



Government of **Western Australia**
Department of **Health**

Antimicrobial Stewardship Guidance Document

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Antimicrobial Stewardship

Antimicrobial stewardship (AMS) is a systematic approach to optimising use of antimicrobials to reduce inappropriate use, improve patient outcomes and reduce adverse consequences of antimicrobials (including antimicrobial resistance, secondary infections (e.g. *Clostridium difficile*), toxicity and unnecessary costs).

It is recommended that hospitals and health services have an AMS Program in place in accordance with the criteria stipulated in Standard 3.14 of the National Safety and Quality Health Service Standards.¹

Governance arrangements for an antimicrobial stewardship program should include;

- Establishment of an AMS Committee lead by a multidisciplinary team with the authority and resources to enable implementation of the program, membership at a minimum including,
 - an appropriate clinician (ideally a clinical microbiologist or infectious diseases physician if available)
 - a clinical pharmacist (with infectious diseases training if possible), and
 - an infection control nurse/nurse practitioner.

Note: For smaller facilities the functions of the AMS Committee may be managed at an Area Health Service level or form part of a combined committee, such as the Drug and Therapeutics Committee (DTC) or Clinical Risk and Infection Prevention Committee.

- Clearly defined links with committees responsible for drug and therapeutics, infection prevention and management, patient safety and quality or clinical governance.
- A limited selection of available antimicrobials for use (within defined criteria) to minimise the development of resistant organisms and promote effective and economical prescribing.
- The restricted availability of certain antimicrobials, which require approval prior to prescribing for specific indications, determined by the health service. Restriction of antimicrobials should take the following into consideration: spectrum, safety, prevalence of resistance, resistance-inducing and amplification potential, frequency

of indication, potential patient hypersensitivity and cost. These restrictions should be governed by the AMS Committee and endorsed by the DTC.

- Assignment of responsibility to the tasks of risk assessment, management, and monitoring of antimicrobials.
- Development of local antimicrobial prescribing policies in consultation with the local AMS Committee or DTC.

Roles and Responsibilities

Antimicrobial Stewardship Committee / Drug and Therapeutics Committee

- Define restriction status and approval process for antimicrobial agents prescribed within the hospital and health service. At a minimum, the approval process should include a discussion with an infectious diseases physician / clinical microbiologist that is documented in the patient's medical record, and is therefore auditable.
- Drug and Therapeutic Committees or AMS Committees must review and recommend any alterations to restrictions, audit antimicrobial use and oversee related education.
- Ensure medication safety is a key consideration in all formulary decisions and antimicrobials considered to be high-risk are included in the high-risk medication list when added to the formulary.
- Development and endorsement of policies, protocols and guidelines relating to antimicrobial use.
- Monitor antimicrobial use and analyse antimicrobial resistance reported by the pathology service and policy compliance rates and formulate corrective action, if indicated.

Chief Pharmacist

- Provision of clinical pharmacy expertise to advise and educate prescribers and implement relevant policy: contribute to AMS Committee activities including program implementation and audit; participate in the application of antimicrobial formulary and prescribing guidelines.

Clinical Microbiology

- Provide best practice diagnostic testing for infection, selective antibiotic susceptibility reporting, clinical microbiology advice, and regular analyses of antimicrobial resistance (antibiograms).

Clinical staff involved in medication management must comply with policy and standards of antimicrobial medicines.

- **Prescribers** (e.g. medical, nurse practitioners, other prescribers) are responsible for:
 - complying with the principles of good antimicrobial prescribing in this policy;
 - documenting the indication and expected duration for prescription of all antimicrobials in the medical record; and
 - complying with the local approval process for restricted antimicrobials, as well as manage any therapeutic drug monitoring if required.
- **Pharmacists** are responsible for:
 - reviewing antimicrobial orders for adherence to local guidelines, and
 - providing timely feedback, where applicable, to the prescriber.

When therapeutic drug monitoring is necessary, the pharmacist advises on sampling time, and assists in interpretation of results and adjustment of dosing regimen.

- **Prescribers and pharmacists** will follow the principles of use of antimicrobials as per the current version of Therapeutic Guidelines: Antibiotic® (eTG: Antibiotics), as well as local procedures for each antimicrobial agent. They will review and document symptoms of infection, duration of treatment, and support the switch from intravenous to oral therapy when appropriate for the patient.
- **Nurses** are responsible for:
 - ensuring antimicrobials are administered in accordance to the prescription, and
 - ensuring the six-rights of medication administration are met each time, as specified in Nursing Practice Policy.
 - In addition, if therapeutic drug monitoring is needed, ensure blood is sampled at an appropriate time, and the result is reviewed prior to administering the next dose or as specified by the doctor or pharmacist.

Evaluation

- Health services are responsible for carrying out regular audits and evaluating compliance with antimicrobial prescribing and restrictions.
- Setting measurable goals can be a useful tool to enhance uptake of implementation of AMS programs and track performance and compliance.

- Assessing compliance against the [Antimicrobial Stewardship Clinical Care Standards](#) is recommended.²
- Relevant data (i.e. audits, education sessions, completion of online learning modules, and quality use of medication indicators) should be regularly monitored to identify local risks, inform the focus of local programs and evaluate the effectiveness of the local antimicrobial stewardship program activities.
 - Antimicrobial usage data is to be regularly analysed by the AMS committee to provide antimicrobial usage data (ideally normalised to usage density rates) and usage reports of antimicrobial agents determined by the hospital or health service. Participation in the National Antimicrobial Utilisation Surveillance Program (NAUSP) and the National Antimicrobial Prescribing Survey (NAPS) is strongly encouraged.
 - Pathology data provided by the clinical microbiology service in the form of a standard antibiograms should be reviewed on a regular basis.
- Audit results are to be carefully analysed and distributed appropriately to prescribers, pharmacists, microbiologists and nursing staff. The feedback will highlight compliance with guidelines, and areas of non-concordance requiring immediate attention and action by the prescribers. This will be supported by education from the AMS team.

Principles of Judicious Antimicrobial Prescribing

The appropriate use of antimicrobials is critical to the effective delivery of care for patients and is a key factor in the management of antimicrobial resistance.

Antimicrobial stewardship is defined as processes to assist and support clinicians with decisions regarding the optimal selection, dose and duration of an antimicrobial agent. The objective of AMS is to ensure the best clinical outcome for the treatment or prevention of infection, with minimal toxicity to the patient and minimal impact on subsequent resistance development.

Key principles for judicious antimicrobial use

1. In most instances it is good practice to collect appropriate specimens whenever possible prior to commencement of empiric antimicrobial therapy as long as this doesn't unduly delay therapy.
2. Consider the following factors prior to prescribing any antimicrobial agent³:

- M** microbiology guides therapy (where possible)
- I** indications should be evidence based
- N** narrowest spectrum required
- D** dosage appropriate to the site and type of infection
- M** minimise duration of therapy
- E** ensure monotherapy (wherever possible).

3. The Antimicrobial Stewardship Clinical Care Standard aims to ensure that a patient with a bacterial infection receives optimal treatment with antimicrobials.² 'Optimal treatment' means treating patients with the right antimicrobial for the condition, at the right dose, by the right route, at the right time and for the right duration based on accurate assessment and timely review. The 9 standards include:

- 1) A patient with a life-threatening condition due to a suspected bacterial infection receives prompt antibiotic treatment without waiting for the results of investigations.
- 2) A patient with a suspected bacterial infection has samples taken for microbiology testing as clinically indicated, preferably before starting antibiotic treatment.
- 3) A patient with a suspected infection, and/or their carer, receives information on their health condition and treatment options in a format and language that they can understand.
- 4) When a patient is prescribed antibiotics, whether empirical or directed, this is done in accordance with the current version of the Therapeutic Guidelines: Antibiotic (or local antibiotic formulary).⁴ This is also guided by the patient's clinical condition and/or the results of microbiology testing.
- 5) When a patient is prescribed antibiotics, information about when, how and for how long to take them, as well as potential side effects and a review plan, is discussed with the patient and/or their carer.
- 6) When a patient is prescribed antibiotics, the reason, drug name, dose, route of administration, intended duration and review plan is documented in the patient's health record.

- 7) A patient who is treated with broad-spectrum antibiotics has the treatment reviewed and, if indicated, switched to treatment with a narrow-spectrum antibiotic. This is guided by the patient's clinical condition and the results of microbiology tests.
 - 8) If investigations are conducted for a suspected bacterial infection, the responsible clinician reviews these results in a timely manner (within 24 hours of results being available) and antibiotic therapy is adjusted taking into account the patient's clinical condition and investigation results.
 - 9) If a patient having surgery requires prophylactic antibiotics, the prescription is made in accordance with the current Therapeutic Guidelines: Antibiotic (or local antibiotic formulary)⁴, and takes into consideration the patient's clinical condition.
4. Antibiograms, or cumulative antibiotic susceptibility results that reflect local resistance epidemiology, may be used to guide empiric antibiotic decision making.
 5. A switch from intravenous (IV) administration to the oral formulation of an antimicrobial is to be made as soon as it is safe to do so and IV to oral switch is to be promoted by pharmacists, clinicians, and local AMS committees and programs.

Criteria for IV to oral switching:

- When the patient is tolerating oral fluids/food and there is no reason to believe poor oral absorption from the gastrointestinal tract.
 - Temperature is less than 38°C or improving over 24 hours.
 - Signs and symptoms of the infection are improved or resolved.
 - An appropriate oral alternative is available.
6. All patients on antimicrobial agents are to be reviewed at each medical practitioner attendance to consider whether it is clinically appropriate to de-escalate to a narrower spectrum agent, to switch from IV to oral agents, or to cease antimicrobials.
 7. Protocols for antibiotic use must be consistent with the most recent version of Therapeutic Guidelines: Antibiotic.⁴ This requires access to the current edition of these guidelines by clinical staff (electronic versions or provision of hard copies) and prescriber education programs. Where other local guidelines exist (e.g. state, site specific) local guidelines should be used in preference.

8. Access to specific broad spectrum antibiotic, antifungal and antiviral agents should be restricted at each site to prevent overuse and selection of resistant organisms and to mitigate the cost of therapy.

Surgical prophylaxis⁶

Prophylaxis should only be considered in the following scenarios, when either there is a significant risk of infection or when the consequences of infection would be disastrous (e.g. joint replacement surgery):

1. Contaminated surgery – Surgical antimicrobial prophylaxis is strongly recommended when there is a risk of macroscopic soiling of the operative field.

Examples include: large bowel resection, biliary or genitourinary tract surgery with infective bile or urine.

2. Clean-contaminated surgery – surgical antimicrobial prophylaxis is recommended where the mucosa is penetrated under controlled conditions without unusual contamination.

Examples include laryngectomy, uncomplicated appendectomy, cholecystectomy, transurethral resection of prostate gland.

3. Clean surgery – surgical antimicrobial prophylaxis is only recommended for insertion of a prosthesis or artificial device or for high risk areas such as the central nervous system, eye, aorta or sternum.

Antimicrobial prophylaxis cannot be relied upon to overcome poor surgical technique (e.g. inadequate haemostasis, excessive damage to tissues, inadequate debridement).

The first dose(s) of surgical prophylaxis should be given at a time that ensures adequate plasma and tissue drug levels are achieved at the start of the procedure (i.e. administration of prophylaxis one hour prior to commencement of the operation).

Repeat intra-operative doses are recommended for prolonged procedures of more than three hours or if there is excessive blood loss.

“Prophylaxis” continuing for more than twenty four hours postoperatively is unnecessary and potentially dangerous.

Recommendations for Auditing and Monitoring of Antimicrobial Usage.

Antimicrobial Stewardship Clinical Care Standard Indicators are available and are recommended parameters to monitor antimicrobial use²:

Quality statement 1 – Life-threatening conditions

1a Median time from first clinical contact to first dose of antibiotics for patients with suspected life threatening infection such as bacterial meningitis or for patients requiring admission to an intensive care unit (ICU) for suspected sepsis.

Quality statement 4 – Use of guidelines and clinical conditions

4a Proportion of antibiotic prescriptions that are in accordance with guidelines

4b Rate of antibiotic/allergy mismatch in prescribing

Quality statement 6 - Documentation

6a Documentation of indication rate

Quality statement 7 – Use of broad-spectrum antibiotics

7a Proportion of patients on broad spectrum antibiotics for which a medical review is documented within 48 hours from first prescription.

Quality statement 9 – Surgical prophylaxis

9a Percentage of patients with surgical prophylaxis prescribed according to guidelines

9b Percentage of patients who are administered indicated prophylaxis within 2 hours before surgical procedure

9c Percentage of patients whose prophylaxis was discontinued within 24 hours after surgery.

[Clinical Excellence Commission Quality Use of Medicines Indicators](#) are also available to monitor antimicrobial prescribing⁷:

2.1 Percentage of patients undergoing specified surgical procedures that receive an appropriate prophylactic antibiotic regimen.

2.2 Percentage of prescriptions for restricted antibiotics that are concordant with drug and therapeutics committee approved criteria.

2.3 Percentage of patients in whom doses of empirical aminoglycoside therapy are continued beyond 48 hours.

2.4 Percentage of adult patients with community acquired pneumonia (CAP) that are assessed using an appropriate validated objective measure of pneumonia severity.

2.5 Percentage of patients presenting with community acquired pneumonia (CAP) that are prescribed guideline concordant antibiotic therapy.

Other Key Performance Indicators

- Median time from first clinical contact to first dose of antibiotics for patients with suspected bacterial meningitis/sepsis
- Proportion of antibiotic prescriptions that are in accordance with guidelines
- Rate of antibiotic/allergy mismatch in prescribing
- Rate of documentation of the indication for antimicrobial use.
- Proportion of patient prescription of broad spectrum antibiotics for which a medical review is documented within 48 hours from first prescription
- Percentage of patients with surgical prophylaxis prescribed according to guidelines
- Percentage of patients who are administered indicated prophylaxis within 2 hours before surgical procedure
- Percentage of patients whose prophylaxis was discontinued within 24 hours after surgery or 48 hours for vascular surgery
- Compliance with Therapeutic Guidelines: Antibiotic for empiric treatment of common infective conditions (e.g. community acquired pneumonia, urinary tract infection, sepsis)
- Compliance with gentamicin dosage and monitoring standards
- Compliance with IV-oral switch programs
- Participation in the annual National Antimicrobial Prescribing Survey (NAPS)

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