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The antibiotic crisis: charting Australia's path towards least resistance

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Antimicrobial resistance (AMR) is a fast-evolving global public health crisis. The UK Chief Medical Officer calls it a catastrophe ranking with terrorism and climate change.¹ Its consequences are an unenviable return to a pre-antibiotic dawn, rendering many routine infections untreatable,² and putting much major surgery, organ transplantation and cancer chemotherapy out of safe reach.³

The World Health Organization (WHO) has called for implementation of programs to contain AMR (Box 1). These initiatives are supported by several multi-national⁴ and national⁵⁻⁸ surveillance and stewardship programs. Some have shown decreasing antibiotic use and consequent decreased resistance. Australia has been part of this, although we still have no nationally coordinated surveillance system for antimicrobial use or resistance.

What has happened in Australia?

Antibiotic resistance appeared on the Australian government agenda in the early 1980s. The evolution of different bodies and responses has been complicated (Table 1). These can be classified into: resistance surveillance; regulatory measures; and infection prevention and control – the latter obviously based on the premise that reducing infection reduces the need for antibiotics. As the table shows, the focus is on hospital care (where the effects of antimicrobial resistance is most keenly felt), although it is actually the community where the greatest tonnage of antibiotics are prescribed (often inappropriately –

Box 1: Examples of WHO-promoted control programs to be implemented by political leadership:¹²

- surveillance of antimicrobial resistance
- antimicrobial use in humans by regulation
- antimicrobial use in animal husbandry by regulation
- infection prevention and control
- fostering innovations (research)

especially for acute respiratory infections). Health education body NPS MedicineWise is currently focused on this community gap.

What needs to happen?

First and foremost, a national over-arching body engaged in the process is very important. It looks as if this is happening. In March 2013, a high level steering group was established consisting of the chief health officer; the chief veterinary officer; heads of the Department of Health and Ageing (DoHA) and the Department of Agriculture, Fisheries and Forestry (DAFF); and the CEO of the Australian Commission on Safety and Quality in Health Care. This group supplements the Antimicrobial Resistance Standing Committee⁹ established in 2012 to provide technical advice to DoHA on resistance issues.

What can they do? Perhaps they should consider important – if draconian – steps to preserve our antibiotics. Following on the Australian success of the sequestration of quinolones,¹⁹ more antibiotics could be put aside for use only with specific patients, with obstructions to access by generalists and junior hospital doctors (such as the Authority to Prescribe), although this approach would be highly unpopular with prescribers. On the surveillance side, we need sentinel general practices (already established in many parts of the world¹⁰ including Australia¹¹) to participate in a structured and ongoing surveillance program across the country to gain a better understanding of pathogens and their antibiotic susceptibilities. Compilation and analysis of the vast volume of information from public and private microbiology laboratories would be of immense value.

Other research questions include ways of not just limiting the spread of infection, but the spread of resistance genes themselves (as they have the capacity to jump species and between pathogenic and commensal organisms). We need a better understanding of the contribution of hospitals and the community to resistance, and the extent to which primary care prescribers can reduce their antibiotic prescribing, and whether that will affect resistance generation. To be successful, these initiatives may need to access incentives such as the Practice Incentives Program, or even to address more fundamental factors of our health care system, such as the fee-for-service environment and the right to independent practice. Otherwise we are asking too much of hospital antimicrobial stewardship programs and their nascent community equivalents, such as NPS MedicineWise.

References

1. McCarthy M. Chief Medical Officer Dame Sally Davies: Resistance to antibiotics risks health 'catastrophe' to rank with terrorism and climate change. *The Independent* [Internet]; 2013 [cited 2013 Mar 17]; March:11. Available from: <http://www.independent.co.uk/news/science/chief-medical-officer-dame-sally-davies-resistance-to-antibiotics-risks-health-catastrophe-to-rank-with-terrorism-and-climate-change-8528442.html>
2. Gottlieb T, Nimmo GR. Antibiotic resistance is an emerging threat to public health: an urgent call to action at the Antimicrobial Resistance Summit 2011. *Med J Aust.* 2011;194:281-3.
3. Cars O, Hogberg LD, Murray M, Nordberg O, Sivaraman S, Lundborg CS, et al. Meeting the challenge of antibiotic resistance. *BMJ.* 2008;337:1438.
4. European Centre for Disease Prevention and Control. Antimicrobial Resistance and Healthcare-associated Infections Programme [Internet]. Stockholm (SWE): ECDC; 2010 [cited 2013 May 8]. Available from: <http://www.ecdc.europa.eu/en/activities/diseaseprogrammes/ARHAI/Pages/index.aspx>
5. Hammerum AM, Heuer OE, Emborg H-D, Bagger-Skjøt L, Jensen V-F, Rogues AM, et al. Danish Integrated Antimicrobial Resistance Monitoring and Research Programme (DANMAP). *Perspective* [Internet]. 2007 [cited 2013 May 8];13(11). DOI: 10.3201/eid1311.070421. Available from: http://wwwnc.cdc.gov/eid/article/13/11/07-0421_article.htm
6. Swedish strategic programme against antibiotic resistance (Strama). *Euro Surveill.* 2008;13(46). pii:19041. PubMed PMID: 19021951.

7. Centers for Disease Control and Prevention. *CDC Surveillance Systems: The Emerging Infections Programs (EIP)* [Internet]. Atlanta (GA): CDC; 2010 [cited 2013 May 8]. Available from: <http://www.cdc.gov/drugresistance/surveillance.html>
8. Public Health Agency of Canada. *Canadian Integrated Program for Antimicrobial Resistance Surveillance (CIPARS)* [Internet]. Ottawa (CAN): Government of Canada; 2007 [cited 2013 May 8]. Available from: <http://www.phac-aspc.gc.ca/cipars-picra/>
9. Australian Commission on Safety and Quality in Health Care. *Antimicrobial Resistance Standing Committee* [Internet]. Sydney (AUST): ACSQHC; 2012 [cited 2013 Aug 5]. Available from: <http://www.safetyandquality.gov.au/our-work/healthcare-associated-infection/antimicrobial-resistance-subcommittee>
10. Bremner SA, Carey IM, DeWilde S, Richards N, Maier WC, Hilton SR, et al. Early-life exposure to antibacterials and the subsequent development of hayfever in childhood in the UK: case-control studies using the General Practice Research Database and the Doctors' Independent Network. *Clin Exp Allergy*. 2003;33:1518-25.
11. Del Mar C, Pincus D. Incidence patterns of respiratory illness in Queensland estimated from sentinel general practice. *Aust Fam Physician*. 1995;24:625-9,32.
12. World Health Organization. *The Evolving Threat of Antimicrobial Resistance: Options for Action 2012*. Geneva (CHE): WHO; 2012.
13. Turnidge J. Australian Government attempts at regulatory and other control of antimicrobial resistance. *Microbiol Aust*. 2007;11:198-200.
14. Joint Expert Advisory Committee on Antibiotic Resistance (JETACAR). *The Use of Antibiotics in Food-producing Animals: Antibiotic-resistant Bacteria in Animals and Humans*. Canberra (AUST): Commonwealth Department of Health and Aged Care and the Commonwealth Department of Agriculture, Fisheries and Forestry Australia; 1999.
15. Commonwealth Department of Health and Aged Care & Commonwealth Department of Agriculture Fisheries and Forestry. *The Commonwealth Government Response to the Report of the Joint Expert Technical Advisory Committee on Antibiotic Resistance (JETACAR)*. Canberra (AUST): Commonwealth Department of Health and Ageing; 2000.
16. Webber J. Expert Advisory Group on Antimicrobial Resistance. *A Comprehensive Integrated Surveillance Program to Improve Australia's Response to Antimicrobial Resistance*. Canberra (AUST): Commonwealth Department of Health and Ageing; 2006 August.
17. Commonwealth Interdepartmental JETACAR Implementation Group. *Facilitating the Implementation of a National Antimicrobial Resistance Management Program: Progress Report*. Canberra (AUST): Commonwealth Department of Health and Ageing; 2003 March.
18. Senate Finance and Public Administration References Committee. *Progress in the Implementation of the Recommendations of the 1999 Joint Expert Advisory Committee on Antibiotic Resistance*. Canberra (AUST): Commonwealth of Australia Senate; 2013.
19. Cheng AC, Turnidge J, Collignon P, Looke D, Barton M, Gottlieb T. Control of Fluoroquinolone resistance through successful regulation. *Emerg Infect Dis*. 2012;18(9):1453-60.

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Table 1: Some Australian activities in response to antimicrobial resistance.

Milestone	Brief elaboration
Resistance Surveillance	
Working Party on Antibiotics (WPA) established by NHMRC (1980s)	To address resistance arising in food animals and spreading to humans. ¹³
WPA evolved into the Joint Expert Committee on Antibiotic Resistance (JETACAR), reporting in 1999	Proposed antibiotic-resistance management program simultaneously focused on human and animal use of antibiotics – Made 22 recommendations, relating to regulation, monitoring and surveillance, infection prevention strategies, education and research. ¹⁴
Commonwealth Response to JETACAR (2000). EAGAR ¹⁶ and CIJIG ¹⁷ later reported, but momentum was lost	Largely supported recommendations ¹⁵ – Proposed establishment of Expert Advisory Group on Antimicrobial Resistance (EAGAR) in 2001 and a Commonwealth inter-departmental JETACAR Implementation Group (CIJIG, 2000).
Strategy for Antimicrobial Resistance Surveillance in Australia (2003)	Strategy to address both JETACAR recommendations for monitoring and surveillance and recommendations relating to surveillance of antibiotic resistance and usage.
Antimicrobial Resistance Summit (2011)	Recommendations to contain antimicrobial resistance and usage, and priorities for a coordinated an interdisciplinary action plan.
Senate inquiry into the implementation of JETACAR (2013) ¹⁸	Recommendations to re-establish an independent national management program for antimicrobial resistance.
National Antimicrobial Utilisation Surveillance Program (NAUSP)	Monitoring antimicrobial usage data in major hospitals.
Australian Group on Antimicrobial Resistance (AGAR)	Prevalence data on important AMR pathogens in Australian hospitals and the community.
National Neisseria Network (NNN)	Resistance trends in <i>Neisseria gonorrhoeae</i> and <i>Neisseria meningitides</i> .
The Sentry antimicrobial surveillance program	Monitors predominant pathogens and resistance patterns for both community-acquired and nosocomial infections globally.
The Surveillance Network (TSN)	Surveillance database of strain-specific AMR test results daily from participating clinical laboratories.
Regulatory	
Antimicrobial Resistance Standing Committee (AMRSC) (2012)	Recommendations to contain antimicrobial resistance and usage, and priorities for a coordinated an interdisciplinary action plan. Provide scientific and clinical expertise informing recommendations for national strategies and priorities to minimise antimicrobial resistance. Focus restricted to human health.
The Australian Antimicrobial Resistance Prevention and Containment (AMRPC) Steering Group (2013)	Governance to develop and implement an integrated national antimicrobial resistance containment framework.
National Antimicrobial Resistance (AMR) Prevention and Containment Strategy announced (Budget 2013-14 Portfolio Budget Statement, DoHA)	Recommendations to re-establish an independent national management program for antimicrobial resistance.
Therapeutic Goods Administration (TGA)	'Resistant risk assessments' for new antibiotics (or extensions for indications of existing antibacterials). Revised scheduling of all antibacterials for human use as 'prescription only' (S4).
Pharmaceutical Benefits Scheme (PBS)	Advise EAGAR on the listing and level of access to new antibacterials.
Australian Pesticides and Veterinary Medicines Authority (APVMA)	Prevention of the registration of fluoroquinolones for use in food producing animals. ¹⁹
Infection prevention and control	
Healthcare Associated Infection Program, Australian Commission on Safety and Quality in Healthcare	National coordination of several initiatives in public and private health care sectors to reduce HAI.
NPS MedicineWise	National consumer awareness and education campaign. Decision support tools (and Shared Decision Making as a core prescribing competency) for uncomplicated ARIs.