

The background of the cover features a blue stethoscope and several white, oval-shaped pills scattered on a light blue surface. The stethoscope is positioned in the upper right, and the pills are in the lower left and center. The overall color scheme is light blue and white.

Antimicrobial Stewardship in Australian Hospitals

2011

Editors: **Margaret Duguid**
and **Marilyn Cruickshank**

AUSTRALIAN COMMISSION ON
SAFETY AND QUALITY IN HEALTHCARE



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**Editors: Margaret Duguid
and Marilyn Cruickshank**

January 2011

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Paperback ISBN 978-0-9806298-9-7

Online ISBN 978-0-9870617-0-6

Duguid M and Cruickshank M (eds) (2010). *Antimicrobial stewardship in Australian hospitals*, Australian Commission on Safety and Quality in Health Care, Sydney.

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Edited and produced by Biotext, Canberra

Contents

Acronyms and abbreviations.....	viii
Acknowledgements.....	x
Executive summary.....	xii
Key points and recommendations.....	xvi
Introduction	xxvi
Part I Strategies for implementing and sustaining antimicrobial stewardship	I
I Implementing an antimicrobial stewardship program.....	2
1.1 Key points.....	2
1.2 Recommendations.....	3
1.3 Antimicrobial management programs	4
1.4 Effective implementation of antimicrobial stewardship programs	4
1.5 The evidence for antimicrobial stewardship programs	5
1.6 Governance of antimicrobial stewardship programs.....	7
1.7 The antimicrobial stewardship team.....	9
1.8 The antimicrobial stewardship program plan	10
1.9 Antimicrobial prescribing and management policy.....	12
1.10 Goals and measurable outcomes for antimicrobial stewardship	14
1.11 Specific antimicrobial stewardship strategies.....	15
1.12 Testing antimicrobial stewardship strategies.....	26
1.13 Implementing and sustaining successful antimicrobial stewardship programs.....	26
1.14 Summarising requirements for antimicrobial stewardship programs.....	28
2 Formularies and antimicrobial approval systems	30
2.1 Key points.....	30
2.2 Recommendations.....	31
2.3 Strategies for antimicrobial stewardship.....	31
2.4 Formulary systems.....	31
2.5 Antimicrobial approval systems	34
2.6 Antibiotic cycling.....	39
3 Antimicrobial review and prescriber feedback	40
3.1 Key points.....	40
3.2 Recommendations.....	41
3.3 Practice review	41
3.4 Reviewing practice.....	42
3.5 Who should undertake the review and feedback process?.....	43
3.6 What should the feedback include and how should it be provided?	43
3.7 Published benefits	46

4	Point-of-care interventions.....	48
4.1	Key points.....	48
4.2	Recommendations.....	48
4.3	Benefits of point-of-care interventions.....	49
4.4	Directed therapy based on the prescription of a restricted antimicrobial.....	49
4.5	Directed therapy based on microscopy results and other rapid tests.....	50
4.6	Directed therapy based on culture and susceptibility test results (de-escalation or streamlining).....	50
4.7	Dosing schedule optimisation.....	51
4.8	Duration.....	52
4.9	Parenteral-to-oral conversion.....	52
4.10	Who should provide point-of-care interventions?.....	53
5	Measuring the performance of antimicrobial stewardship programs.....	54
5.1	Key points.....	54
5.2	Recommendations.....	55
5.3	Assessing antimicrobial stewardship activities.....	55
5.4	Effective use of surveillance data in stewardship programs.....	56
5.5	Measuring the volume of antimicrobial usage.....	56
5.6	Measuring the quality of antimicrobial usage.....	61
5.7	Reporting and use of data at state and national levels.....	62
5.8	Process and outcome measures of stewardship activities.....	63
6	Education and competency of prescribers.....	66
6.1	Key points.....	66
6.2	Recommendations.....	67
6.3	Education of prescribers.....	67
6.4	Educational strategies.....	68
6.5	The evidence that education influences prescribing.....	69
6.6	Educational resources.....	71
6.7	Education programs.....	73
6.8	The influence of the pharmaceutical industry.....	76
	Part 2 Resources required for antimicrobial stewardship.....	79
7	The role of the clinical microbiology service.....	80
7.1	Key points.....	80
7.2	Recommendations.....	81
7.3	Clinical microbiology services' involvement in antimicrobial stewardship.....	82
7.4	Diagnostic testing practice.....	82
7.5	Microbiology reporting practice.....	84
7.6	Clinician liaison.....	88
7.7	Antimicrobial level monitoring and review.....	89
7.8	Antimicrobial resistance analysis and reporting.....	89

8	The role of the infectious diseases service	92
8.1	Key points	92
8.2	Recommendations	93
8.3	Infectious diseases services and antimicrobial stewardship	93
8.4	Leading the antimicrobial stewardship program	94
8.5	Consultation with infectious diseases services	95
8.6	Antimicrobial formularies and approval systems	96
8.7	Review and feedback strategies	97
8.8	Antimicrobial policies, guidelines and clinical pathways	98
8.9	Liaising with other clinical departments and committees	102
8.10	Education of staff.....	103
8.11	Interactions with pharmaceutical companies and their representatives	103
9	The role of the pharmacy service.....	104
9.1	Key points	104
9.2	Recommendations	105
9.3	Pharmacy services and antimicrobial stewardship	105
9.4	Pharmacy administration.....	106
9.5	Pharmacists providing clinical and dispensary services	106
9.6	Specialist infectious diseases pharmacists	106
9.7	Roles and responsibilities of infectious diseases pharmacists.....	106
9.8	Skills and training.....	111
10	Use of computer technology to support antimicrobial stewardship	112
10.1	Key points	112
10.2	Recommendations	112
10.3	Use of computer technology to support antimicrobial stewardship	113
10.4	Electronic antimicrobial decision-support systems	113
10.5	Electronic prescribing and medication management systems	115
10.6	Information technology requirements	117
10.7	Implementing antimicrobial computerised decision-support systems	118
	Appendixes.....	119
A1	Antimicrobial usage: monitoring and analysis.....	120
A2	Resource materials	144
	Glossary.....	186
	References.....	188
	Index	201

Tables

Table 1.1	Comparison of core antimicrobial stewardship interventions.....	19
Table 1.2	Examples of strategies employed in successful antimicrobial stewardship programs	25
Table 1.3	North Coast Area Health Service culture change initiatives.....	27
Table 2.1	Effect of formulary changes on prevalence of multiresistant pathogens	33
Table 6.1	Examples of passive and active education strategies.....	69
Table 6.2	Content of e-learning package, Central Manchester University Hospitals Trust.....	75
Table 6.3	Influence of gifts from pharmaceutical industry on prescribing behaviour	77
Table 7.1	Example microbiology report comments that interpret isolate significance	85
Table 7.2	Example microbiology report comments that provide antimicrobial susceptibility interpretation	86
Table 7.3	Example microbiology report comments that provide antimicrobial management advice.....	87
Table 9.1	Pharmacy liaison with departments and committees.....	108

Figures

Figure 1.1	Targeted antibiotic (Abx) consumption and nosocomial <i>Clostridium difficile</i> -associated disease (CDAD) incidence per 1000 patient days of hospitalisation.....	6
Figure 1.2	Model for antimicrobial prescribing pathways in acute hospitals (Scotland)	8
Figure 3.1	Rates of nosocomial <i>Clostridium difficile</i> and resistant Enterobacteriaceae infections, expressed per 1000 patient days, before (1989–91) and after (1992–98) implementation of the antimicrobial management program	47
Figure 5.1	Amphotericin B use in an intensive care unit.....	57
Figure 5.2	Third generation cephalosporin use in inpatients in an Australian teaching hospital (defined daily doses per 1000 bed-days) Shewhart/EWMA chart from September 2003 to March 2007	58
Figure 5.3	Third-generation cephalosporin use in inpatients in an Australian teaching hospital (defined daily doses per 1000 bed-days), GAM chart from September 2003 to March 2007	59

Figure 5.4	Third-generation cephalosporin use in inpatients in an Australian teaching hospital (defined daily doses per 1000 bed-days), September 2003 to March 2007.....	60
Figure 6.1	Antimicrobial prescribing process (solid boxes) and antimicrobial stewardship program (dotted boxes)	68
Figure 7.1	Example of a hospital antibiogram.....	91
Figure A1.1	Evolution of the monthly per cent methicillin-resistant <i>Staphylococcus aureus</i> (MRSA) and monthly sum of lagged antimicrobial use as identified in a polynomial distributed lag model: macrolides (lags of 1–3 months), third-generation cephalosporins (lags of 4–7 months) and fluoroquinolones (lags of 4 and 5 months), Aberdeen Royal Infirmary, January 1996–December 2000.....	123
Figure A1.2	The usage of ceftriaxone at a South Australian hospital.....	125
Figure A1.3	Usage of ciprofloxacin between July 2004 and June 2007 by National Antimicrobial Utilisation Surveillance Program contributors.....	135
Figure A1.4	Comparison of aggregate antibiotic usage rates in Australian hospitals with international benchmarks.....	137

Boxes

Box 1	Summary of contents of the SACAR template for hospital antimicrobial policy	13
Box 2	The antimicrobial creed, MINDME.....	13
Box 3	United Kingdom Specialist Advisory Committee on Antimicrobial Resistance recommended guidelines.....	17
Box 4	An example of a successful Australian antimicrobial stewardship (AMS) program	22
Box 5	Requirements for antimicrobial stewardship programs.....	28

Acronyms and abbreviations

ACSQHC	Australian Commission on Safety and Quality in Health Care
ADE	adverse drug event
AMS	antimicrobial stewardship
ATC	anatomical therapeutic chemical
CAPTION	community-acquired pneumonia: towards improving outcomes nationally
CDI	<i>Clostridium difficile</i> infection
CDSS	clinical decision-support systems
CHRISP	Centre for Healthcare Related Infection Surveillance and Prevention (Queensland)
CMS	clinical microbiology service
DANMAP	Danish Integrated Antimicrobial Resistance Monitoring and Research Programme
DDD	defined daily dose
DUE	drug usage evaluation
EAGAR	Expert Advisory Group on Antimicrobial Resistance
eMMS	electronic medication management system
e-prescribing	electronic prescribing
ESCMID	European Society of Clinical Microbiology and Infectious Disease
HAI	healthcare associated infection
ICU	intensive care unit
ID	infectious diseases
IT	information technology
IV	intravenous
JETACAR	Joint Expert Technical Advisory Committee on Antibiotic Resistance
MRSA	methicillin-resistant <i>Staphylococcus aureus</i>
NAUSP	National Antimicrobial Utilisation Surveillance Program
NHS	National Health Service (United Kingdom)

NPS	National Prescribing Service
OBD	occupied bed-day
PBAC	Pharmaceutical Benefit Advisory Committee
PBS	Pharmaceutical Benefits Scheme
POCI	point-of-care intervention
US	United States
WHO	World Health Organization

Acknowledgements

This book is a culmination of the work of a dedicated group of clinicians committed to improving antimicrobial use in hospitals and reducing the risk of harm to patients from inappropriate antimicrobial prescribing.

In particular, the Australian Commission on Safety and Quality in Health Care would like to thank the members of the Antimicrobial Stewardship Advisory Committee for their generosity in giving their time and expertise on top of already busy workloads to contribute to the publication.

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Professor John Turnidge
SA Pathology, Adelaide
University of Adelaide

Dr Helen van Gessel
Office of Safety and Quality in Healthcare, WA Health
Curtin University

Special acknowledgement is also given to:

- the following hospitals who provided examples of their policies, guidelines and educational materials for inclusion in the book
 - » Austin Health Services, Victoria
 - » Children, Youth and Woman's Health Service, South Australia
 - » Frankston Hospital, Victoria
 - » Hunter New England Health, New South Wales
 - » North Coast Area Health Service, New South Wales
 - » Princess Alexandra Hospital, Queensland
 - » Southern Health, Victoria
 - » St Vincent's Hospital, Sydney, New South Wales
 - » Repatriation General Hospital, Daw Park, South Australia
 - » Royal Adelaide Hospital, South Australia
 - » Royal Perth Hospital, Western Australia
- Drs Rod Givney, Geoff Hogg, Graeme Nimmo, Peter Taylor and Maria Yates for their review of the manuscript for Chapter 7 — The role of the clinical microbiology service.
- the members of the Society of Hospital Pharmacists Committee of Specialty Practice in Infectious Diseases for their comments on Chapter 9 — The role of the pharmacy service.
- Claire Boardman, Cath Murphy and Deborah McBeth for their advice on the role of infection control professionals in antimicrobial stewardship.

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).^{1,11}

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).¹²

Effective hospital AMS programs have been shown to decrease antimicrobial use and improve patient care.¹⁻² 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%¹ and substantial pharmacy cost savings.^{1-2, 4, 13} Successful programs have been shown to improve the appropriateness of antimicrobial use, and reduce institutional resistance rates, morbidity, mortality and healthcare costs.^{1, 12, 14-15} 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.¹³

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.²

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.^{1, 12, 14-18} 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*,¹⁹ 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

- 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.