North Bristol NHS Trust

Antibiotic Stewardship and Prescribing Policy 2018

This policy should be used in conjunction with the
NBT Antibiotic Guidelines

Introduction

This document describes the steps required when initiating and continuing antimicrobials as well as information on the Trust's Antimicrobial Stewardship management systems and reporting. It should be read in conjunction with the NBT Antibiotic Guidelines which provide greater detail on prescribing of individual drugs, the treatment of different conditions, including patients with renal impairment and drug allergy.

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1. Policy Summary

To inform all practitioners of their responsibilities in the safe, effective and appropriate prescribing of antimicrobials in all patient groups.

Current evidence clearly demonstrates that the inappropriate use of antimicrobials is associated with:

- Increased selection of drug-resistant organisms – including Carbapenemase producing Enterobacteriaceae (CPE), Methicillin-resistant *Staphylococcus aureus* (MRSA) and other resistant organisms.
- Changes to the normal bowel flora leading to super-infection with organisms such as *Clostridium difficile*
- Increased risks of drug-related adverse effects
- Increased costs

An Antimicrobial Stewardship Programme is a key component in the reduction of healthcare associated infections (HCAI) The Department of Health's guidance: Antibiotic stewardship '*Start Smart –Then Focus'* provides an outline of evidence-based antimicrobial stewardship in the secondary care setting.

This policy sets out the standards for prescribing antimicrobials (antibacterials, antifungals and antivirals) within the Trust.

2. Policy Statements

Antimicrobial treatment should not be started unless there is clinical or microbiological evidence of infection. If a serious life-threatening infection is suspected then treatment should be commenced promptly.

Empirical antibiotic prescribing should be in accordance with the Trust's Antimicrobial Guidelines. The reason for any departure from the empirical guidelines must be clearly documented in the medical notes.

Antimicrobial treatment must be reviewed within 72 hours and a decision based on clinical and microbiological considerations should be made and clearly documented in the medical notes. Where de-escalation of treatment is appropriate parenteral antimicrobials should be switched to oral equivalents.

The indication for an antimicrobial should be clearly documented in both the patient's medicine chart and in the medical notes.

A review or stop date should be recorded on the medicine chart along with the prescribers name and contact details.

Antimicrobial courses must be regularly reviewed by the clinician.

Other healthcare professionals including infection specialists, pharmacists and nursing staff should query antimicrobial prescriptions or the duration of therapies that do not appear to meet the antimicrobial guidelines.

3. Definition of Terms Used

Antimicrobial therapy refers to the treatment of infection with antibacterial, antifungal or antiviral medication.

Empirical antimicrobial therapy refers to the treatment of infection when the causative organism(s) is/are unknown.

Antimicrobial Prophylaxis for surgery refers to the use of antimicrobials to prevent surgical site infection.

4. Duties and Responsibilities

Infection Specialists

- Provide expert leadership and advice, in conjunction with the antimicrobial pharmacist(s), on the use of antimicrobial drugs and the management of specific patients and infections, including those not specified in the guidelines and adults.
- Work closely with the Antibiotic Stewardship Group to co-ordinate antimicrobial stewardship throughout the Trust.
- Be integrally involved in the development of antimicrobial prescribing guidelines and audits.
- In conjunction with the antimicrobial pharmacist and others, lead a ward-focused antimicrobial team providing regular multidisciplinary antimicrobial stewardship, clinical input and reviewing prescriptions at a ward level.
- Provide teaching and training to other healthcare professionals regarding antimicrobial stewardship.
- Provide expert advice on therapeutic drug monitoring (TDM) of anti-infectives and liaise with the laboratory to provide this in an efficient and effective way.
- Provide antimicrobial resistance data, as needed, on which to base guideline decisions.

Antimicrobial Pharmacist

- Provide leadership and advice, in conjunction with the Infection Specialists on the use of antimicrobials and the management of specific patients and infections, including those not specified in the guidelines.
- In conjunction with the Trust lead for antimicrobials, co-ordinate antimicrobial stewardship throughout the Trust.
- Approve the use of, and monitor the prescribing of antimicrobials, designated as 'restricted antimicrobials' within the Trust.
- Be a key member, in conjunction with the Infection Specialists and others, of a ward-focused antimicrobial team providing regular multidisciplinary antimicrobial stewardship input and reviewing prescriptions at a ward level.
- Work in conjunction with ward clinical pharmacists to ensure review and monitoring of antimicrobial prescriptions as part of their regular clinical pharmacy service provision.
- Arrange for reporting and auditing of antimicrobial prescribing and usage trends and adherence to antimicrobial stewardship guidelines within the Trust.
- Assist with timely acquisition of novel or off licence agents when recommended by Consultant medical microbiologists.
- Ensure timely communication to Infection Specialists when pharmaceutical supply issues are likely to have impact on availability of commonly used antibiotics

Prescribers

- Prescribe antimicrobials according to the best practice guidance provided within this policy.

Nurses and Midwives

- Urgently query unclear prescriptions with the prescriber including those which they consider or potentially erroneous or dangerous
- Start all antimicrobial courses promptly. For some life-threatening indications, such as sepsis, ensure that the first dose of antibiotic is administered within one hour of the diagnosis.
- Prevent missed doses. If an antimicrobial is not available on the ward make it an urgent priority to get a supply from pharmacy so that the dose is not missed. 'Drug Unavailable' is **not** a valid reason for an antimicrobial dose to be missed.
- Be aware of contact details to access on call pharmacist when a prescribed drug is not available in ward stock out of hours .
- Do not give antimicrobials beyond their stop date.

Ward Pharmacists

- Be aware of all patients on the ward undergoing antimicrobial treatment and the reason for the prescription.
- Check the patient's allergy status for antimicrobials.
- Ensure antimicrobials are prescribed according to the best practice guidance provided within this policy. Highlight problems and challenge prescribers on cases that are not. Refer to antimicrobial team if further advice or support is needed.
- Regularly review prescriptions for patients on antibiotics that require therapeutic drug monitoring (TDM) such as gentamicin, amikacin and vancomycin.
- If necessary give advice to the prescriber on how to monitor these antimicrobials or in complex cases it may be necessary to refer the patient to the Antimicrobial Pharmacist, or Infection Specialists.
- Ensure that an adequate supply of antimicrobial is available on the wards to ensure that doses are not missed.

5. Prescribing Antimicrobials

5.1. Initiating Antibiotics

When initiating antimicrobials a clear clinical case definition must be recorded along with associated evidence of infection.

- The decision to start antibiotic therapy should be documented along with the indication or provisional diagnosis in medical records (this must include clear identification of prescriber and contact details). The indication **must** also be recorded on the drug chart.
- NBT antibiotic guidelines should be followed unless there is a clear clinical reason. Any deviation should be recorded in the medical notes. Consult with a medical microbiologist if guideline choice is contraindicated or patient does not respond to therapy.
- All allergies must be recorded on the front of the drug chart and anaesthetic record. The nature of the allergy/reaction should also be stated. Patients with a history of allergies should be assessed and the allergy label removed where it is not correct.

- In severe sepsis or life-threatening infections treatment should be started urgently and within one hour of diagnosis.
- For patients with less severe infection, it is only necessary to cover the expected pathogens. Broad spectrum agents are sometimes not as potent as narrow-spectrum agents against certain pathogens.
- Appropriate specimens should be obtained for MC&S.
- IV therapy should only be used in patients who are severely unwell, unable to tolerate oral therapy or when oral antibiotics would not provide adequate coverage or tissue penetration.
- Prescribers should consider the risks of infection with multidrug resistant pathogens. Risks are increased by previous healthcare exposure, previous antibiotic therapy, prolonged hospital stay, previous infection/colonisation with an MDR pathogen, travel to some countries outside the UK.
- A range of multi resistant bacteria will be encountered clinically, i.e. MRSA, VRE, ESBL producing Enterobacteriaceae, carbapenem resistant Gram negative rods and others. Treatment should be discussed with a Medical Microbiologist.
- Restricted antibiotics should only be prescribed after discussion with a medical microbiologist, or if recommended by these guidelines. A list of antibiotics used at NBT can be found on the BNSSG formulary website.
- A stop or review date **must** be documented on the prescription and in the medical notes when antibiotics are prescribed.

5.2. Continuing Antibiotics

START SMART, THEN FOCUS. Review therapy after 48-72 hours when culture results are available and document the decision in the medical notes. There are 5 options for review:

- **Stop** antibiotic therapy if no clinical evidence of infection
- **Switch** therapy from intravenous to oral (following IV to oral switch guidelines)
- **Change** antibiotics to a narrower spectrum depending on cultures and sensitivities
- **Continue**
- **Discharge** patient with IV antibiotics (after discussion with microbiology)

In addition:-

- Microbiology results should be reviewed daily and therapy de-escalated as needed.
- Treatment with IV antibiotics should be switched to oral therapy within 24 hours of meeting the switch criteria. The rationale for continuing with IV antibiotics should be recorded in the notes.
- Treatment beyond 5 days is not normally necessary. Rationale for continuing beyond 7 days should be clearly documented.

5.3. Clinical evaluation

General factors

Before selecting an antibacterial you must first consider two factors – the patient and the known or likely causative organism. Factors related to the patient are:

- previous or recent antibiotic therapy
- recent hospital stay and duration
- known colonisation with multi-resistant organisms
- history of allergy
- renal and hepatic disease
- resistance to infection (i.e. whether immunocompromised)
- ability to tolerate drugs by mouth
- severity of illness
- ethnic origin
- age and sex
- pregnancy and breast feeding

The known or likely organism and its antibacterial susceptibility, in association with the above factors will suggest one or more antimicrobials, the final choice depending on the microbiological, pharmacological and toxicological properties.

The principals involved in selection of an antibacterial must allow for a number of variables including:

- changing renal and hepatic function
- increasing bacterial resistance
- new information on side effects
- duration of therapy
- dosage and route of administration
- site, type and severity of infection and response

Specific factors

When confronted with a patient who may have infection then the following steps may be useful in establishing a clinical diagnosis of infection.

- Confirm there is a high probability of infection as evidenced by fever, rigors, changes in blood parameters (CRP, WBC, lactate, etc.)

- Establish a primary site of infection by initial history, physical examination and laboratory tests (blood count, chest X-ray, urine analysis). If there is an obvious focus of infection – pneumonia, pyelonephritis, cellulitis, wound infection – then therapy should be directed against the likely organisms causing that infection.

- Further evaluation will depend on establishing in the history
  - community vs hospital acquired infection
  - prior or current medications
  - recent surgery or procedures

- underlying diseases: heart valve disease, splenectomy, intra-abdominal pathology, IVDU, immunosuppression
- travel history

- Physical examination:
  - skin, iv sites, rash, jaundice, wound infection, ulcers
  - head, ear, sinus infection
  - heart, new murmurs
  - lungs
  - abdomen/rectal/pelvic/abdominal scars, rectal and pelvic examination
  - arms/legs, cellulitis
  - CNS, confusion, photophobia, neck stiffness, etc.

5.4. Monitoring and follow up of patients with infection

Hospital inpatients should be regularly reviewed (more frequently for more severely ill patients). Resolution of clinical symptoms and signs should be followed as well as relevant blood parameters (CRP, peripheral WBC, renal function) and serial diagnostic imaging if needed.

Patients who are failing therapy by 48-72h should be discussed with Medical Microbiology.

5.5. Restricted antibiotics

Those antibiotics listed in section 11 are restricted unless recommended for specific indications within guidelines. They are available from pharmacy on a named patient basis after discussion with a Microbiologist.

5.6. Surgical Prophylaxis

Prophylactic antibiotics have an important part to play in the prevention of post-operative wound and deep site infections. The key principle is to have a high concentration of the antimicrobial (s) in the relevant tissues at the time of operation, when bacteria may contaminate the tissues. Surgery may be classified as:

- Clean
- Clean-contaminated
- Contaminated

Whether antibiotics are required and the antibiotic course length depends on the classification of the surgical procedure and if any prosthetic material is being implanted. For most clean-contaminated procedures, this requires only a single dose of the antibiotic(s) within the 60 minutes prior to surgical incision or tourniquet inflation. If surgery is prolonged (over 6 hours) or there is significant intraoperative blood loss (>1.5 litres), a further dose of intra-operative antibiotics may be needed.

See the Surgical Prophylaxis section in the Antibiotic Guidelines for more detail.

Timing of administration of prophylaxis is important to ensure that there are maximum tissue levels at the time of first incision. Oral and intramuscular antibiotics should be given one hour pre-operatively and IV antibiotics given so that the infusion or dose has just been completed at the time of incision.

Where deep seated prosthetic joint infection is suspected, prophylaxis should be delayed until an appropriate number of deep specimens have been taken for microbiology and histology.

5.7. Documentation

The clinical indication, duration or review date, route and dose should be clearly documented in the patient's medical notes and on the drug chart.

Reasons for any deviations from empirical treatment guidelines should be recorded in the patient's medical notes.

Allergies must be recorded on the front of the drug chart and anaesthetic record, along with the nature of the reaction.

5.8. Therapeutic Drug Monitoring

Vancomycin, amikacin and gentamicin concentrations should be checked at appropriate intervals and adjust dose / dosage interval according to concentrations. See Guidelines for Dosing and Monitoring of gentamicin, vancomycin and amikacin for more information.

Gentamicin, vancomycin and amikacin are potentially nephrotoxic and may not be appropriate for patients with acute kidney injury or those with chronic renal impairment. Please discuss with a medical microbiologists if concerned.

Gentamicin or amikacin should not be used for more than 7 days without discussion with an infection specialist.

5.9. Antibiotic Allergy

Patients with a reported antibiotic allergy should have this clearly documented in the appropriate section of the Patients Medication Record and medical notes. The nature of the allergy should also be recorded as some patients will describe previous antibiotic-related nausea or GI upset as an allergy. Every effort must be made by nursing and pharmacy staff to establish the allergy status before supplying or administering an antibiotic, in particular penicillin.

Patients with a history of anaphylaxis, urticarial rash or a rash immediately after penicillin administration (type 1 allergy) should not receive a penicillin, cephalosporin or other beta-lactam antibiotic. Discuss alternative antibiotic treatment with a Medical Microbiologist if a suitable one is not given in the guidelines.

The prescriber should always check which class an antibiotic belongs to before prescribing antimicrobial therapy in a patient with an antibiotic allergy.

6. Antibiotic Duration

6.1. Introduction

Failure to specify course lengths can lead to unnecessarily long courses being administered to patients. This inappropriate usage of antibiotics has adverse consequences which compromise the efficacy of therapy for individuals and the hospital as a whole. These include:

- Adverse drug-related effects for patients
- Alteration of normal flora leading to super-infection with organisms such as *Clostridium difficile*
- Selection of drug resistant bacterial strains
- Unnecessary cost

6.2. Policy

1. Prescribers must specify a stop or review date in the medical notes **and** on the inpatient chart when prescribing an antibiotic.

2. Once the review date is reached the prescriber must state the intended course length. Nursing staff must **not** omit a dose without confirming with a member of the medical team.

3. Once the course length has been reached, nurses must not administer the antibiotic. Pharmacists will cross through the prescription to prevent any more doses being given.

4. If a pharmacist encounters an antibiotic prescription without a specified duration they will contact the medical team for a course length.

5. If a member of the medical team is unavailable then the pharmacist will attach and complete an 'antibiotic duration policy' sticker with the date the antibiotic will be stopped (5 days from the date started).

6. The ward pharmacist will follow up any prescription that has no course length and attempt to contact the medical team. As a minimum an entry will be made in the medical notes and the above mentioned sticker affixed to the inpatient chart.

7. If there is still no course length after 5 days then the ward pharmacist will cross off the antibiotic. The pharmacist will annotate the chart 'as per NBT duration policy' along with a signature and date.

8. Antibiotic courses will not be crossed off over weekends or Bank Holidays; antibiotic courses will only be crossed off by a ward pharmacist who has signed up to the NBT Pharmacy enabling policy

9. The following conditions are excluded from the Policy: infective endocarditis, deep bone and/or joint infection, pleural infections, *C difficile* associated diarrhoea, TB.

6.3. Clinical Risk Management

This policy must be read by all medical and nursing staff. A copy of this policy must be available on all wards.

6.4. Specific durations

Specific suggested durations for a range of conditions are summarised in Section 1.3. of this Guideline.

7. Monitoring Compliance

Monthly prevalence audits will be undertaken on in-patients wards. Policy adherence will be audited by pharmacists Antimicrobial Pharmacist and Medical Infection Specialists.

Audit results will be reported regularly to the DIPC, Infection Prevention & Control Committee, the Drugs and Therapeutic Committee and fed back to prescribers of antimicrobials.

Key performance monitoring points include:

- Indication for antimicrobials clearly recorded in patient medical record.
- Length of course or review date specified on the inpatient medicines administration record.
- Compliance with Trust's Guidelines for the Empirical Treatment of Infections.

8. Training

Details of training for nurses, pharmacists and doctors are under continuing review and development.

The Department of Health document "Start Smart – then Focus" (2015) states:

'There should be mandatory core training in prudent antibiotic use for doctors, pharmacists and nurses in addition to an introductory session on each induction programme. Post-registration, this training should be repeated by all such staff every three years and should specifically cover those antibiotics that are linked to CDI'.

As a result:

- All prescribers will be provided with teaching on prescribing of antimicrobials at induction by the Antimicrobial Pharmacist and/or Consultant in Infection. A mandatory training programme can be delivered via face-to-face learning or e-learning every three years. This may be rolled out to all nursing and pharmacy staff.
- Additional lectures/teaching sessions will be provided to medical staff as part of the junior doctor training programme and when required to nursing staff and pharmacists.

9. Review

This policy will be subject to a planned review every three years as part of the Trust's Policy Review Process. It is recognised however that there may be updates required in the interim arising from amendments or release of new regulations, Codes of Practice or statutory provisions or guidance from the Department of Health or professional bodies. These updates will be made as soon as practicable to reflect and inform the Trust's revised policy and practise.

10. Organisation of the Trust's Antibiotic Stewardship Activities

Antibiotic stewardship at NBT is developed and implemented by the Antimicrobial Stewardship Group. This is a sub group of the Drugs and Therapeutics Committee. The group's membership includes a consultant microbiologist, an antimicrobial pharmacist, an acute care physician, a surgeon, a senior member of the pharmacy management team, an anaesthetist, a senior nurse and primary care representation.

The key roles of the antimicrobial steering committee are to:

- ensure that evidence-based local antimicrobial guidelines are in place and reviewed regularly or when new evidence is published
- ensure regular auditing of the guidelines, antimicrobial stewardship practice and QA measures
- report a regular formal review of the organisation's retrospective antibiotic consumption data.
- identify actions to address non-compliance with local guidelines, general antimicrobial stewardship issues and other prescribing issues

11. NBT Restricted Antimicrobial List

The following agents must only be prescribed after consultation with a medical microbiologist or infective diseases consultant unless prescribed according to NBT antibiotic guidelines. These agents are generally not kept as ward stock and will not be supplied by pharmacy unless approval has been granted.

Agent	Exemptions
Benzylpenicillin	Obs & gynae, NICU
Co-amoxiclav IV	Renal transplant surgery
Benzathine benzylpenicillin	Treatment of syphilis
Piperacillin/tazobactam	Respiratory, renal
Cefuroxime	Obs and gynae
Ceftriaxone	Meningitis, neurosurgery, gonorrhoea, obs&gynae
Cefotaxime	NICU
Ceftazidime	respiratory
Meropenem	respiratory
Ertapenem	
Gentamicin (nebulised)	Respiratory
Tobramycin (IV and nebulised)	Respiratory
Amikacin	
Erythromycin (IV and oral)	Gut motility
Chloramphenicol	
Teicoplanin	
Linezolid	
Colistin IV	
Daptomycin	
Rifampicin IV	
Rifaximin	Hepatic encephalopathy
Streptomycin	
Dapsone	
Ciprofloxacin IV	
Moxifloxacin	
Fosfomycin	
Pristinamycin	
Liposomal amphotericin	
Fluconazole IV	
Voriconazole	
Itraconazole	
Flucytosine	
Posaconazole	

12. References

Department of Health Advisory Committee on Antimicrobial Resistance and Healthcare Associated Infection (ARHAI). Antimicrobial Stewardship: "Start Smart – Then Focus". Antimicrobial Stewardship Toolkit for English Hospitals 2015.
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/417032/Start_Smart_Then_Focus_FINAL.PDF