Embedding Antimicrobial Stewardship (AMS) in Acute Hospitals

Associate Professor Kirsty Buising
Infectious Diseases Physician and Head AMS service
Royal Melbourne Hospital
Deputy Director National Centre Antimicrobial Stewardship

Therapeutic Guidelines Antibiotic
40th Anniversary, November 2018

Disclaimer

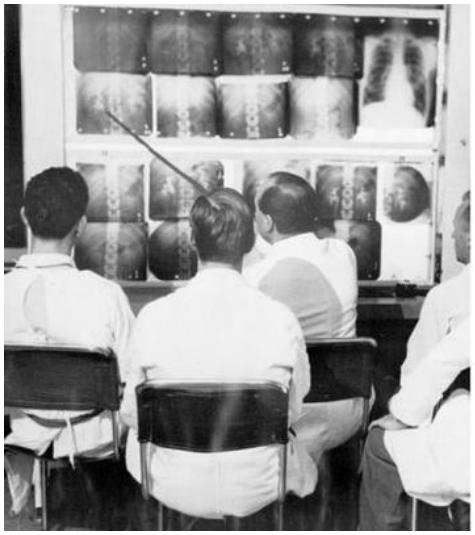
Apologies for any omissions

so many people contributed, I will surely have missed mentioning many

What was I doing in 1978?

Med student (1990) and Intern (1996)

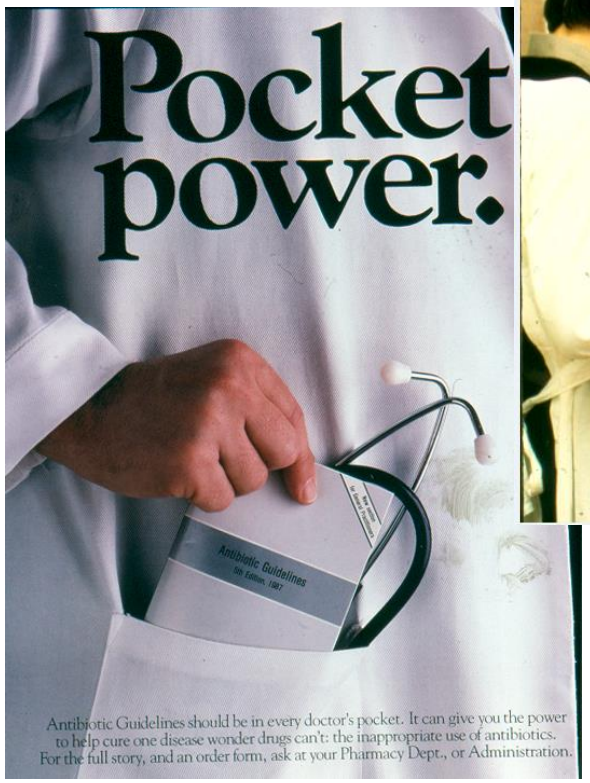
- Hard copy x rays, path reports faxed filed in notes
- White coats and notebooks in pockets
  - Small books (eg; Oxford handbook)
  - Summarised lecture notes
  - Unit ‘cheat sheets’ handed over
- No internet or smart phones(!)
  - Visit to the library to get journals
  - Photocopiers (10c a sheet)



- Therapeutic Guidelines Antibiotic
  - A nice neat summary, simple
  - Familiar authors – Australian

What was happening in hospitals? Antibiotic Guidelines were being promoted

Most visible form of AMS in hospitals



Broader recognition: Antimicrobial resistance is important

We knew AMR was a problem - 1997 “Call for Action”

September 17, 1997

Preventing the Emergence of Antimicrobial Resistance

A Call for Action by Clinicians, Public Health Officials, and Patients

Benjamin Schwartz, MD; David M. Bell, MD; James M. Hughes, MD

JAMA. 1997;278(11):944-945. doi:10.1001/jama.1997.03550110082041

We knew that hospital infection control programs were important, alongside prudent antibiotic use

Infect Control Hosp Epidemiol. 1997 Apr;18(4):275-91.

Society for Healthcare Epidemiology of America and Infectious Diseases Society of America Joint Committee on the Prevention of Antimicrobial Resistance: guidelines for the prevention of antimicrobial resistance in hospitals.

Shlaes DM[1], Gerding DN, John JF Jr, Craig WA, Bornstein DL, Duncan RA, Eckman MR, Farrer WE, Greene WH, Lorian V, Levy S, McGowan JE Jr, Paul SM, Ruskin J, Tenover FC, Watanakunakorn C.

But…

Hospital AMS programs didn't exist

not mentioned in literature until much later

Clin Infect Dis. 2007 Jan 15;44(2):159-77. Epub 2006 Dec 13.

Infectious Diseases Society of America and the Society for Healthcare Epidemiology of America guidelines for developing an institutional program to enhance antimicrobial stewardship.

Dellit TH[1], Owens RC, McGowan JE Jr, Gerding DN, Weinstein RA, Burke JP, Huskins WC, Paterson DL, Fishman NO, Carpenter CF, Brennan PJ, Billeter M, Hooton TM; Infectious Diseases Society of America; Society for Healthcare Epidemiology of America.

Now know we can't just rely on 'education' and guidelines

We need to do more

'Systems approach' - try to embed evidence based best practice

Build a program to support the prescriber

How did we start AMS programs in Australian hospitals?

Drug and Therapeutics Committees managing formularies

- Recognition that **antimicrobials were quite complex**
  - e.g; Antimicrobial subcommittee formed RMH 2000 to advise

Formulary restrictions

- Some drugs were **suitable for certain indications only**
- Some drugs **warranted expert advice**
  - e.g; Amphotericin, Ticarcillin-clavulanate

Dedicated audits

- Emergence of DUE/QUM roles for pharmacists
- **Recognition that misuse of antimicrobials was common**
  - Eg using TG as comparator - ceftriaxone use very poor RMH

Antimicrobial restriction

Late 1990s: Antimicrobial approval systems emerging

- often managed by ID and microbiologists
- restriction/approvals often ‘informed’ by Therapeutic Guidelines

Phone approval from consultant/registrar

- Hours on the phone each day
- Interruptions
- Workflow
- Lack of audit trail
- Lack of consistency

Exploration of computerised approvals

- computers becoming part of hospital workflow

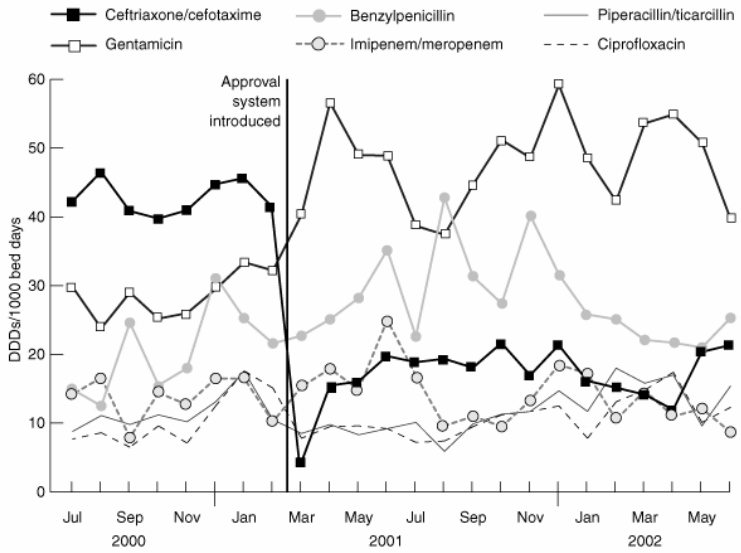
Computerised antimicrobial approval

Impact of a web-based antimicrobial approval system on broad-spectrum cephalosporin use at a teaching hospital

Michael J Richards, Lyn-Li Lim, Marion B Robertson, Nicholas R Jones, Simone E Taylor, Margarida M Duarte, Dale A Kerr, Graham J Stanton, Peter D Ritchie and Jonathan G A Dartnell

Med J Aust 2003; 178 (8): 386-390.
Published online: 21 April 2003

2: Use of ceftriaxone/cefotaxime and other antibiotics at Royal Melbourne Hospital before and after introduction of the antimicrobial approval system



DDD = defined daily dose. After introduction of the approval system in March 2001, there was a signif
($P = 0.0001$) and benzylpenicillin ($P = 0.01$).

3: Ceftriaxone/cefotaxime use and concordance with national antibiotic guidelines at Royal Melbourne Hospital and other hospitals

	Royal Melbourne Hospital		Other Melbourne teaching hospitals[6]			
			A	B	C	D
Study date	Jul 2001	Sep 1999	Sep 1999	Sep 1999	Sep 1999	Sep 1999
Length of enrolment (days)	14	7	7	7	7	7
Number of courses	74	79	45	39	39	22
Defined daily doses/1000 bed days	22	35	26	22	39	12
Number of courses started in operating theatres	0	17 (22%)	16 (36%)	0	0	0
Concordance with guidelines*						
All courses	51%†	26%†	33%	28%	18%	45%
Empirical courses for respiratory tract infection	17/41 (41%)	8/36 (22%)	11/27 (41%)	8/23 (35%)	4/20 (20%)	6/13 (46%)

* *Therapeutic guidelines: antibiotic* (11th edition[7] in 2001 and 10th edition[9] in 1999). † $P < 0.002$ Fisher's exact test.

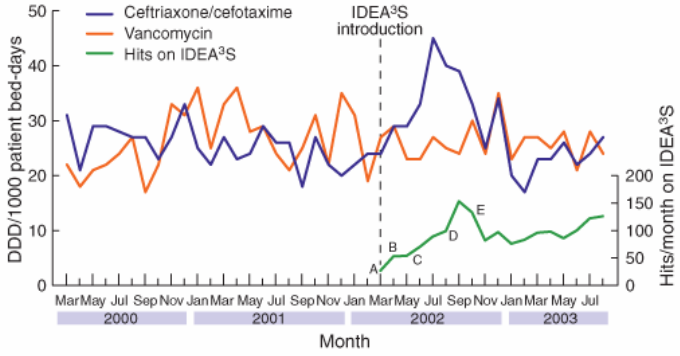
Implemented at RMH in 2001

Impact of an electronic antibiotic advice and approval system on antibiotic prescribing in an Australian teaching hospital

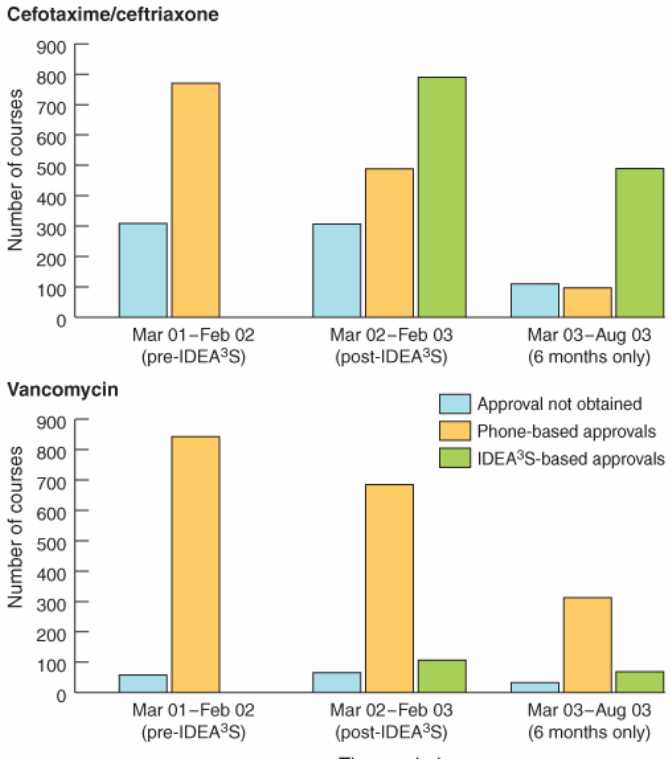
M Lindsay Grayson, Sharmila Melvani, Sue W Kirsa, Stephen Cheung, M Kent Garrett, Anthony M Korman and William A Thomson

Med J Aust 2004; 180 (9): 455-458.
Published online: 3 May 2004

3: Impact of IDEA^{3}S ("hits"/month) on the use of ceftriaxone/cefotaxime and vancomycin bed-days) at Austin Health, March 2002–August 2003*†

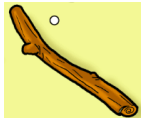


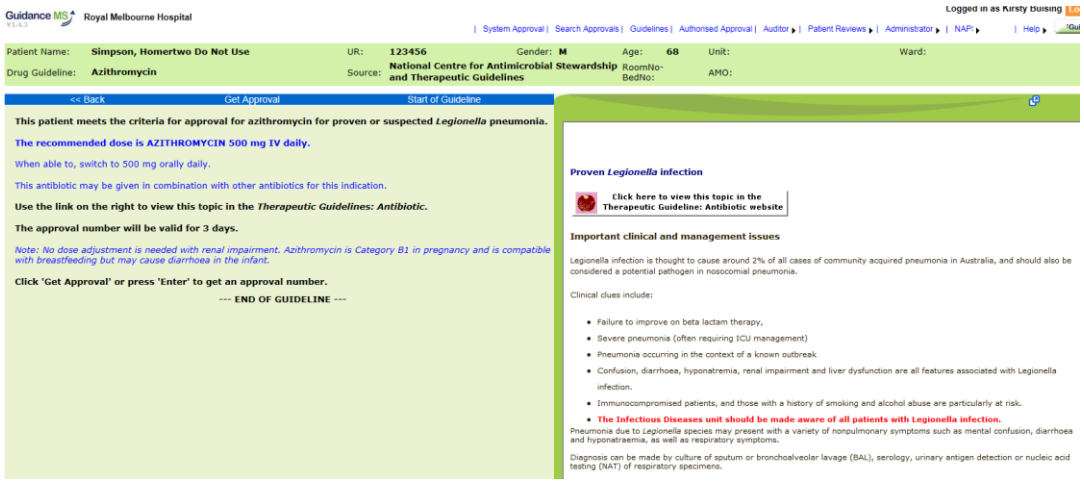
DDD = defined daily doses. IDEA^{3}S = infectious diseases electronic antibiotic advice and approval system.

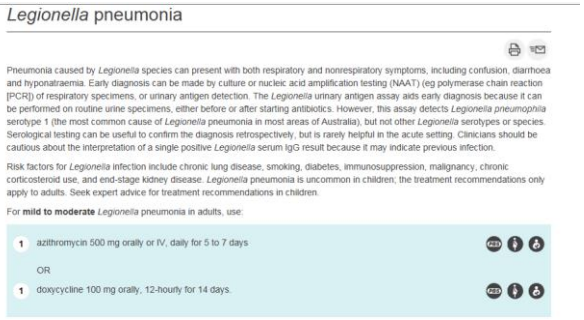


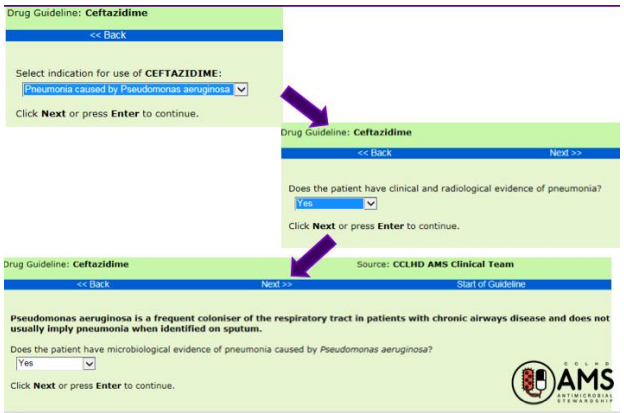
Computerised tools

Antimicrobial Approval and **Decision support** – implemented 2005









Managing large numbers of restricted antimicrobial drugs

Provide information at the point of care – complex knowledge base

Included access to online Therapeutic Guidelines Antibiotic

Locally customised

It wasn't easy…

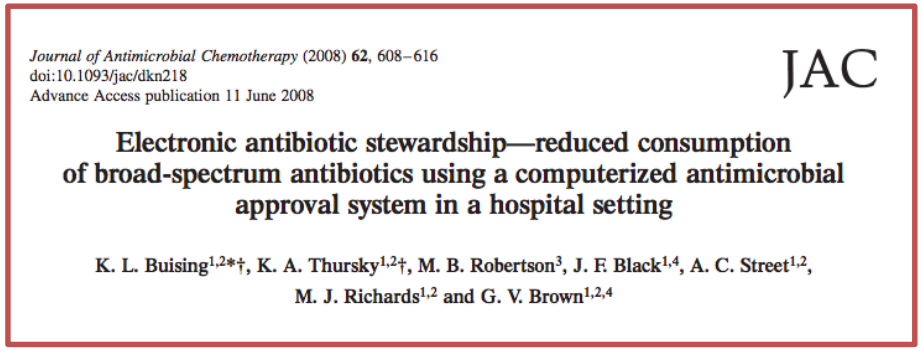
Why should I have to get approval?

I know more about gentamicin than your registrar will ever know!

I can't believe we seriously need to do this…..

With time, the practice was accepted and adopted

Evidence of impact



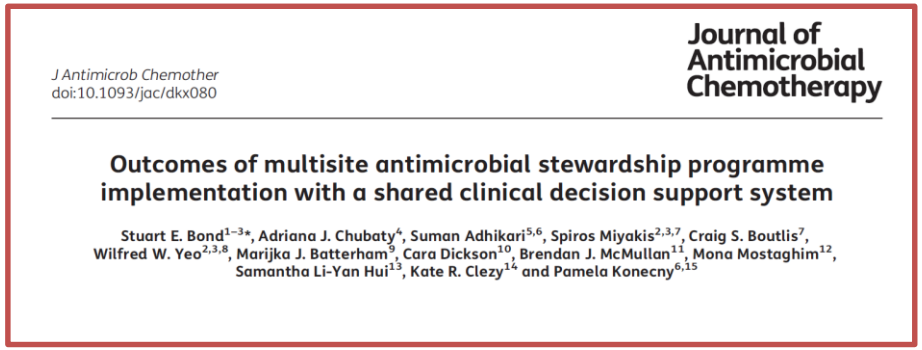
Journal of Antimicrobial Chemotherapy (2008) **62**, 608–616
doi:10.1093/jac/dkn218
Advance Access publication 11 June 2008

JAC

Electronic antibiotic stewardship—reduced consumption of broad-spectrum antibiotics using a computerized antimicrobial approval system in a hospital setting

K. L. Buising[1,2]*†, K. A. Thursky[1,2]†, M. B. Robertson[3], J. F. Black[1,4], A. C. Street[1,2], M. J. Richards[1,2] and G. V. Brown[1,2,4]

2008 publication: 1 site, 7 years
Fall in broad spectrum antibiotic use



J Antimicrob Chemother
doi:10.1093/jac/dkx080

Journal of Antimicrobial Chemotherapy

Outcomes of multisite antimicrobial stewardship programme implementation with a shared clinical decision support system

Stuart E. Bond[1–3]*, Adriana J. Chubaty[4], Suman Adhikari[5,6], Spiros Miyakis[2,3,7], Craig S. Boutlis[7], Wilfred W. Yeo[2,3,8], Marijka J. Batterham[9], Cara Dickson[10], Brendan J. McMullan[11], Mona Mostaghim[12], Samantha Li-Yan Hui[13], Kate R. Clezy[14] and Pamela Konecny[6,15]

Transferability - 5 sites in NSW, 5 years

Decreased
-antimicrobial use (-23%; $P < 0.01$)
-antimicrobial costs (-AUD$64551/month; $P < 0.01$)
-HCA-CDI rates (-0.2 cases/10000 OBDs/month; P,0.01

2007 presented data to CDC

"Not sure we could do that here",

"Agreement on guidelines would be a major barrier"

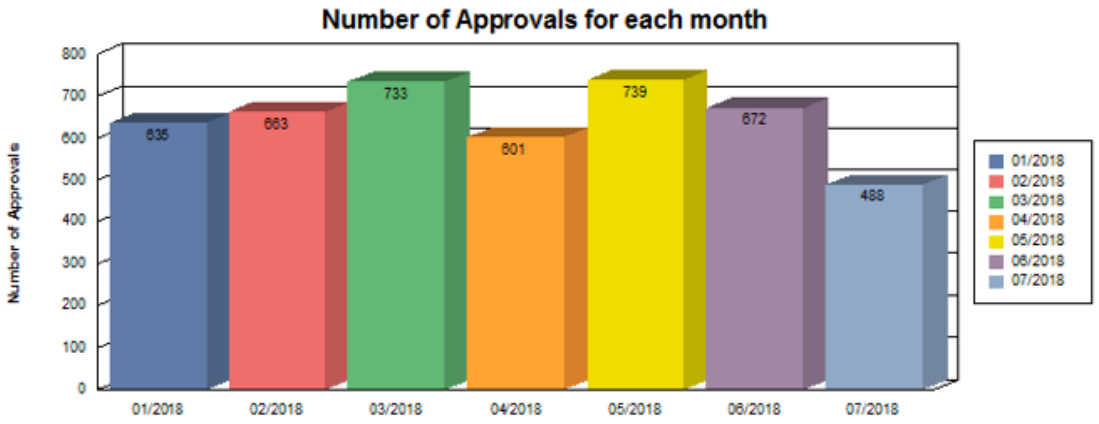
Fast forward to 2018

Electronic approval systems now used by most large hospitals in Australia

Used for over 30 restricted antimicrobial drugs

Tertiary hospitals: 500-700 approvals/month

Embedded in EMR in many sites



Hospital Comparisons

NAUSP: National Antimicrobial Utilisation Surveillance Program

South Australian surveillance program, 2001

Compared volumes of antibiotics used

2004, pilot of 15 non-SA tertiary referral hospitals

Gradual expansion post 2005

- Initially large hospitals were ‘targeted’,
- then medium and small facilities (50 beds or more)
- 2005-2008: increased to between 30-40 hospitals/year

Tracking and comparing consumption

1. TOTAL HOSPITAL USE BY ANTIMICROBIAL CLASS

Total hospital antimicrobial utilisation rates for the period July 2004 to October 2011 are displayed in charts 1 and 2.

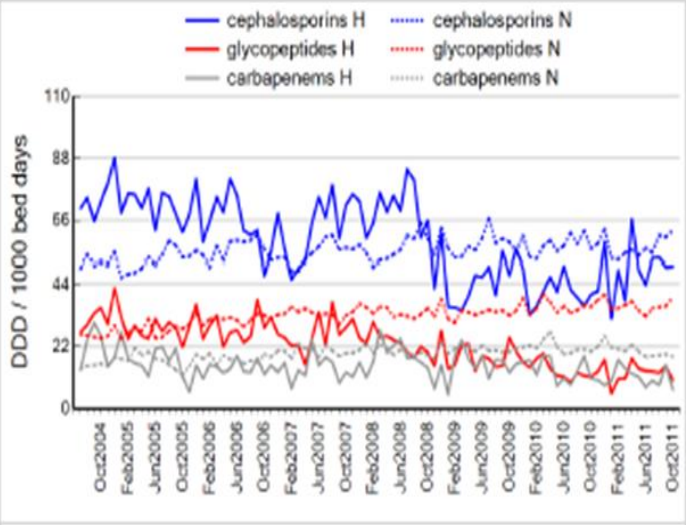


Chart1: Total hospital usage of 3rd/4th generation cephalosporins, glycopeptides and carbapenems.

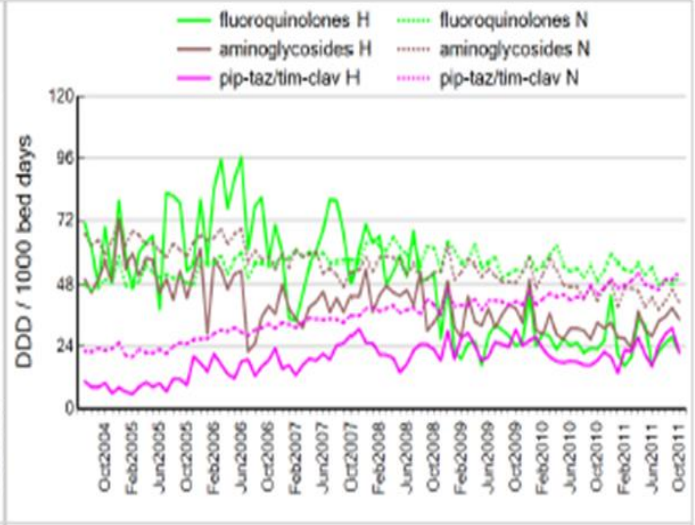
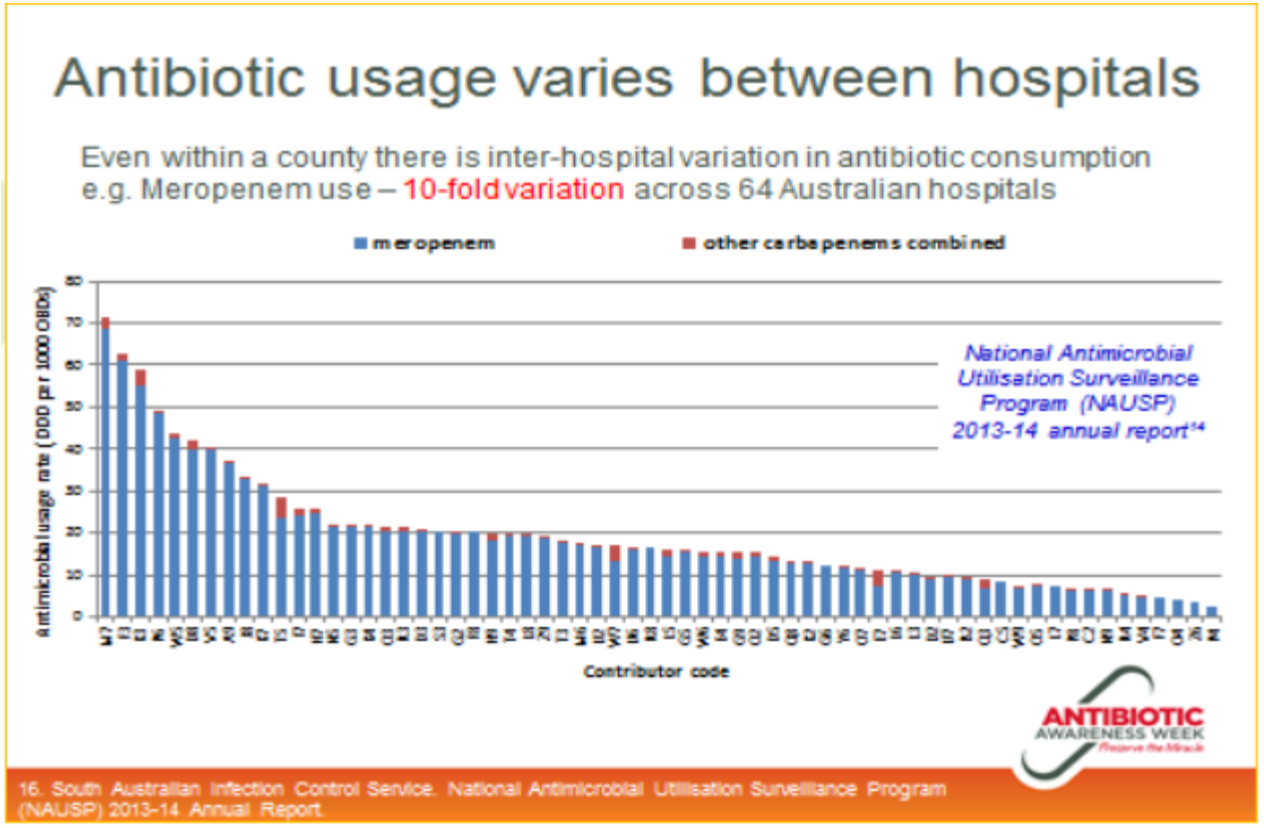


Chart2: Total hospital usage of fluoroquinolones, aminoglycosides and anti-pseudomonal penicillins plus ß-lactamase inhibitor.

High variability in consumption



Usage varied, but is this appropriate?

- 2010 pilot point prevalence audit at RMH
  - Detailed look at prescriptions
    - High burden antimicrobial use
    - Bulk of antimicrobial use is not seen by ID teams
    - Lots of aberrant practices
    - Lots of scope to address recurrent problems

- Point prevalence audits expanded to compare hospitals
  - 5 hospitals in 2011
  - 32 hospitals in 2012

How do we define appropriate use?

HOSPITAL NAPS National Antimicrobial Prescribing Survey

Appropriateness definitions

GUIDANCE NCAS

			If endorsed guidelines are present	If endorsed guidelines are absent
Appropriate	1	Optimal[1]	Antimicrobial prescription follows either the Therapeutic Guidelines[2] or endorsed local guidelines *optimally*, including antimicrobial choice, dosage, route and duration[3]	The antimicrobial prescription has been reviewed and endorsed by an infectious diseases clinician or a clinical microbiologist **OR** The prescribed antimicrobial will cover the likely causative or cultured pathogens ***and*** there is not a narrower spectrum or more appropriate antimicrobial choice, dosage, route or duration[3] available
	2	Adequate	Antimicrobial prescription does not optimally follow the Therapeutic Guidelines[2] or endorsed local guidelines, including antimicrobial choice, dosage, route or duration[3], however, is a ***reasonable*** alternative choice for the likely causative or cultured pathogens **OR** For surgical prophylaxis, as above ***and*** duration[3] is less than 24 hours	Antimicrobial prescription including antimicrobial choice, dosage, route and duration[3] is not the most optimal, however, is a ***reasonable*** alternative choice for the likely causative or cultured pathogens **OR** For surgical prophylaxis, as above ***and*** duration[3] is less than 24 hours
Inappropriate	3	Suboptimal	There may be a mild or non-life-threatening allergy mismatch **OR** Antimicrobial prescription including antimicrobial choice, dosage, route and duration[3], is an ***unreasonable*** choice for the likely causative or cultured pathogens, including: • spectrum excessively broad, unnecessary overlap in spectrum of activity, dosage excessively high or duration excessively long • failure to appropriately de-escalate with microbiological results	
	4	Inadequate	Antimicrobial prescription including antimicrobial choice, dosage, route or duration[3] is ***unlikely*** to treat the likely causative or cultured pathogens **OR** The documented or presumed indication does not require ***any*** antimicrobial treatment **OR** There may be a severe or possibly life-threatening allergy mismatch, or the potential risk of toxicity due to drug interaction **OR** For surgical prophylaxis, the duration[3] is greater than 24 hours (except where local guidelines endorse this)	
	5	Not assessable	The indication is not documented and unable to be determined from the notes **OR** The notes are not comprehensive enough to assess appropriateness **OR** The patient is too complex, due to multiple co-morbidities, allergies or microbiology results, *etc.*	

[1] Taking into account acceptable changes due to the patient's weight or renal function, if this information is available

[2] Antibiotic Expert Group. Therapeutic Guidelines: Antibiotic. Version 15 (2014), or online version

[3] Duration should only be assessed if the guidelines state a recommended duration and the antimicrobial has already been dispensed for longer than this, or if there is a clear planned 'end date' documented

Doc:nNAPS.AD.v6.1; 20161117

In 2010 developed tool

"Appropriateness" accounted variation from guideline that is clinically justifiable

Having agreed national guidelines made this possible

Measuring Appropriate Antimicrobial Use: Attempts at Opening the Black Box FREE

Emily S. Spivak ✉, Sara E. Cosgrove, Arjun Srinivasan

Clinical Infectious Diseases, Volume 63, Issue 12, 15 December 2016, Pages 1639–1644,

The Australian Commission on Safety and Quality in Health Care required that ASPs be established in all Australian hospitals in 2013 and that antimicrobial prescribing be audited and monitored [24, 39]. A multidisciplinary group within Melbourne Health, Victoria, designed an antimicrobial prescribing survey tool suitable for use in all Australian hospitals [24]. The tool was developed using knowledge gained from prior audit tools, local and national treatment guidelines, expert opinion, and clinician feedback; it was designed to be used by auditors of varying expertise ranging from ID physicians and pharmacists to infection control practitioners, nurses, and microbiologists. Areas of interest for benchmarking were documentation of antimicrobial indication, compliance with national prescribing guidelines, and duration of surgical prophylaxis [24]. Auditors were asked to assess appropriateness based on compliance with published national prescribing guidelines, with use of a multidisciplinary team to assess appropriateness if warranted. In contrast to the United States, Australian antimicrobial prescribing guidelines are written with consensus from multiple disciplines and the intention of supporting antimicrobial stewardship efforts. Therefore, they provide an agreed-upon objective metric that can be collected by auditors of varying expertise. The audit tool was piloted in 2 successive years and revised based on end-user feedback. All participating sites were provided a toolkit and webinar as well as training scenarios on assessing appropriateness. Although the majority of auditors felt the survey had the right amount of detail and committed to future participation, 58% reported that staffing issues and lack of expert advice for complex cases were a continued barrier [24].

The development of consensus-based antimicrobial prescribing quality indicators and audit tools to measure antimicrobial prescribing quality at a national level represent monumental strides in the effort to improve antimicrobial use. Although resource constraints and lack of access to individuals with antimicrobial expertise remain an issue, these tools and surveys demonstrate that large-scale assessments of antimicrobial use are possible, and provide the framework for further national and international evaluations.

Adding value
Post prescription review

Why bother getting approval if nothing happens?
What happens after antibiotic initiation?

AMS team

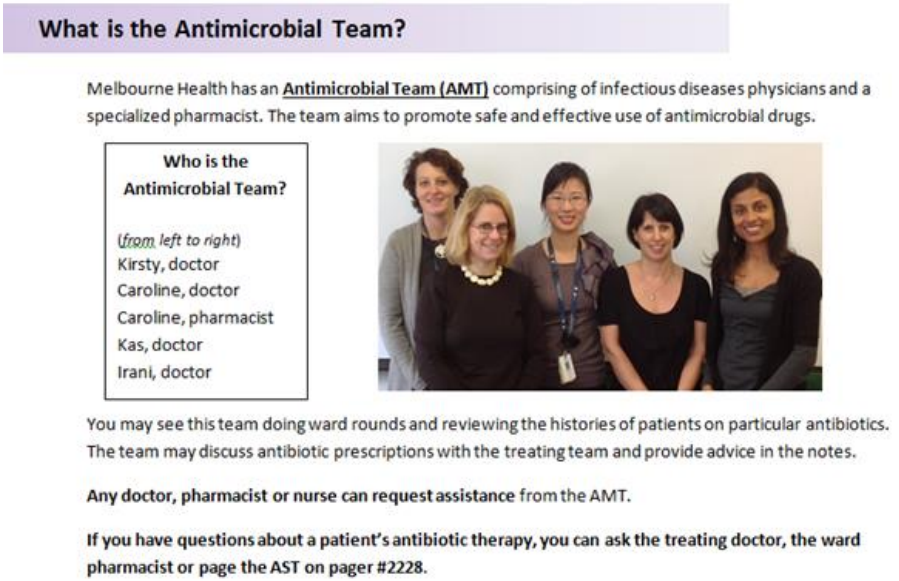
- Uninvited consult, not examining patient,
- Needed to move forward with caution (controversial)
- Build trust, know what was safe to do

Building a service/team that hadn't existed before

- First few hospitals 2010
- Champion units eg; ICU who allowed the team to find role

Finding our way

- What should the AMS team look like? – Who? What EFT is needed?
- Who should we liaise with, How often to round?
- How do we locate patients? Triaging?
- Can we write in notes?
- Training on the job



What is the Antimicrobial Team?

Melbourne Health has an **Antimicrobial Team (AMT)** comprising of infectious diseases physicians and a specialized pharmacist. The team aims to promote safe and effective use of antimicrobial drugs.

Who is the Antimicrobial Team?

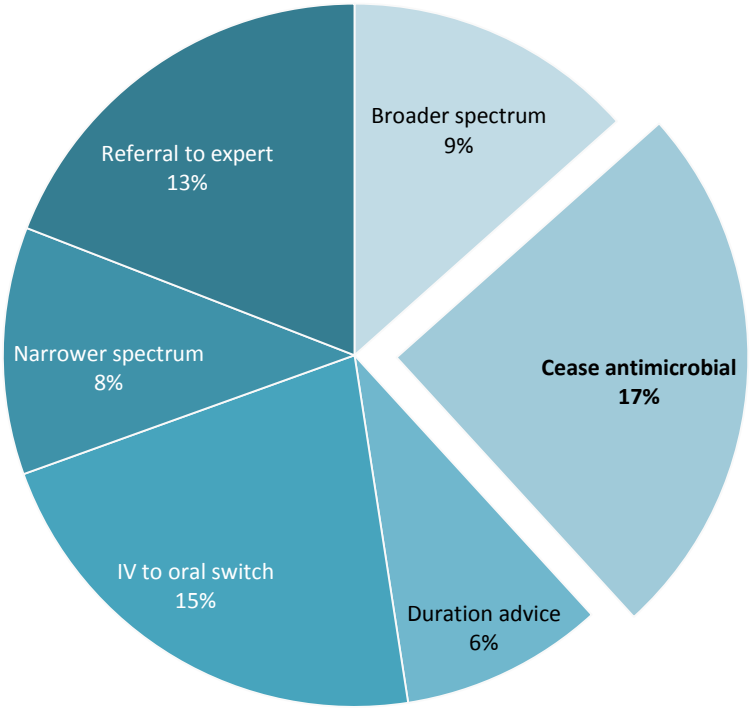
(from left to right)
Kirsty, doctor
Caroline, doctor
Caroline, pharmacist
Kas, doctor
Irani, doctor

You may see this team doing ward rounds and reviewing the histories of patients on particular antibiotics. The team may discuss antibiotic prescriptions with the treating team and provide advice in the notes.

Any doctor, pharmacist or nurse can request assistance from the AMT.

If you have questions about a patient's antibiotic therapy, you can ask the treating doctor, the ward pharmacist or page the AST on pager #2228.

AMS team recommendations



(% of the total 358 recommendations)

Post round audits show an overall acceptance rate of 77% within 24 hours
In ICU, acceptance rate was 83% within 24 hours

July-Nov 2016

A workforce was needed
Capacity building

Workshops

- ASID: Advanced Infection control & AMS for ID/ micro doctors
  - since 2011
- ACIPC: AMS for nurses and ICPs
  - since 2012
- SHPA: AMS forum for pharmacists
  - since 2014
- AMS in rural/regional hospitals
  - since 2016

Articulating best practice

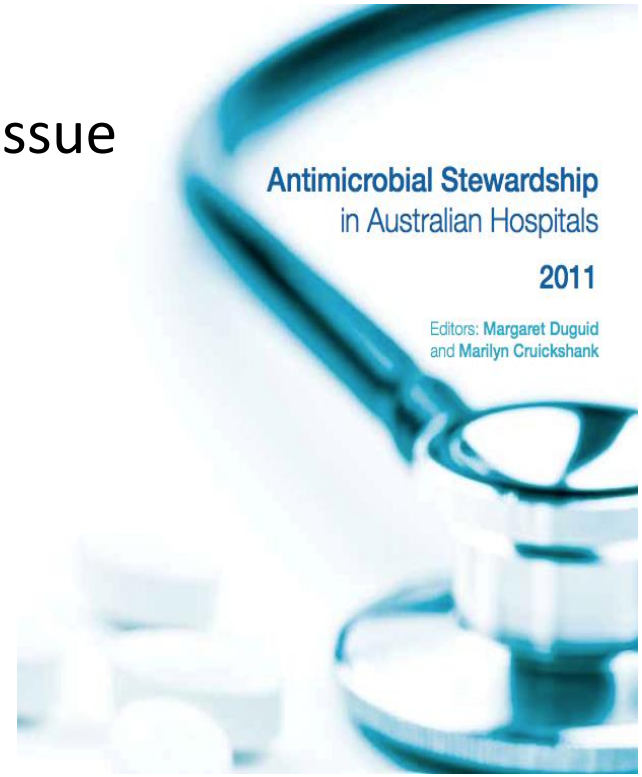
AUSTRALIAN COMMISSION on SAFETY and QUALITY in HEALTH CARE

To lead and coordinate the safety and quality agenda in Australia's health care system

Drew attention to AMS as a quality & safety issue

AMS Advisory group formed 2008

Published recommendations 2011



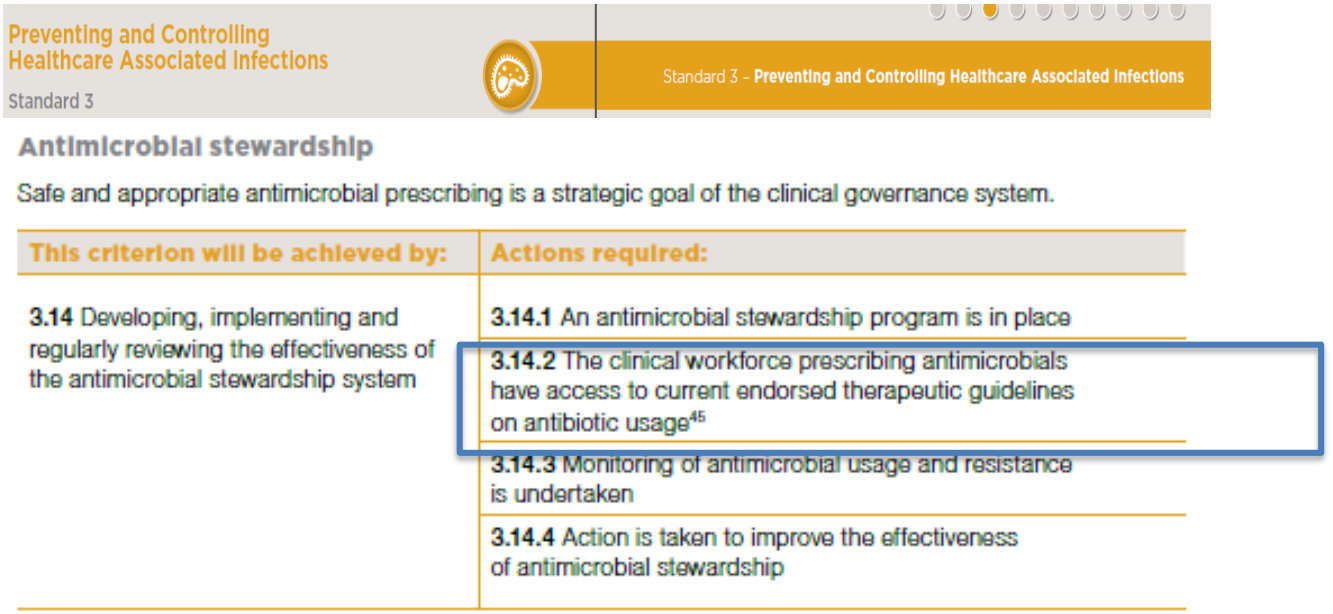
2011: Recommendations
AMS Programs in Acute Hospitals

- **Antimicrobial Stewardship committee**
  - Governance in place, Executive is responsible
- **Antimicrobial prescribing policy**
  - Endorsed Guidelines (Therapeutic Guidelines Antibiotic)
- **Formulary with restrictions**
  - Approval systems are functioning
- **Post prescription review service**
  - AMS Team active ward rounds
- **Auditing and feedback**
  - Targeted to issues, comprehensive national audits
- **Education**
  - All healthcare professionals (nurses, pharmacists, doctors)

2013: Hospital Accreditation Standards

National Safety and Quality Standards for Hospital Accreditation were used to drive action

These define what an **organisation** should do to ensure safe and effective use of antimicrobials



Preventing and Controlling Healthcare Associated Infections

Standard 3

Standard 3 – **Preventing and Controlling Healthcare Associated Infections**

Antimicrobial stewardship

Safe and appropriate antimicrobial prescribing is a strategic goal of the clinical governance system.

This criterion will be achieved by:	Actions required:
3.14 Developing, implementing and regularly reviewing the effectiveness of the antimicrobial stewardship system	**3.14.1** An antimicrobial stewardship program is in place
	3.14.2 The clinical workforce prescribing antimicrobials have access to current endorsed therapeutic guidelines on antibiotic usage[45]
	3.14.3 Monitoring of antimicrobial usage and resistance is undertaken
	3.14.4 Action is taken to improve the effectiveness of antimicrobial stewardship

2015: Clinical Care Standards

Clinical Care Standards

Clinician Fact Sheet:

Antimicrobial Stewardship

The goal of the Antimicrobial Stewardship Clinical Care Standard is to ensure that a patient with a bacterial infection receives optimal treatment with antibiotics. This means that patients are offered the right antibiotic to treat their condition, the right dose, the right route, at the right time and for the right duration. This should be based on accurate assessment and timely review as to lessen the risk of adverse effects and reduce the emergence of antibiotic resistance.

UNDER THIS CLINICAL CARE STANDARD

A patient with a life-threatening condition due to a suspected bacterial infection receives prompt antibiotic treatment without waiting for the results of investigations.

A patient with a suspected bacterial infection has samples taken for microbiology testing as clinically indicated, preferably before starting antibiotic treatment.

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.

When a patient is prescribed antibiotics, whether empirical or directed, this is done in accordance with the current version of the *Therapeutic Guidelines* (or local antibiotic formulary). This is also guided by the patient's clinical condition and/or the results of microbiology testing.

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.

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.

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.

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.

If a patient having surgery requires prophylactic antibiotics, the prescription is made in accordance with the current *Therapeutic Guidelines* (or local antibiotic formulary), and takes into consideration the patient's clinical condition.

More information on the Clinical Care Standards program is available from the Australian Commission on Safety and Quality in Health Care website at **www.safetyandquality.gov.au/ccs.**

AUSTRALIAN COMMISSION ON SAFETY AND QUALITY IN HEALTH CARE

Antimicrobial Stewardship Clinical Care Standard
Clinician Fact Sheet, 2014

Life threatening sepsis – urgent Rx

Samples taken for micro investigations

Information provided about diagnosis

Prescribe c/w guidelines

Communicate plan – duration, SEs

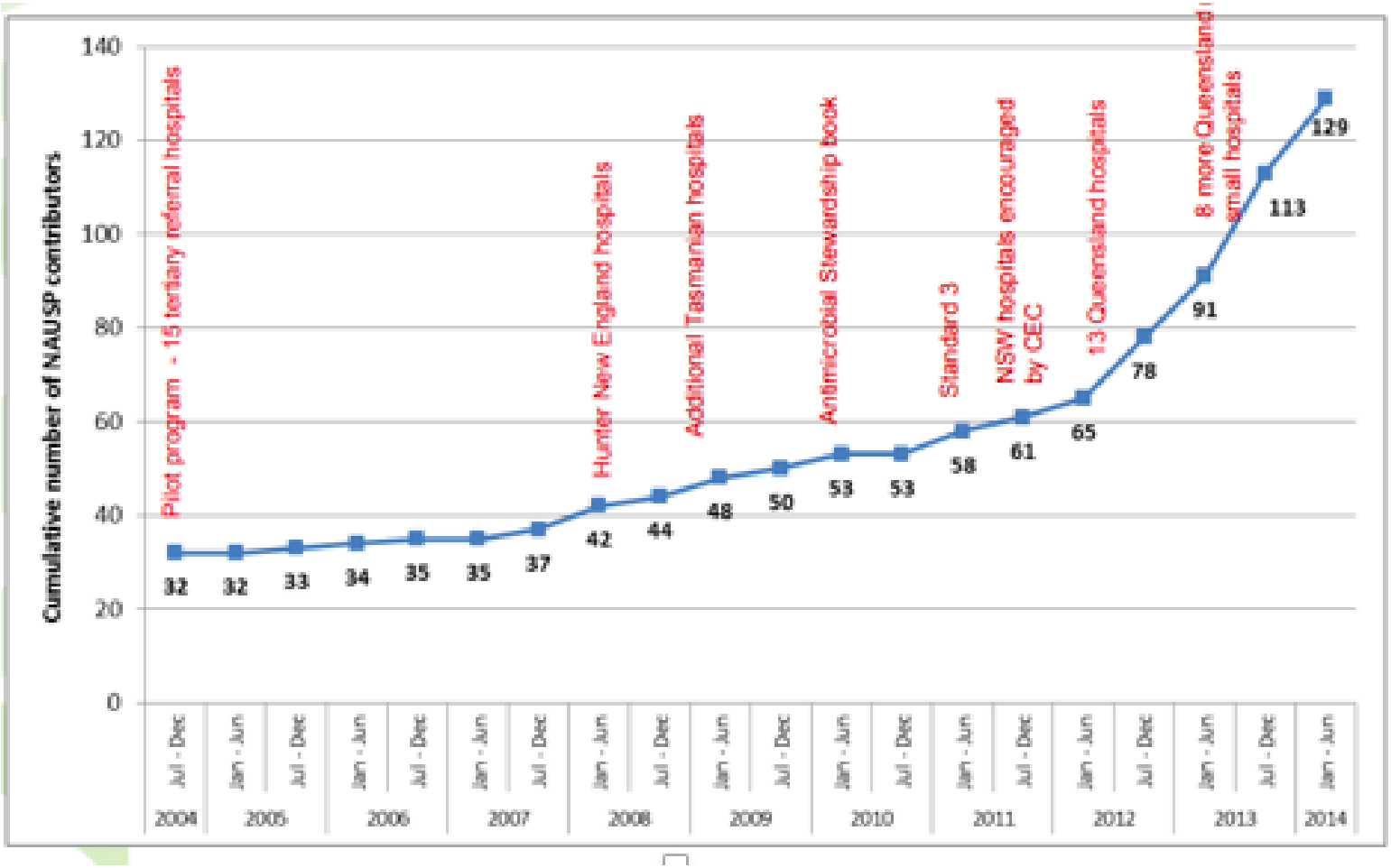
Documentation is clear

Timely review results of investigations

De-escalate narrow spectrum

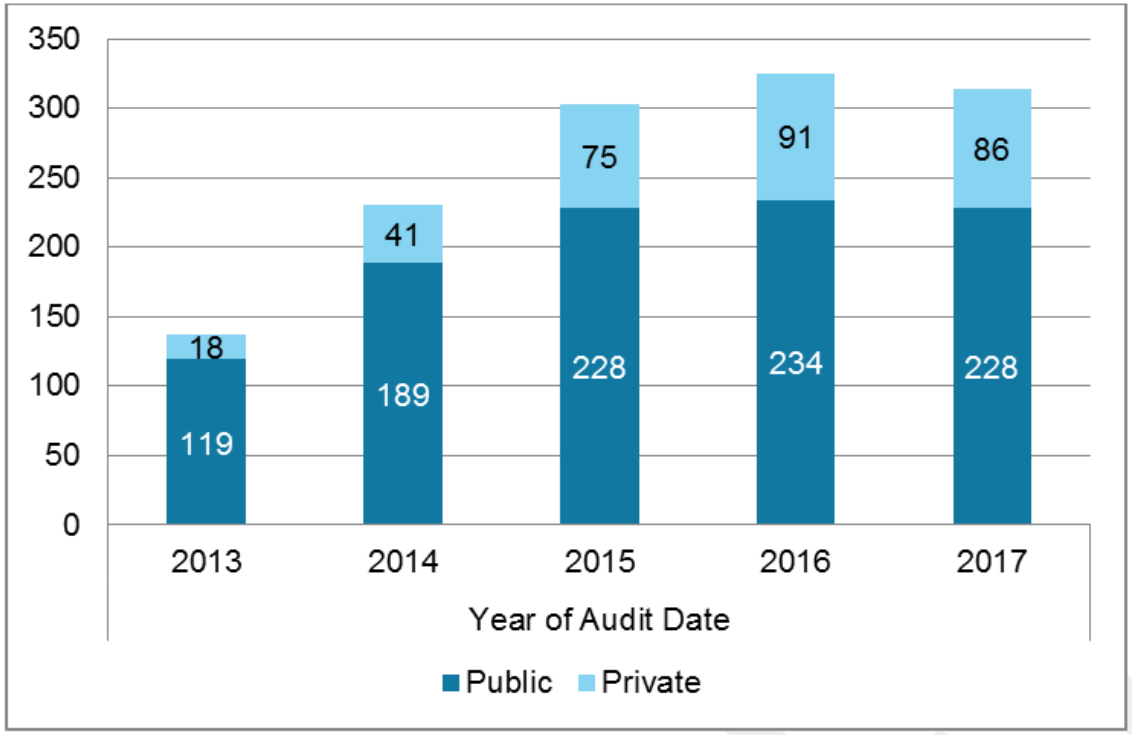
Surgical prophylaxis c/w guideline

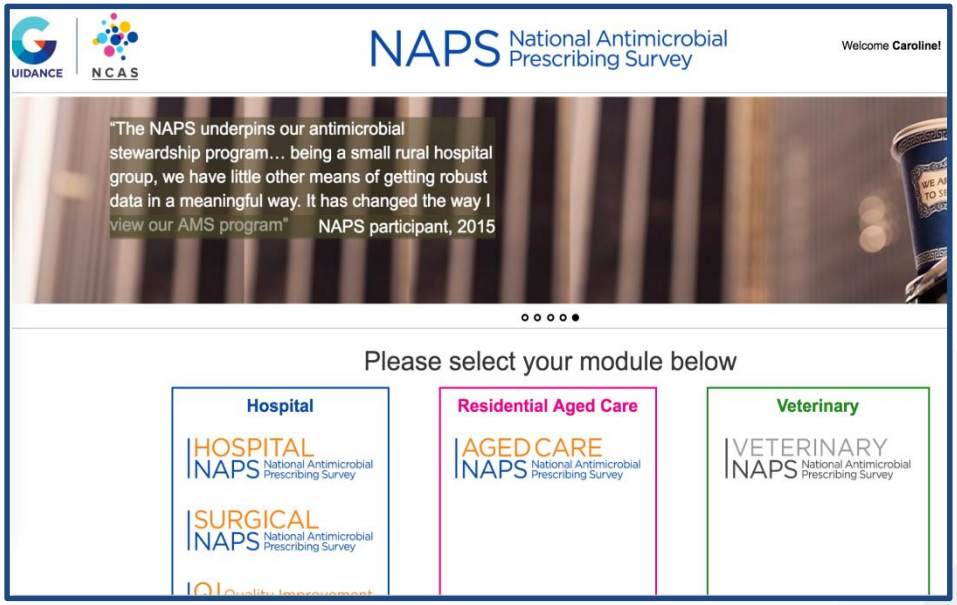
Growth in NAUSP participation



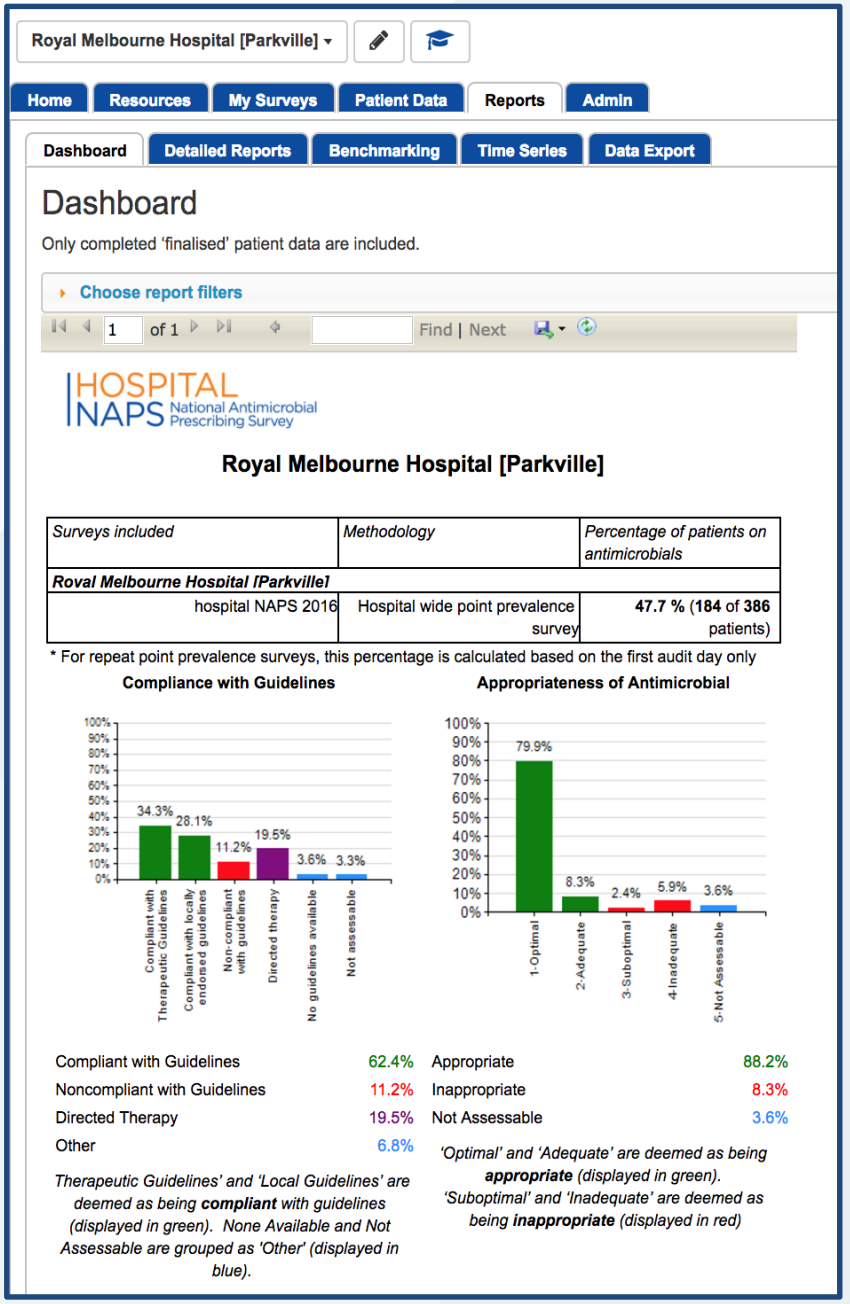
Growth in NAPS nationally

Figure 1 Number of public and private hospitals that have contributed to Hospital NAPS, 2013–2017

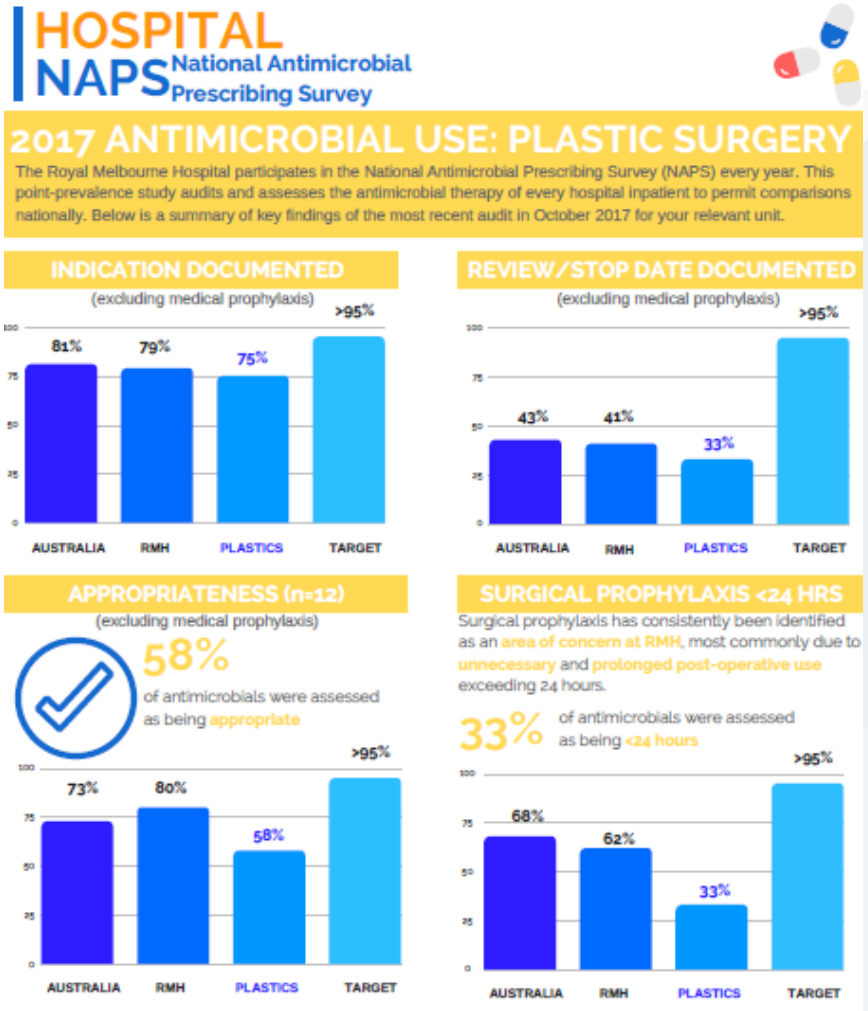



NAPS National Antimicrobial Prescribing Survey
Welcome Caroline!
"The NAPS underpins our antimicrobial stewardship program… being a small rural hospital group, we have little other means of getting robust data in a meaningful way. It has changed the way I view our AMS program" NAPS participant, 2015
Please select your module below
Hospital
HOSPITAL NAPS National Antimicrobial Prescribing Survey
SURGICAL NAPS National Antimicrobial Prescribing Survey
Residential Aged Care
AGED CARE NAPS National Antimicrobial Prescribing Survey
Veterinary
VETERINARY NAPS National Antimicrobial Prescribing Survey


Hospital NAPS 2016
Resources
Welcome
How to conduct the Hospital NAPS (methodology)
How to complete the form
Guideline compliance
Appropriateness assessment
COMPLETE ASSESSMENT
HOSPITAL NAPS National Antimicrobial Prescribing Survey
Welcome to the e-learning module
Are you a Hospital NAPS veteran? Go straight to the assessment!
Preview
GUIDANCE
NCAS


Royal Melbourne Hospital [Parkville]
Home
Resources
My Surveys
Patient Data
Reports
Admin
Dashboard
Detailed Reports
Benchmarking
Time Series
Data Export
Dashboard
Only completed 'finalised' patient data are included.
Choose report filters
1 of 1
Find | Next
HOSPITAL NAPS National Antimicrobial Prescribing Survey
Royal Melbourne Hospital [Parkville]
Surveys included
Methodology
Percentage of patients on antimicrobials
Royal Melbourne Hospital [Parkville]
hospital NAPS 2016
Hospital wide point prevalence survey
47.7 % (184 of 386 patients)
* For repeat point prevalence surveys, this percentage is calculated based on the first audit day only
Compliance with Guidelines
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
34.3%
28.1%
11.2%
19.5%
3.6%
3.3%
Compliant with Therapeutic Guidelines
Compliant with locally endorsed guidelines
Non-compliant with guidelines
Directed therapy
No guidelines available
Not assessable
Appropriateness of Antimicrobial
79.9%
8.3%
2.4%
5.9%
3.6%
1-Optimal
2-Adequate
3-Suboptimal
4-Inadequate
5-Not Assessable
Compliant with Guidelines 62.4%
Noncompliant with Guidelines 11.2%
Directed Therapy 19.5%
Other 6.8%
Therapeutic Guidelines' and 'Local Guidelines' are deemed as being compliant with guidelines (displayed in green). None Available and Not Assessable are grouped as 'Other' (displayed in blue).
Appropriate 88.2%
Inappropriate 8.3%
Not Assessable 3.6%
'Optimal' and 'Adequate' are deemed as being appropriate (displayed in green).
'Suboptimal' and 'Inadequate' are deemed as being inappropriate (displayed in red)

Internal use: unit specific feedback



HOSPITAL NAPS National Antimicrobial Prescribing Survey

2017 ANTIMICROBIAL USE: PLASTIC SURGERY

The Royal Melbourne Hospital participates in the National Antimicrobial Prescribing Survey (NAPS) every year. This point-prevalence study audits and assesses the antimicrobial therapy of every hospital inpatient to permit comparisons nationally. Below is a summary of key findings of the most recent audit in October 2017 for your relevant unit.

INDICATION DOCUMENTED

(excluding medical prophylaxis)

REVIEW/STOP DATE DOCUMENTED

(excluding medical prophylaxis)

APPROPRIATENESS (n=12)

(excluding medical prophylaxis)

58% of antimicrobials were assessed as being appropriate

SURGICAL PROPHYLAXIS <24 HRS

Surgical prophylaxis has consistently been identified as an area of concern at RMH, most commonly due to unnecessary and prolonged post-operative use exceeding 24 hours.

33% of antimicrobials were assessed as being <24 hours

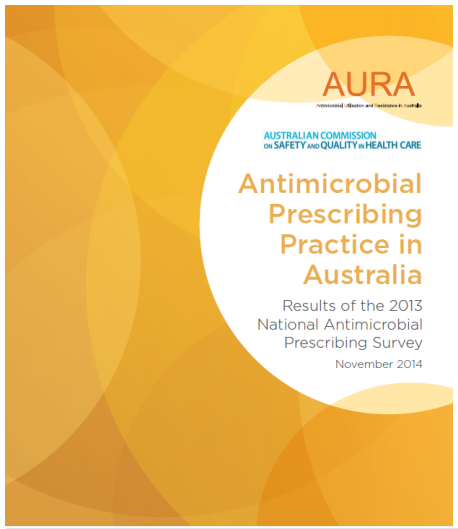
Make it tangible, relevant, local

External use:
National Performance indicators

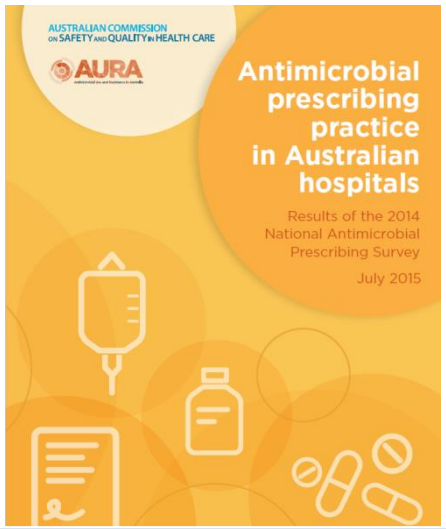
Table 3.3: Results for key Hospital NAPS indicators, 2013–2015

Key indicator		Percentage of total prescriptions			Percentage change from 2014 to 2015	
		2013	2014	2015	Absolute change*	Relative change†
Indication documented in medical notes (best practice >95%)		70.9	74.0	72.5	-1.5	-2.0
Review or stop date documented (best practice >95%)		na	na	35.5	na	na
Surgical prophylaxis given for >24 hours (best practice <5%)[§]		41.8	35.9	27.4	-8.5	-24.0
Compliance with guidelines	Compliant with *Therapeutic Guidelines: Antibiotic* or local guidelines[#]	59.7 (72.2)	56.2 (73.7)	55.9 (70.6)	-0.3	-1.0
	Noncompliant[‡]	23.0 (27.8)	24.3 (26.3)	23.3 (29.4)	-1.0	-4.0
	Directed therapy	na	10.4	12.4	2.0	19.0
	No guideline available	11.0	4.6	3.8	-0.8	-17.0
	Not assessable	6.3	4.5	4.7	0.2	4.0
Appropriateness	Appropriate (optimal and adequate)**	70.8 (75.6)	72.3 (75.9)	73.2 (77.0)	0.9	1.0
	Inappropriate (suboptimal and inadequate)**	22.9 (24.4)	23.0 (24.1)	21.9 (23.0)	-1.1	-5.0
	Not assessable	6.3	4.7	5.0	0.3	6.0

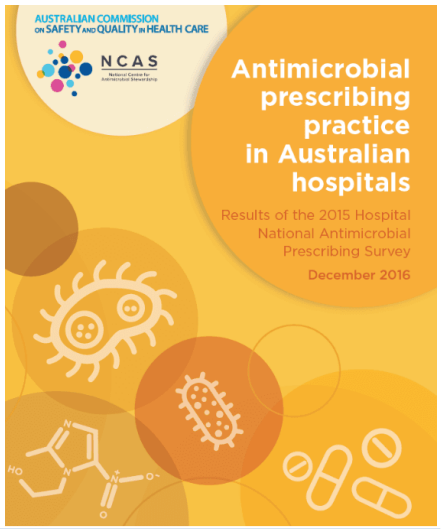
Public reports:
National Antimicrobial Prescribing Survey



NAPS (2013-14)



NAPS (2014-15)



NAPS (2015-16)

ACNAPS (2015-16)

This made the issues tangible, visible
Collective activity – everyone working together to collect data
Local benefit – identified what we could target here

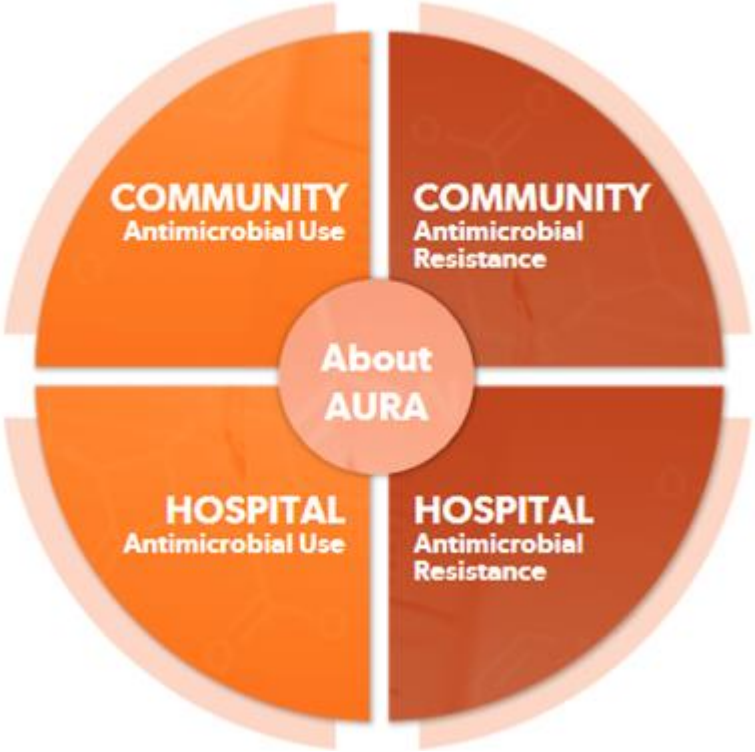
National coordination of surveillance

AUSTRALIAN COMMISSION
ON SAFETY AND QUALITY IN HEALTH CARE

AURA 2017

Second Australian report on antimicrobial use and resistance in human health

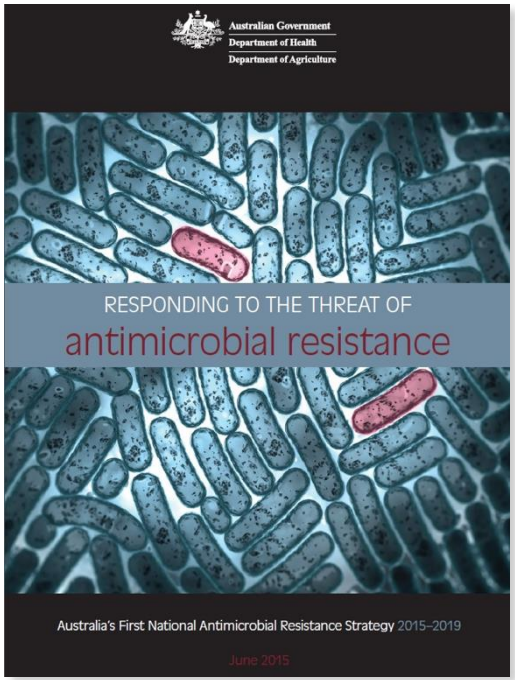
AURA



AUSTRALIAN COMMISSION
ON SAFETY AND QUALITY IN HEALTH CARE

2015: National AMR Action Plans

e.g. Australia's First National Antimicrobial Resistance Strategy



Objective One
Increase awareness and understanding of antimicrobial resistance, its implications and actions to combat it, through effective communication, education, and training

Objective Two
Implement effective antimicrobial stewardship practices across human health and animal care settings to ensure the appropriate and judicious prescribing, dispensing and administering of antimicrobials

Objective Three
Develop nationally coordinated One Health surveillance of antimicrobial resistance and antimicrobial usage

Objective Four
Improve infection prevention and control measures across human health and animal care settings to help prevent infections and the spread of resistance

Objective Five
Agree a national research agenda and promote investment in the discovery and development of new products and approaches to prevent, detect and contain antimicrobial resistance

Objective Six
Strengthen international partnerships and collaboration on regional and global efforts to respond to antimicrobial resistance

Objective Seven
Establish and support clear governance arrangements at the local, jurisdictional, national and international levels to ensure leadership, engagement and accountability for actions to combat antimicrobial resistance

Advocacy

ANTIBIOTIC AWARENESS WEEK
Antibiotics: Handle with Care.

Public awareness, sharing of ideas

ANTIBIOTICS are everyone's business

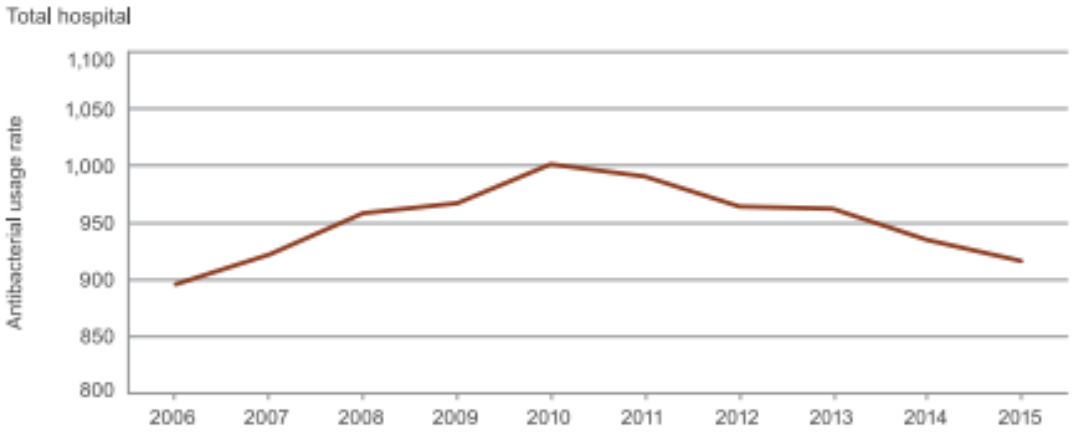
Inappropriate antibiotic use is associated with poor patient outcomes and can promote antibiotic resistant pathogens. We ALL have a role to play in ensuring that patients get the right antibiotic therapy, and that inappropriate antibiotic use is prevented.

What can YOU do to help?

- Take samples for **microbiology testing** preferably before starting antibiotics
- **Don't delay** antibiotics in a patient with sepsis
- Check that your patient is **not allergic** to the antibiotics prescribed
- Prescribe antibiotics according to ***Therapeutic Guidelines: Antibiotic*** and remember that restricted antibiotics need an approval in Guidance
- Ensure that the **indication and plan** for antibiotics are documented
- Consider **IV to oral switch** if your patient:
  - ✓ is able to eat and drink
  - ✓ has clinically improved
- Check **results of investigations** in a timely manner and review antibiotic therapy
- **Educate patients** and carers about antibiotic therapy

Starting to see change

Figure 3.1: Annual aggregate antibacterial use in NAUSP contributor hospitals (DDD/1,000 OBD), 2006–2015



Source: NAUSP[20]

Status in Victoria in 2012

Med J Aust. 2013 Nov 18;199(10):692-5.

Antimicrobial stewardship in Victorian hospitals: a statewide survey to identify current gaps.

James RS[1], McIntosh KA, Luu SB, Cotta MO, Marshall C, Thursky KA, Buising KL.

Essential strategy	No. of respondents (%)			
	Public metropolitan (*n* = 32)	Public regional (*n* = 81)	Private (*n* = 42)	Total (*n* = 155)
Implementing clinical guidelines that are consistent with the latest version of *Therapeutic guidelines: antibiotic*,[13] and which take into account local microbiology and antimicrobial susceptibility patterns				
Therapeutic guidelines: antibiotic is available (online or paper-based copies or both)*	32 (100%)	81 (100%)	37 (88.1%)	150 (96.8%)
Establishing formulary restriction and approval systems that include restricting broad-spectrum and later-generation antimicrobials to patients in whom their use is clinically justified				
Antibiotic guidelines are promoted or included in hospital antimicrobial policy	29 (90.6%)	37 (45.7%)	9 (21.4%)	75 (48.4%)
A formulary covering antimicrobials is available	30 (93.8%)	31 (38.3%)	7 (16.7%)	68 (43.9%)
The formulary specifies restrictions on the use of broad-spectrum antimicrobials	30 (93.8%)	14 (17.3%)	2 (4.8%)	46 (29.7%)
Reviewing antimicrobial prescribing with intervention and direct feedback to the prescriber — this should, at a minimum, include intensive care unit patients				
Feedback is provided to prescriber following the review of antimicrobial prescription	24 (75.0%)	41 (50.6%)	16 (38.1%)	81 (52.3%)
The hospital has a dedicated antimicrobial management team	7 (21.9%)	0	1 (2.4%)	8 (5.2%)

Rural hospitals

A mixed methods study of the barriers and enablers in implementing antimicrobial stewardship programmes in Australian regional and rural hospitals FREE

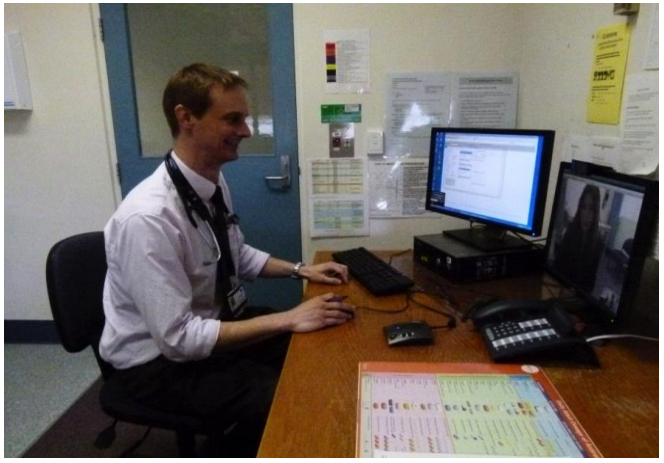
Rodney James ✉, Susan Luu, Minyon Avent, Caroline Marshall, Karin Thursky, Kirsty Buising

Journal of Antimicrobial Chemotherapy, Volume 70, Issue 9, 1 September 2015, Pages 2665–2670,
https://doi.org/10.1093/jac/dkv159
Published: 16 June 2015 **Article history** ▾

Quantitative data	(*n*=11[a])	
Hospitals with an antimicrobial management committee	4	36%
Hospitals with an antimicrobial management policy in place	6	55%
Hospitals where the national antibiotic prescribing guidelines were available	11	100%
Hospitals with an antimicrobial formulary	6	55%
Hospitals with an antimicrobial approval system in place	6	55%
Hospitals that provide education on antimicrobial prescribing	7	64%
Hospitals performing audits on antimicrobial prescribing	7	64%

Implementation Research

- Private hospitals
  - How might these AMS services be funded?
- Regional & rural hospitals
  - Adapting AMS programs to suit resources and needs



What helps hospitals most

254 hospitals surveyed in 2017 nationally (large, small, rural, urban)

Enablers of AMS:

The Therapeutic Guidelines: Antibiotic, Therapeutic Guidelines Limited	224
National Safety and Quality Health Service Standards	174
The National Antimicrobial Prescribing Survey (NAPS)	173
Antibiotic Awareness Week	147
Commission's book – AMS in hospitals	140
Clinical Care Standards AMS	139
NPSMedicine wise	110
NAUSP	104

James et al (in process) 2018

How does TG help you in hospitals?

" We always use the TG as the starting point on which to base local guidelines-and try not to vary from them but rather make our local guidelines add the site-specific information to improve local utility of the guideline"

"We always use it as bench mark for antibiotic usage audits"

"The Introductory chapters on antibiotics and prescribing mandatory reading for rotating medical students and junior doctors when on ID term.

All doctors doing ID rotation encouraged to use TG and given a pink book to carry around if they don't have one (hopefully will be able to change to app with institutional licences)! "

"I very frequently use it for

antimicrobial dosing changes in renal failure. "
antibiotic duration
empiric treatment
endocarditis guidelines-it's a handy reference for dosing based on MIC etc
dosing of TB drugs
gastrointestinal infection antibiotic choice and dosing
urinary infection and treatment doses and durations

" In our electronic medical record, there is a link to eTG on the top of the page (not as good as Guidance but at least you don't have to get out of the application to look something up). "

Summarising what happened

- Therapeutic Guidelines – clarified best practice
- Governance in place – committees established
- Formularies & restrictions for use
- Approval systems – put restrictions into workflow, access information
- Hospital Comparisons
  - Describe variation (NAUSP), Examine in detail (NAPS)
- AMS teams – post prescription review to add value
- ACQSHC recommendations – put it together
- Hospital accreditation and Clinical care standards – embed it
- Ongoing capacity building all staff, growing awareness

In Summary

Do what you can,
with what you have,
where you are

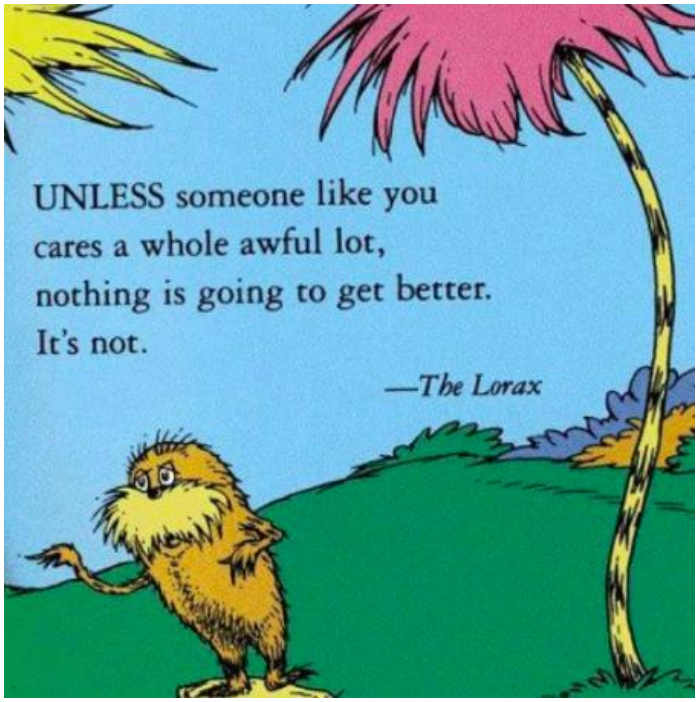
Theodore Roosevelt

Having an agreed guideline the Therapeutic Guidelines Antibiotic was such an important starting point enabling AMS programs to be introduced to acute hospitals

They enabled AMS teams in hospitals to do
what they could,
with what they had,
where they were

And finally….

A thought that sustained me when I began work as an author



With thanks to the many authors, editors, and extended team who have created and delivered the Therapeutic Guidelines Antibiotic over 40 years

Thankyou

Broader context: Calls to action

The Epidemic of Antibiotic-Resistant Infections: A Call to Action for the Medical Community from the Infectious Diseases Society of America

Brad Spellberg,[1,2] Robert Guidos,[5] David Gilbert,[7] John Bradley,[3,4] Helen W. Boucher,[8] W. Michael Scheld,[6] John G. Bartlett,[9] and John Edwards, Jr., [1,2] for the Infectious Diseases Society of America

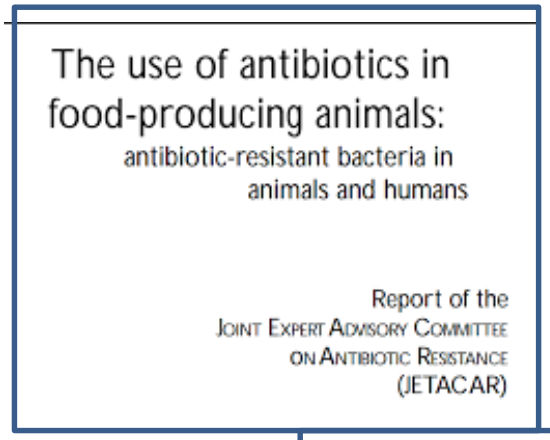
[1]Division of Infectious Diseases, Harbor–University of California–Los Angeles (UCLA) Medical Center, Torrance, [2]Geffen School of Medicine, UCLA, Los Angeles, and [3]Children's Hospital San Diego and [4]University of California at San Diego, California; [5]Infectious Diseases Society of America, Alexandria, and [6]Division of Infectious Diseases, University of Virginia Health System, Charlottesville, Virginia; [7]Division of Infectious Diseases, Providence Portland Medical Center and Oregon Health Sciences University, Portland, Oregon; [8]Tufts–New England Medical Center, Boston, Massachusetts; and [9]Department of Medicine, Johns Hopkins University School of Medicine, Baltimore, Maryland

2008

Really got people talking

Australian awareness

Aus: JETACAR 2002, EAGAR 2006



US: White paper 2014
UK: O'Neill report 2016