **Temocillin injection** – Add - May be used without specialist advice as an alternative to gentamicin if more than 72 hours intravenous therapy is required according to recommendations in the 'Piperacillin/tazobactam Shortage Resolved SBAR March 2018' or NHS Grampian empirical antimicrobial guidelines. **Tobramycin injection** - Treatment of Pseudomonas aeruginosa in non-cf bronchiectasis added. **Voriconazole IV/oral** - Empiric treatment of haematology patients (≥ 2 years of age) with (possible/probable) intracerebral invasive fungal infections added.	p13 p14 p14 p14 p14 p15
Dec 2021	Oct 2019	**Meropenem/Vaborbactam** – new product added	p12,13,17

* Changes marked should detail the section(s) of the document that have been amended, i.e. page number and section heading.

NHS Grampian Staff Guidance For Optimising Use Of Alert (Restricted) Antimicrobials

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1. Introduction

1.1 Objective

'Alert' antimicrobials are for restricted use only under the authorisation of a Medical Microbiologist, or infectious diseases (or other relevant) specialist, and/or according to approved indications within local guidelines/policies.

Their use is restricted for two reasons:

- To slow the development of resistance to an antimicrobial by limiting its use
- There are more suitable alternatives that are more cost effective or less toxic.

1.2 Rationale

One of the minimum standards for hospital antimicrobial prescribing policies stipulated by the Scottish Antimicrobial Prescribing Group (SAPG) is that Health Boards have in place a restricted list of antimicrobials requiring Microbiology or Infectious Diseases Team approval. SAPG suggest the following for inclusion in this list: Any newly licensed agents accepted for use by Scottish Medicines Consortium and valuable antimicrobials which should be reserved for complex infection. Examples of the latter may include; linezolid, daptomycin, tigecycline, meropenem, ertapenem, fidaxomicin and antifungals other than fluconazole.[1]

The alert antibacterial agents (excluding antifungals) listed in Appendix 1 account for a significant proportion of serious antibiotic adverse effects, including *Clostridioides difficile* infection, as well as the emergence of major antimicrobial resistance. Safer and more cost effective alternatives are often available which allow such agents to be kept in reserve for occasions when there are specific microbiological indications. It is critical, therefore, that alert antimicrobials are only prescribed for the agreed indications on the recommendation of specialist consultants (see Appendix 1) or after discussion with the duty Medical Microbiologist or Infection Specialist.
See Appendix 2 for a summary of alert antimicrobials and approved indications.

2. Main Recommendations

Alert antimicrobials and their approved indications are listed in Appendix 1 and have been agreed by the Antimicrobial Management Team (AMT) and NHS Grampian Formulary Group. Patients in the Infection Unit (IU), the Intensive Care Unit (ICU) and Neonatal Unit (NNU) are **excluded** from this policy as they are reviewed daily by (IU and ICU), or are in regular contact with (NNU), a Microbiology or Infection Specialist. This policy applies to adults, children and infants but inclusion of antibiotics in this policy does not imply that the indication is licensed for children. Clinical staff should check the manufacturer's summary of product characteristics at www.medicines.org.uk for licensed indications and other prescribing information.

Where the alert antimicrobial is included in the Medusa Injectable Medicines Guide the approved indication(s)/use will be highlighted in each monograph.

Any off-label/unlicensed use of an antimicrobial should be under the guidance of an Infection Specialist, Microbiologist or other Consultant Specialist and standard non-formulary procedures followed (see NHS Grampian Staff Guidance For Processing Requests To Prescribe Unlicensed, Off-Label or Non-Formulary Medicines (Including Medicines Awaiting Consideration By, Or Not Recommended For Use By, The Scottish Medicines Consortium).

Where a product is only for use in adults this is stated as part of the approved indication.

2.1 Responsibilities

2.1.1 Prescribers (Acute Sector)

It is the prescriber's responsibility to ensure that when an alert antimicrobial is prescribed it is in accordance with this policy. The prescriber must:

a) Check that the alert antimicrobial is being prescribed for an approved indication according to the recommendations in Appendix 1 and document this in the patient's medical notes.

OR

b) Obtain authorisation for the prescribing of the alert antimicrobial from a Medical Microbiologist or Infection (or other relevant) Specialist and document this in the patient's medical notes.

It is important that all the recommendations in the 'NHS Grampian Antimicrobial Documentation Policy' are followed when an Alert Antimicrobial is prescribed, i.e. there should be clear documentation of both the indication and either a stop/review date or duration. Where antimicrobials have been recommended/authorised by Medical Microbiology or an Infection (or other relevant) Specialist this should also be clearly documented in the patient's medical notes.

Use in Primary Care

When an alert antimicrobial is prescribed either at discharge or for outpatient use it should be used in accordance with this guidance. Before advising a GP to prescribe an alert antimicrobial the secondary care clinician should discuss this with a clinical pharmacist. Some alert antimicrobials are only available in hospital, some may require specialist monitoring and many are expensive. The specialist who initiates the alert antimicrobial retains responsibility for assessing clinical efficacy and safety (e.g. monitoring blood results when required). It is important that the details of the authorising specialist, the indication and either a stop/review date or duration should be clearly specified in the GP letter and further details provided where necessary. GPs should only be asked to prescribe a **maximum of one months treatment** at a time unless there are extenuating circumstances for longer supply. Where an alert antimicrobial is considered appropriate to be initiated in primary care this is detailed in the individual drug monograph.

2.1.2 Medical Microbiologists and Infection Specialists

Medical Microbiologists and Infection Specialists have a responsibility to advise prescribers on the appropriate use of alert antimicrobials in accordance with the recommendations in Appendix 1. When giving authorisation to use an alert antimicrobial, Medical Microbiologists and Infection Specialists should give their full name and ask the prescriber to document their advice in the medical notes.

2.1.3 Clinical Pharmacists

It is the Clinical Pharmacist's responsibility to check that when an alert antimicrobial has been prescribed it is in accordance with the recommendations in Appendix 1 and they are accountable by signing the NHS Grampian Prescription and Administration Record (PAR).

If the prescribing of an alert antimicrobial is deemed to be out with the guidance given in Appendix 1, the clinical pharmacist should contact the specialist antibiotic pharmacists for advice.

When the clinical pharmacist signs a discharge prescription for an alert antimicrobial this will be taken to signify that the alert antimicrobial is being used in accordance with this policy.

If the clinical pharmacist is aware that an alert antimicrobial will be prescribed on an outpatient basis they should ensure that adequate information is passed on to the appropriate GP and/or practice/HSCP pharmacist to confirm that it is being used in accordance with this policy and contact the appropriate community pharmacist if there are likely to be any supply issues.

2.1.4 Dispensary Pharmacists

Discharge Prescriptions

If an alert antimicrobial is prescribed on a discharge prescription and the prescription has been signed by a clinical pharmacist, the alert antimicrobial should be dispensed.

If an alert antimicrobial is prescribed on a discharge prescription and the prescription has **not** been signed by a clinical pharmacist, the alert antimicrobial can be dispensed if the PAR has been signed by the clinical pharmacist. If neither the discharge prescription nor the PAR have been signed by a clinical pharmacist, then the relevant clinical pharmacist should be contacted for clarification (if not available contact the specialist antibiotic pharmacists). At weekends and out of hours if it is not possible to contact the clinical/specialist antibiotic pharmacist then the prescriber should be contacted to confirm that usage is in line with the recommendations in Appendix 1. If the prescriber cannot be contacted or it is not possible to confirm appropriate usage then the prescription can be dispensed but a copy should be sent to the specialist antibiotic pharmacists for follow-up.

Outpatient Prescriptions

For all alert antimicrobials prescribed on an outpatient prescription (**except** for prescriptions for cystic fibrosis, infection unit or haematology out-patients) the dispensary pharmacist should check that the alert antimicrobial is being used in accordance with the recommendations in Appendix 1, if necessary contacting the prescriber. If the alert antimicrobial is being used out with this policy, the dispensary pharmacist should contact the specialist antibiotic pharmacists for advice. If the specialist antibiotic pharmacists cannot be contacted, e.g. at weekends, then the prescription can be dispensed and a copy sent to the specialist antibiotic pharmacists for follow-up.

2.1.5 Nurses

It is the nurse's responsibility to ensure that they know the indication for alert antimicrobials prescribed for their patients before administration. The indication for the alert antimicrobial must be documented by the prescriber in the medical notes/PAR. If the indication is not documented in the medical notes/PAR the nurse should request that the prescriber completes this information. Nurses will need to inform the clinical pharmacist of the indication for the alert antimicrobial when ordering supplies.

2.1.6 Antimicrobial Management Team

If contacted regarding the use of an alert antimicrobial prescribed out with this guideline, the specialist antibiotic pharmacists will make recommendations on alternative options where possible or request a review of the patient by a Medical Microbiologist or Infection Specialist. Alternative options will be discussed with either the clinical pharmacist or the patient's medical team.

The specialist antibiotic pharmacists will ensure reports on the usage of all alert antimicrobials are produced regularly for assessment by the antimicrobial management team. Further audit work and feedback to prescribers will be arranged when necessary.

2.2 Supply of Alert Antimicrobials to Wards

Alert antimicrobials will not be kept as stock items in general ward areas unless authorised by the antibiotic pharmacists. Stock may be kept in the Infection Unit, ITU or the named specialist units who are authorised to use alert antimicrobials. Areas where alert antimicrobials are kept as stock are not permitted to lend or supply to other clinical areas unless authorised by a pharmacist.

3. Reference

1. Good Practice Recommendations for Hospital Antimicrobial Stewardship in NHS Scotland. Scottish Antimicrobial Prescribing Group. NHS Scotland. October 2018
https://www.sapg.scot/media/3861/good-practice-recommendations-for-hospital-antimicrobial-stewardship.pdf

4. Consultation List

Antimicrobial Management Team
Dr Kevin Carter (Consultant – Medicine)
Dr Gavin Preston (Consultant Haematologist)
Elaine Sheridan (Clinical Pharmacist)
Miss Lucia Kuffova (Consultant Ophthalmologist)
Dr Catharina Hartman (Consultant in Emergency Medicine)
Mr Ivan Depasquale (Consultant Plastic Surgeon)
Mr James Milburn (Consultant surgeon)
Dr Mohammed Khan (Consultant Haematologist)
Valerie Dick (Clinical Pharmacist)
Alison Davie (Lead Pharmacist (Aberdeen HSCP)

5. Distribution List

- All Consultants
- Group Pharmacy
- HSCP Clinical Hospital Leads
- HSCP Pharmacists
- Medical Microbiology Registrars
- Non-Medical Prescribers
- Nurse Managers
- GP Practices

Appendix 1: Alert (restricted) antimicrobials and their approved indications

N.B. This policy does not apply to the Infection Unit or Intensive Care Unit in Aberdeen Royal Infirmary (ARI) or the Neonatal Unit at Aberdeen Maternity Hospital (AMH).

Amikacin injection

Only on the advice of a Medical Microbiologist, Infection Specialist or Ophthalmologist for:

1. Extended spectrum beta-lactamase (ESBL) producing (multi-drug resistant) coliforms.
2. Endophthalmitis (intravitreal).
3. Gram-negative bacteria resistant to first line agents.

Anidulafungin injection

Only on the advice of a Medical Microbiologist, Infection Specialist or Haematologist for:

1. First-line echinocandin for treatment of invasive candidiasis in **non-neutropenic** adult patients who are either unable to tolerate fluconazole or have invasive candidiasis that is resistant to fluconazole.
2. Alternative to caspofungin for treatment of invasive candidiasis in **neutropenic** adult patients.

Aztreonam injection

May be used for the following indications:

1. As an alternative to gentamicin for patients with CrCl < 30mL/min (CKD≥4) **or** known or suspected Acute Kidney Injury (AKI) in previous 48 hours (≥50% increase in baseline serum creatinine or oliguria > 6 hours) **being treated empirically for sepsis of unknown origin.**
2. As an alternative to gentamicin for **high risk** patients with CrCl < 30mL/min (CKD≥4) **or** known or suspected AKI in previous 48 hours (≥50% increase in baseline serum creatinine or oliguria > 6 hours) **being treated empirically for neutropenic sepsis.**
3. On the advice of a Medical Microbiologist or Infection Specialist for treatment of gram-negative infections.

Refer to: NHS Grampian Guidance On The Use Of Aztreonam

Caspofungin injection

Only on the advice of a Medical Microbiologist, Infection Specialist or Haematologist for:

1. Treatment of fluconazole-resistant invasive candidiasis as an alternative to amphotericin.
2. Empirical treatment of sepsis in haematology patients after 48-72 hours of treatment with antibacterial therapy and continuing fever, in accordance with haematology/ oncology sepsis protocol.

3. First-line echinocandin for all neutropenic patients and non-neutropenic paediatric patients (12 months to 17 years), and second-line for adult non-neutropenic patients.

Cefotaxime injection

May be used for the following indications:

1. Treatment of meningitis in penicillin allergic patients in primary care as a single dose prior to admission to hospital (IV/IM).
2. Treatment of suspected sepsis in primary care as a single dose prior to admission to hospital if anticipated time from assessment to arrival at hospital is >1 hour (IV/IM).
3. Treatment of meningitis in children and infants (IV).
4. Treatment of brain abscess in children and infants (IV).
5. Treatment of pyelonephritis/urosepsis in children (IV).
6. Treatment of sepsis in children and infants (IV).

For all other indications only on the advice of a Medical Microbiologist or Infection specialist if ceftriaxone is not suitable.

Ceftazidime injection

May be used for the following indications:

1. Documented or suspected *Pseudomonas aeruginosa* infection.
2. Febrile neutropenia in those with mild penicillin allergy, in accordance with haematology or oncology sepsis protocol.
3. Empiric therapy for Continuous Ambulatory Peritoneal Dialysis (CAPD)-associated peritonitis (intraperitoneal).
4. Empiric therapy for infective exacerbations of cystic fibrosis.
5. Bronchiectasis.
6. Endophthalmitis (intravitreal).

For all other indications contact the duty Medical Microbiologist.

Ceftobiprole injection

Only on the advice of a Medical Microbiologist or Infection Specialist (if first or second line options are not suitable) for:

1. Hospital-acquired pneumonia (HAP), excluding ventilator-associated pneumonia (VAP) - when activity is required against suspected methicillin-resistant *Staphylococcus aureus* (MRSA) and Gram-negative pathogens (including *Pseudomonas aeruginosa*, *Escherichia coli* and *Klebsiella pneumoniae*) and when combination treatment that includes vancomycin or teicoplanin is inappropriate, has not been tolerated, or treatment modification is required.

Not licensed for use in children.

Ceftriaxone injection

May be used for the following indications:

1. Bacterial meningitis.
2. Brain Abscess.
3. Pelvic Inflammatory Disease (IM/IV).
4. Epididymitis (IM).
5. Chancroid (IM).
6. Gonorrhoea (IM).
7. Orbital cellulitis.
8. Treatment of acute bacterial skin and skin structure infections (ABSSSI) in adults suitable for Outpatient Parenteral Antibiotic Therapy (OPAT).
9. Epiglottitis (only with ENT Specialist advice).

For all other indications contact the duty Medical Microbiologist.

Chloramphenicol injection

May be used for the following indication:

1. Bacterial meningitis in patients allergic to penicillin.

For all other indications contact the duty Medical Microbiologist.

Clindamycin injection/capsules/suspension

May be used for the following indications:

1. Oral switch in osteomyelitis in patients allergic to penicillin.
2. Diabetic foot infection as per the Scottish Diabetes Foot Action Group guideline (endorsed by SAPG).
3. Necrotising fasciitis or severe or rapidly progressing skin infection in an intravenous drug user.
4. Surgical prophylaxis where specified in the departmental guideline.
5. Second-line oral/IV option for patients with lymphoedema unresponsive to first-line therapy or penicillin allergic.
6. Second-line for appendicitis, peritonitis, penetrating abdominal trauma, pilonidal abscess, perianal abscess, acute osteomyelitis, septic arthritis, acute discitis, deep myositis, orbital cellulitis, pre-septal cellulitis, quinsy, cellulitis, post-operative wound infections for children and infants with penicillin allergy.
7. Toxic shock syndrome in children and infants.

Only on the advice of a Medical Microbiologist, Infection Specialist or Maxillofacial Surgeon for:

1. Patients with deep dental/facial/neck abscesses who are penicillin allergic or unresponsive to first-line therapy.

Treatment may be initiated in primary care.

For all other indications, contact the duty Medical Microbiologist.

Colistimethate sodium inhalation powder (Colobreathe®)

Only on the advice of a Cystic Fibrosis Specialist prior to continuation in Primary Care for:

1. First line use for suppressive therapy of chronic pulmonary infection due to *Pseudomonas aeruginosa* in adults and children aged 6 years and older with cystic fibrosis.

Colistimethate sodium injection

Only on the advice of a Medical Microbiologist, Infection Specialist or Respiratory Specialist for:

1. Patients with gram-negative infections resistant to other antibacterials.
2. As a nebulised solution for suppressive therapy of chronic pulmonary infection due to *Pseudomonas aeruginosa* in children aged >1 month and adults with cystic fibrosis.

Dalbavancin infusion

Only on the advice of a Medical Microbiologist or Infection Specialist for the treatment of acute bacterial skin and skin structure infections (ABSSSI) in adults for:

1. 2nd line use or when Meticillin-Resistant Staphylococcus Aureus (MRSA) infection is suspected.

And

Where the patient is initially hospitalised due to ABSSSI, requires intravenous antibiotics, but is eligible for early discharge as soon as their medical condition does not require further inpatient treatment.

Not licensed for use in children.

Daptomycin injection

Only on the advice of a Medical Microbiologist or Infection Specialist:

1. For *Staphylococcus aureus* bacteraemia associated with right-sided infective endocarditis (RIE) or with complicated skin and soft tissue infection (SSTI) in adults.
2. For the (off-label) treatment of *S. aureus* bacteraemia, not associated with RIE or SSTI, in penicillin allergic patients.
3. As an alternative to linezolid for the second-line treatment of complicated MRSA skin and soft tissue infection.
4. For the treatment of serious MRSA infection after glycopeptide treatment failure or if increased doses of glycopeptides cause nephrotoxicity.

Ertapenem IV

Only on the advice of a Medical Microbiologist or Infection Specialist for:

1. ESBL-producing (multi-drug resistant) coliforms.
2. Second-line treatment of community-acquired intra-abdominal infections resistant to the current conventional treatments.

3. Treatment of diabetic foot infections of the skin and soft tissue when caused by bacteria known or very likely to be susceptible to ertapenem.

Fidaxomicin oral

Only on the advice of a Medical Microbiologist or Infection Specialist for:

1. Treatment of adults with a *Clostridioides difficile* (CDI) recurrence, following Health Protection Scotland guidance. Treatment may be initiated in primary care.

Not licensed for use in children.

Fosfomycin injection

Only on the advice of a Medical Microbiologist or Infection Specialist for:

1. Osteomyelitis.
2. Complicated urinary tract infections.
3. Nosocomial lower respiratory tract infections.
4. Bacterial meningitis.
5. Bacteraemia associated, or suspected to be associated with, any of the infections above.

Ganciclovir injection

Only on the advice of a Medical Microbiologist/Virologist, Infection Specialist, Ophthalmologist, Renal Specialist, or Haematologist for:

1. Initial treatment of cytomegalovirus (in immunocompromised patients).

Not licensed for use in children under 12 years old for this indication.

Isavuconazole infusion/capsules

Only on the advice of a Medical Microbiologist, Infection Specialist or Haematologist for the following indications:

1. Invasive aspergillosis.
2. Mucormycosis in patients for whom amphotericin B is inappropriate.

Not licensed for use in children.

Levofloxacin infusion/tablets

May be used for the following indication:

1. Second-line in accordance with guidelines for severe pneumonia in hospitalised patients where there is proven penicillin or macrolide resistance or allergy.

Only on the advice of a Cystic Fibrosis Specialist for:

1. Infective exacerbations in cystic fibrosis patients where the organism is sensitive to levofloxacin.

For all other indications, contact the duty Medical Microbiologist.

Not licensed for use in children.

Linezolid infusion/tablets/suspension

May be used for the following indications:

1. Staphylococcal pneumonia (e.g. post influenza infection) in patients with penicillin allergy.
2. For MRSA infections post-vascular surgery where an oral option is necessary.

Otherwise, only on the advice of a Medical Microbiologist or Infection Specialist for:

1. Restricted indications including infections due to proven glycopeptide-insensitive *Staphylococcus aureus* (GISA) or vancomycin-resistant enterococcus (VRE) (currently uncommon).
2. Enabling IV/oral switch from IV vancomycin to oral linezolid (when patient discharge is possible and continuation treatment using combination, e.g. rifampicin/trimethoprim is inappropriate).
3. Poor IV access and a glycopeptide is indicated.
4. Use in out-patient antibiotic therapy for skin and soft tissue infections as an alternative to IV teicoplanin.
5. Rare cases of (proven) hypersensitivity/allergy to the glycopeptides.

For all other indications contact the duty Medical Microbiologist.

Not licensed for use in children.

Meropenem injection

May be used for the following indication:

Febrile neutropenia, in accordance with haematology or oncology sepsis protocol or NHS Grampian empirical antimicrobial guidelines.

Only on the advice of a Medical Microbiologist, Infection Specialist, or Cystic Fibrosis Specialist for:

1. Exacerbation of cystic fibrosis.
2. Infections due to multi-drug resistant organisms (in line with microbiology sensitivity reports).

Not licensed for use in children under 3 months of age.

Meropenem/Vaborbactam injection

Only on the advice of a Medical Microbiologist or Infection Specialist for the following indication where alternative options have been considered:

1. Treatment of adults with confirmed carbapenem-resistant Enterbacteriaceae (CRE), which is involved in the production of Klebsiella pneumoniae carbapenemase (KPC) associated with complicated urinary tract infection

(including acute pyelonephritis), complicated intra-abdominal infection, hospital acquired pneumonia (including ventilator associated pneumonia) and bacteraemia that occurs in association with, or is suspected to be associated with any of the infections previously mentioned.

Micafungin Infusion

Only on the advice of an Intensive Care Physician or Medical Microbiologist for:

Treatment of invasive candidiasis in adults, elderly and children (including neonates). Use is restricted to intensive care units and the decision to use micafungin should take into account a potential risk for the development of liver tumours. Micafungin should therefore only be used if other antifungals are not appropriate.
Third-line echinocandin for adults and second-line for paediatric, non-neutropenic patients in intensive care units.

Ofloxacin Tablets

Only on the advice of a Medical Microbiologist, Infection Specialist, Genito-Urinary Medicine Specialist or Urologist for:

1. First line for epididymitis with suspected Gram-negative enteric organisms plus *Chlamydia trachomatis* (low risk for *N. gonorrhoea*).
2. Second-line for prostatitis/epididymitis in adults >35 years or low risk of Sexually Transmitted Diseases (STDs) (ciprofloxacin is first line).
3. Second-line for prostatitis/epididymitis in adults <35 years or high risk of STDs where patient is unable to take doxycycline (doxycycline is included in both first- and second-line options at present).
4. Second-line for pelvic inflammatory disease in adults.

Treatment may be initiated in primary care.

Not licensed for use in children.

Piperacillin with tazobactam infusion

May be used for the following indications:

1. Febrile neutropenia, in accordance with haematology or oncology sepsis protocol and empirical guidelines.

2. Severe diabetic foot infection in non-antibiotic naive patients as per the Scottish Diabetes Foot Action Group guideline (endorsed by SAPG).

For all other indications contact the duty Medical Microbiologist or Infection Specialist.

Not licensed for use in children under 2 years of age.

Posaconazole oral suspension, tablets and infusion (only in patients unable to receive oral formulation)

Only on the advice of a Medical Microbiologist, Infection Specialist, Haematologist or Oncologist for:

1. Treatment of specific invasive fungal infections refractory to, or intolerant of, other antifungal agents (i.e. amphotericin B formulations, itraconazole, fluconazole).
2. Treatment of invasive fungal infections according to microbiological sensitivities.
3. Prophylaxis of invasive fungal infections in immunocompromised patients, in whom there is a specific risk of invasive *Aspergillus* infection, or where fluconazole or itraconazole are not tolerated.

Not licensed for use in children.

Rifaximin (550mg tablets only)

Only on the advice of a GI Specialist for:

1. Reduction in episodes of overt hepatic encephalopathy in patient's ≥18 years of age who present with persistent symptoms despite being on lactulose, or in those who are lactulose intolerant. Treatment may be initiated in primary care.

Tedizolid infusion and tablets

Only on the advice of a Medical Microbiologist or Infection Specialist for:

1. Second or third line option for treatment of acute bacterial skin and skin structure infections (ABSSSI) caused by Gram-positive *Staphylococcus aureus* (specifically methicillin-resistant *Staphylococcus aureus* [MRSA] isolates) in adults where other options have failed or have caused unacceptable side-effects.

Not licensed for use in children.

Temocillin injection

Only on the advice of a Medical Microbiologist or Infection Specialist for:

1. The treatment of multi-drug resistant gram-negative organisms causing or suspected of causing septicaemia, urinary tract infection or lower respiratory tract infection in adults.

Only on the advice of a Medical Microbiologist or Respiratory consultants for:

1. The treatment of *Burkholderia cepacia* infections in situations where an alternative to ceftazidime or meropenem is required in adults.

May be used without specialist advice as an alternative to gentamicin if more than 72 hours intravenous therapy is required according to recommendations in the 'Piperacillin/tazobactam Shortage Resolved SBAR March 2018' or NHS Grampian empirical antimicrobial guidelines.

Not licensed for use in children.

Tigecycline injection

Only on the advice of a Medical Microbiologist or Infection Specialist for:

1. Second- or third-line treatment of complicated skin and soft tissue infections or intra-abdominal infections refractory to, or intolerant of, other usual agents.

Not licensed for use in children under 8 years old.

Tobramycin injection

Only on the advice of a Medical Microbiologist, Infection Specialist, Respiratory Specialist or Cystic Fibrosis (CF) Specialist for:

1. Empiric therapy for infective exacerbations of cystic fibrosis.
2. Treatment of *Pseudomonas aeruginosa* in non-cf bronchiectasis.

Tobramycin inhaler, dry powder (TOBI® Podhaler)

Only on the advice of a Cystic Fibrosis Specialist prior to continuation in Primary Care for:

1. Second line suppressive therapy for chronic pulmonary infection with *Pseudomonas aeruginosa* in adults and children aged 6 years and older with cystic fibrosis, when Colobreathe® is contra-indicated, is not tolerated, or has not produced an adequate clinical response.

Tobramycin nebuliser solution

Only on the advice of a Cystic Fibrosis Specialist for:

1. Chronic pulmonary infection due to Pseudomonas aeruginosa in adults and children aged 6 years and older with cystic fibrosis.

Valganciclovir tablets/oral solution

Valganciclovir is an oral pro-drug of ganciclovir. Only on the advice of a Consultant Virologist, Infection Specialist, Renal Specialist or Ophthalmologist for:

1. Treatment of CMV retinitis in HIV patients and prevention of CMV in solid organ transplant patients.

Not licensed for use in children for CMV retinitis.

Voriconazole IV/oral

Only on the advice of a Medical Microbiologist, Infection Specialist or Haematologist for:

1. Treatment of suspected or confirmed invasive *Aspergillus* infection.
2. Treatment of invasive fungal infections according to microbiological sensitivities.
3. Treatment of serious invasive *Candida* infections in patients with resistance or non-response to fluconazole; intolerance to, or at increased risk of side-effects with, amphotericin.
4. Treatment of chronic pulmonary aspergillosis in patients with resistance, intolerance, or non-response to itraconazole.
5. Empiric treatment of haematology patients (≥ 2 years of age) with (possible/probable) intracerebral invasive fungal infections.

Appendix 2 - Alert Antimicrobial Summary

'Alert' antimicrobials are for restricted use only, under the authorisation of a Medical Microbiologist, or Infectious Diseases (or other relevant) Specialist, and/or according to approved indications within local guidelines/policies. **NB**: This policy does not apply to the Intensive Care Unit or Infection Unit at ARI or the Neonatal Unit at AMH.

❖ **Alert Antimicrobials that require MEDICAL MICROBIOLOGY or INFECTIOUS DISEASES (or other) SPECIALIST AUTHORISATION for ALL indications:**

Amikacin IV (Ophthalmologist)
Anidulafungin IV (Haematologist)
Caspofungin IV (Haematologist)
Ceftobiprole IV
Colistimethate Sodium IV/inhaled (Respiratory or CF Specialist)
Dalbavancin IV
Daptomycin IV
Ertapenem IV
Fidaxomicin oral
Fosfomycin IV
Ganciclovir IV (Ophthalmologist, Renal Specialist, Haematologist)
Isavuconazole IV/capsules (Haematologist)
Meropenem/Vaborbactam IV
Micafungin IV (ICU physician)
Ofloxacin oral (Genito-Urinary Medicine Specialist, Urologist)
Posaconazole IV/oral (Haematologist, Oncologist)
Rifaximin oral (Gastroenterologist)
Tedizolid IV/ oral
Tigecycline IV
Tobramycin IV/inhaled (Respiratory/Cystic Fibrosis Specialist)
Valganciclovir oral (Ophthalmologist, Renal Specialist)
Voriconazole IV/ oral (Haematologist)

❖ **Alert Antimicrobials that are allowed for SPECIFIED INDICATIONS**

For use outwith the indications listed below authorisation/ recommendation must be obtained from Medical Microbiology or Infectious Diseases/other Specialist. See Appendix 1 for full details.

Aztreonam injection
1. As alternative to gentamicin in patients with CrCl<30mL/min treated empirically for sepsis of unknown origin.
2. As an alternative to gentamicin in **high risk** patients with CrCl<30mL/min treated empirically for neutropenic sepsis.

Refer to: NHS Grampian Guidance On The Use Of Aztreonam

Cefotaxime Injection
1. Treatment of meningitis in penicillin allergic patients in primary care as a single dose prior to admission to hospital.
2. Treatment of suspected sepsis in primary care as a single dose prior to admission to hospital if anticipated from assessment to arrival at hospital is > 1 hour.
3. Children and infants only: meningitis, brain abscess, pyelonephritis/urosepsis, sepsis.

Ceftazidime Injection
1. Documented or suspected Pseudomonas aeruginosa infection.
2. Febrile neutropenia in those with mild penicillin allergy, in accordance with haematology or oncology sepsis protocol.
3. Empiric therapy for CAPD associated peritonitis.
4. Empiric therapy for infective exacerbations of cystic fibrosis.
5. Bronchiectasis.
6. Endophthalmitis.

Ceftriaxone Injection
1. Bacterial meningitis.
2. Brain abscess.
3. Pelvic Inflammatory Disease (IM/IV).
4. Epididymitis (IM).
5. Chancroid (IM).
6. Gonorrhoea (IM).
7. Orbital cellulitis.
8. Acute bacterial skin and skin structure infections (ABSSSI) in adults suitable for Outpatient Parenteral Antibiotic Therapy (OPAT).

Chloramphenicol Injection
1. Bacterial meningitis in patients allergic to penicillin.

Clindamycin Injection, capsules, suspension
1. Oral switch in osteomyelitis in patients allergic to penicillin.
2. Diabetic foot infection as per the Scottish Diabetes Foot Action Group Guideline (endorsed by SAPG).
3. Necrotising fasciitis or severe or rapidly progressing skin infection in an intravenous drug user.
4. Surgical prophylaxis where specified in departmental guideline.
5. Second line oral/IV option for patients with lymphoedema unresponsive to first line therapy or penicillin allergic.
6. Children and infants only: Toxic shock syndrome, second line for appendicitis, peritonitis, penetrating abdominal trauma, pilonidal abscess, perianal abscess, acute osteomyelitis, septic arthritis, acute discitis, deep myositis, orbital cellulitis, pre-septal cellulitis, quinsy, cellulitis and post-operative wound infections if penicillin allergic.

Levofloxacin Infusion, tablets
1. Second line in accordance with guidelines for severe pneumonia in hospitalised patients where there is proven penicillin or macrolide resistance or allergy.

Linezolid Infusion, tablets, suspension
1. Staphylococcal pneumonia (e.g. post influenza infection) in patients with penicillin allergy.
2. For MRSA infections post vascular surgery where an oral option is required.

Meropenem injection
1. Febrile neutropenia, in accordance with haematology or oncology sepsis protocol or NHS Grampian empirical antimicrobial guidelines.

Piperacillin/tazobactam Infusion
1. Febrile neutropenia, in accordance with haematology or oncology sepsis protocol and empirical guidelines.
2. Severe diabetic foot infection in non-antibiotic naïve patients as per the Scottish Diabetes Foot Action Group guideline (endorsed by SAPG).

Temocillin injection
1. As an alternative to gentamicin if more than 72 hours intravenous therapy is required according to recommendations in the 'Piperacillin/tazobactam Shortage Resolved SBAR March 2018' or NHS Grampian empirical antimicrobial guidelines.