Antimicrobial stewardship in Australian hospitals

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Executive summary

The introduction of antimicrobial agents must be considered as one of the most significant milestones in modern medicine. Previously feared and often fatal infections became curable, and the treatment seemed so safe and effective that doctors often prescribed antibiotics inappropriately for dubious indications and for longer than necessary. For many years, the emergence of resistance in some bacterial species caused little alarm, because new, more effective agents with broader antibacterial spectra were being developed. This is no longer the case. The prevalence of multidrug-resistant bacterial pathogens such as methicillin-resistant Staphylococcus aureus (MRSA) has risen alarmingly over the last 40 years, while in recent years few truly novel antimicrobials have been developed.

Inappropriate use of antimicrobials leads to the emergence of resistant bacteria, an increase in the risk of patient harm from avoidable adverse reactions and interactions with other drugs, infection with multiresistant bacteria or Clostridium difficile, and unnecessary costs.1-3

Most importantly, inappropriate antimicrobial use increases the risk to patients of colonisation and infection with resistant organisms and subsequent transmission to other patients. The consequences of this are now well known — patients with infections due to resistant bacteria experience delayed recovery, treatment failure and even death.6 Turnidge et al. reported that one in five Australian and New Zealand patients diagnosed with S. aureus bacteraemia died, and that patients with MRSA infections had a higher mortality rate than those with methicillin-sensitive S. aureus infections.6 Roberts et al. reported that twice as many patients with antimicrobial-resistant infections died than patients infected with nonresistant organisms.5 When multiresistant pathogens are prevalent, clinicians are forced to use broader spectrum and usually more expensive agents to treat seriously ill patients. All of these effects contribute to increasing healthcare and societal costs.5

Research shows that up to half of antimicrobial regimens prescribed in Australian hospitals are considered inappropriate.7-10 Compared with northern Europe, Australian hospitals have a higher overall rate of inpatient antimicrobial use. Further work is required to optimise the use of antimicrobials in our hospitals.

As antimicrobial resistance increases and development of new antimicrobial agents declines, it is critical that antimicrobials are used wisely and judiciously.
Antimicrobial stewardship

An effective approach to improving antimicrobial use in hospitals is an organised antimicrobial management program — known as antimicrobial stewardship (AMS).  

AMS involves a systematic approach to optimising the use of antimicrobials. It is used by healthcare institutions to reduce inappropriate antimicrobial use, improve patient outcomes and reduce adverse consequences of antimicrobial use (including antimicrobial resistance, toxicity and unnecessary costs).

Effective hospital AMS programs have been shown to decrease antimicrobial use and improve patient care. Along with infection control, hand hygiene and surveillance, AMS is considered a key strategy in local and national programs to prevent the emergence of antimicrobial resistance and decrease preventable healthcare associated infection.

Comprehensive AMS programs have demonstrated an overall reduction in antimicrobial use by 22–36% and substantial pharmacy cost savings. Successful programs have been shown to improve the appropriateness of antimicrobial use, and reduce institutional resistance rates, morbidity, mortality and healthcare costs. Although data on the economics of AMS programs are limited, maintaining an AMS team to optimise treatment of bacteraemia has been shown to be cost-effective.

The contribution of antimicrobial stewardship to the Australian Healthcare Associated Infection Program

Prevention and control of healthcare associated infection (HAI) is an essential element of patient safety and a priority area for the Australian Commission on Safety and Quality in Health Care (ACSQHC). Improving the safe and appropriate use of antimicrobials in hospitals is an important component of preventing HAI. AMS is one of several initiatives in the ACSQHC HAI program that has been identified as an important strategy to address systemic problems and gaps in the prevention of HAI. The program aims to ensure that comprehensive actions are undertaken in a nationally coordinated way by leaders and decision makers in both public and private health systems.

Aim of this publication

This publication is designed to provide clinicians and health administrators with the evidence for the use of specific quality improvement and patient safety activities to reduce preventable HAI. It has been produced primarily for use in hospitals.

The publication provides guidance on developing and introducing a hospital AMS program. It describes the structure, governance and resources needed for an effective program, along with those strategies shown to influence antimicrobial prescribing and reduce inappropriate use.
Elements of antimicrobial stewardship

AMS programs are multidisciplinary: they utilise the expertise and resources of infectious diseases physicians, clinical microbiologists and pharmacists. Their success depends on the explicit support of the hospital administration, the allocation of adequate resources, and the cooperation and engagement of prescribers.

The requirements for effective AMS programs in hospitals are well described in the literature. Successful programs contain a range of strategies — essential and complementary — and the structure and governance to support their implementation.

Requirements for AMS programs

Structure and governance

The overall accountability for antimicrobial management control lies with the hospital administration. They are responsible for ensuring an antimicrobial management program is developed and implemented, and outcomes are evaluated.

Hospital management support is needed, including:

- providing dedicated resources for stewardship activities, education, and measuring and monitoring antimicrobial use
- establishing a multidisciplinary AMS team with core membership (wherever possible) of either an infectious diseases physician, clinical microbiologist or nominated clinician (lead doctor), and a clinical pharmacist
- ensuring that AMS resides within the hospital’s quality improvement and patient safety governance structure, and clear lines of accountability exist between the chief executive; clinical governance; drug and therapeutics, and infection prevention and control committees; and the AMS team.

Essential strategies for all hospitals

Five strategies considered essential for effective AMS in Australia are:

- implementing clinical guidelines that are consistent with the latest version of Therapeutic Guidelines: Antibiotic, and which take into account local microbiology and antimicrobial susceptibility patterns
- establishing formulary restriction and approval systems that include restricting broad-spectrum and later generation antimicrobials to patients in whom their use is clinically justified
- reviewing antimicrobial prescribing with intervention and direct feedback to the prescriber — this should, at a minimum, include intensive care patients
Executive summary

- monitoring performance of antimicrobial prescribing by collecting and reporting unit or ward-specific use data, auditing antimicrobial use, and using quality use of medicines indicators

- ensuring the clinical microbiology laboratory uses selective reporting of susceptibility testing results that is consistent with hospital antimicrobial treatment guidelines.

**Antimicrobial stewardship activities according to local priorities and resources**

Activities that may be undertaken according to local priorities and available resources include:

- educating prescribers, pharmacists and nurses about good antimicrobial prescribing practice and antimicrobial resistance

- using point-of-care interventions, including streamlining or de-escalation of therapy, dose optimisation or parenteral-to-oral conversion

- using information technology such as electronic prescribing with clinical decision-support or online approval systems

- annually publishing facility-specific antimicrobial susceptibility data.

**Structure of document**

This document contains 10 chapters that summarise current evidence about AMS programs and their implementation in hospitals. The document has two parts:

1. Strategies for implementing and sustaining AMS (Chapters 1–6)
2. Resources required for AMS (Chapters 7–10).

Each chapter begins with key points and recommendations required for implementing effective AMS in hospitals. These are listed in the next section.