

GOOD PRACTICE RECOMMENDATIONS FOR HOSPITAL ANTIMICROBIAL STEWARDSHIP IN NHS SCOTLAND

Aim:

Each NHS board, through its Antimicrobial Management Team (AMT) and in liaison with local Infection Prevention and Control Teams (IPCT), is responsible for maintaining a local antimicrobial stewardship programme [1]. This document aims to provide NHS boards with recommendations on core components for local hospital antimicrobial stewardship.

SUMMARY OF GOOD PRACTICE RECOMMENDATIONS	
1	Hospital antimicrobial guidelines should be readily accessible to prescribers and subject to regular review by the Antimicrobial Management Team with a formal review at a minimum of every 3 years
2	Hospital empirical antimicrobial treatment guidelines should give recommendations for commonly encountered infections including the avoidance of unnecessary antibiotic use, a guide to the assessment of infection severity and taking into account minimisation of potential unintended consequences of antimicrobial prescribing
3	Hospital antimicrobial guidelines should give recommendations on review of empirical therapy including criteria and recommendations for intravenous to oral antibiotic switch and guidance on duration of therapy
4	A surgical/ procedural antibiotic prophylaxis guideline, based on recommendations of SIGN 104, should be in place for all specialities where interventional procedures are undertaken
5	A protected/ "alert" list of antimicrobials requiring Microbiology/Infectious Diseases specialist approval should be locally agreed
6	A strategy to limit the prescribing of carbapenem antibiotics should be in place
7	Compliance with antimicrobial guidelines should be monitored
8	Antimicrobial Management Teams in conjunction with clinical specialty and governance teams should be alert to/ monitor for unintended consequences of antimicrobial guidelines
9	Antimicrobial guidelines should be supported by training for all staff that prescribe, administer and monitor antimicrobials.
10	Antimicrobial Management Teams should have robust systems in place to communicate with key clinical personnel regarding antimicrobial prescribing alerts such as issues with resistance or supply

Detailed recommendations

1. **Hospital antimicrobial guidelines should be readily accessible to prescribers (e.g. via NHS board intranet, therapeutic handbook, posters in clinical areas and clinical applications including the SAPG Antimicrobial Companion app [2]) and should refer to relevant SAPG guidance where available [3]. Local guidelines should be subject to regular review and formal update at a minimum every three years by the AMT (in collaboration with the IPCT and relevant clinical specialties). Guideline development and review should take into account the following:**
 - Local and national emerging antimicrobial resistance
 - Local and national surveillance of antimicrobial use
 - Local qualitative data on prescribing (e.g. point prevalence surveys)
 - Rates of *C. difficile*
 - Emergence/recognition of unintended consequences of guidance

2. **Hospital empirical antimicrobial guidelines should:**
 - i. **Give recommendations for commonly encountered infections including:**
 - Respiratory tract infections including community acquired pneumonia, healthcare associated pneumonia, aspiration pneumonia, infective exacerbations of COPD and suspected influenza.
 - Skin and soft tissue infections including rapidly progressive necrotising infections and those related to injection drug use.
 - Urinary tract infection including lower UTI, pyelonephritis and catheter related infections.
 - Intra-abdominal infection including gastroenteritis, acute abdomen, sub-acute bacterial peritonitis.
 - Bone and joint infection including septic arthritis, osteomyelitis and diabetic foot infection.
 - Central Nervous System infections including encephalitis and bacterial meningitis.
 - Sepsis syndrome including sepsis of unknown source differentiating between community and healthcare associated sepsis [4]
 - Fever in the immunocompromised host
 - Suspected infective endocarditis
 - Specific healthcare associated infections: *S. aureus* bacteraemia (SABs) and *C. difficile*. [5]
 - Suspected/ proven Candidaemia

 - ii. **Include/ take into account core principles of antimicrobial stewardship:**
 - Highlight the importance of prudent prescribing with limitation of antibiotics to those where there are clear symptoms or suspicion of bacterial infection.
 - Highlight those circumstances where antibiotics are not or are unlikely to be beneficial such as self-limiting bacterial or viral infections and infections where the source has not been removed/ controlled.
 - Restriction of selected antibiotics with increased capacity for promoting *C. difficile* infection. Examples include cephalosporins, quinolones, clindamycin, co-amoxiclav, piperacillin/tazobactam and carbapenems [6].
 - Preservation of selected antibiotics in order to preserve their future utility / minimise resistance. (See section 5).
 - Guidance on safe use of gentamicin and vancomycin including dosage, clinical, biochemical and therapeutic drug monitoring requirements and duration of treatment. Note that calculators for gentamicin and vancomycin are available on the SAPG Antimicrobial Companion app [2]

iii. Guide optimal pre-treatment clinical assessment of infection

- Promote early identification and prompt management of sepsis within one hour of recognition as per Sepsis 6 Bundle [5]
- Include details of severity of infection assessments e.g. Community acquired pneumonia (CURB-65) and *C. difficile* infection.
- Promote / optimise relevant microbiological sampling (particularly Blood cultures) and use of non-culture investigations prior to initiating therapy.
- Promote review of previous microbiological investigations (when available) before commencing therapy (e.g. MRSA status, recent ESBL infection, CPE carriage, recurrent Pseudomonas exacerbations in bronchiectasis).

iv. Guide optimal selection of antimicrobial therapy

- Ensure suitably potent antimicrobials (including spectrum of activity and dose) are chosen to reduce the risk of treatment failure.
- Recommended route, dose and schedule of antimicrobial administration.
- Promote clarification of penicillin allergy / penicillin allergy de-labelling and provide alternative treatment options for each indication where penicillin allergy is suspected.
- Highlight important antimicrobial- drug interactions (e.g. multiple drug interactions with clarithromycin, reduction of doxycycline and quinolone absorption by cations such as iron and calcium)

v. Promote good documentation of infection diagnosis and management plan at the time of antibiotic initiation. This includes documentation of duration for oral antibiotics on the prescription chart/record.

3. Hospital antimicrobial guidelines should give recommendations on review of empirical therapy including:

- Emphasising the importance of clinical review of the patient and the diagnosis
- Review of microbiological results to inform rationalisation of antibiotic therapy.
- Daily review of intravenous therapy to optimise timely IV to oral switch therapy (IVOST)
- Criteria for IVOST and details of oral switch options (where applicable) for key clinical indications.
- Specification of total duration of therapy (IV and oral) for each indication.
- Support for early hospital discharge in suitable patients either through timely IVOST or, when the facility exists, in selected patient groups through outpatient parenteral antibiotic therapy (OPAT) programmes.
- Where OPAT programmes exist, AMTs to ensure that they are governed in accordance with national good practice recommendations [7].
- Clear documentation of clinical decisions pertaining to review and discontinuation of antimicrobial therapy.

4. Surgical and procedural antibiotic prophylaxis guideline, based on recommendations of SIGN 104 [8], must be in place for all specialities where interventional procedures are undertaken. Examples of specialities include: all surgical specialities and others who undertake endoscopy or implant cardiac devices and those who perform interventional radiology.

5. A protected/ 'alert' list of antimicrobials requiring Infection specialist approval must be locally agreed and implemented:

- Suggested antimicrobials are all 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,

- imipenem- cilastin, ertapenem, fidaxomicin and systemic antifungals other than fluconazole.
 - Measures should be in place to limit unauthorised supply/dispensing of protected/ alert antimicrobials
 - Use of protected/alert agents should be monitored and subject to review by the AMT
- 6. A strategy to limit the use of carbapenem antibiotics should be in place.**
 - Carbapenems should only be prescribed on the recommendation of an infection specialist or as a part of a specialist infections policy authorised by the AMT.
 - Alternatives to carbapenems should be available to support this strategy e.g. aztreonam, temocillin, fosfomycin, tigecycline.
- 7. Compliance with antimicrobial guidelines should be monitored:**
 - As a minimum there should be a system in place to record compliance with prescribing indicators agreed by SAPG. Where data is collected by non AMT members, validation by the AMT should be undertaken on a regular basis e.g. 6 monthly.
 - Local surveillance of hospital use of antimicrobials following SAPG guidance should be undertaken [9]
 - A locally agreed programme of regular point prevalence audits is recommended to complement quantitative data to provide information on indication for use and compliance with antimicrobial prescribing policy/guidance. This may be carried out across the whole hospital or through a rolling programme of ward/unit level audits. Timely feedback to clinical teams should be part of the process and a feedback loop of actions generated established.
- 8. Antimicrobial Management Teams in conjunction with clinical specialty and governance teams should be alert to/monitor for unintended consequences of antimicrobial guidelines and antimicrobial supply issues.**
 - It is recommended that unintended consequences of antibiotics are considered through communication with and collaboration between the AMT and other clinical specialists and hospital governance bodies including IPCTs and ADTCs.
 - Examples of known potential unintended consequences include renal and oto-toxicity related to aminoglycosides, surgical site infections related to inadequate surgical antibiotic prophylaxis
 - AMTs should be aware of and consider contingency plans (antimicrobial substitution) for acute shortages of key antimicrobials.
 - Consider early warning system/ signals where appropriate.
- 9. Antimicrobial guidelines should be supported by training for all staff that prescribe, administer and monitor antimicrobials.**
- 10. Antimicrobial Management Teams should have robust systems in place to communicate with key clinical personnel regarding antimicrobial prescribing alerts**
 - AMTs should discuss and review proposed actions where compliance with guidelines is sub-optimal or where trends in usage suggest there is a change in prescribing habits or unintended consequences of guidance has been identified or there are acute shortages of key antimicrobials.
 - There should be clear lines of communication between the AMT and Medical, Pharmacy and Nursing management and ADTC to facilitate rapid communication of actions for prescribers/ other healthcare professionals when required.

References/ links

1. The Scottish Management of Antimicrobial Resistance Action Plan [ScotMARAP] 2014. Scottish Government <http://www.gov.scot/Resource/0045/00456736.pdf>
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<http://www.antimicrobialcompanion.scot/national-template/>
3. SAPG Hospital Prescribing guidance <https://www.sapg.scot/quality-improvement/hospital-prescribing/>
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<http://emj.bmj.com/content/early/2010/10/28/emj.2010.095067.full.pdf>
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7. Chapman ALN, Seaton RA, Cooper MA et al Good practice recommendations for outpatient parenteral antimicrobial therapy (OPAT) in adults in the UK: a consensus statement J Antimicrob Chemother doi:10.1093/jac/dks003 <http://jac.oxfordjournals.org/content/67/5/1053.full>
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9. SAPG Framework for local surveillance of antimicrobial use
<https://www.sapg.scot/media/3750/local-surveillance-of-antimicrobial-use-framework-for-amts.pdf>