Antimicrobial use and resistance in Australia (AURA): New Reporting Findings

Prof John Turnidge1, Adj Prof Kathy Meleady2, Jan Bell3, Dimity Herden4

1 Senior Medical Advisor, 2 Director, 3 Project Officer, 4 Senior Project Officer, Commonwealth Programs, Australian Commission on Safety and Quality in Health Care, Sydney

Antimicrobial resistance (AMR) is a global concern. While AMR to some extent is a natural phenomenon, high and inappropriate antimicrobial use (AU) has accelerated the process of increasing resistance worldwide, including in Australia.1

OBJECTIVE
To establish a comprehensive coordinated surveillance system for AU and AMR in Australia, in collaboration with existing surveillance programs. The results of surveillance will enable high-quality information and data for practice improvement, health program and policy development, and to support research priorities.

AURA 2016: First Australian report on antimicrobial use and resistance in human health (AURA 2016) includes valuable data and comprehensive analyses of AU, AMR and appropriateness of prescribing in Australia across all healthcare settings.

METHODS
To develop AURA, the Commission worked collaboratively with established programs and key stakeholders across settings to improve the coverage, capture and quality of existing surveillance programs and data collections, and to identify gaps.

The report consolidates the information arising from these sources, describes key emerging issues for AU and AMR in Australia, draws on comparisons with other countries undertaking similar surveillance, and provides commentary on the relationship between select organisms and antimicrobials.

Box 1: AURA Surveillance System

Existing data collections partnering with AURA:
- Australian Group on Antimicrobial Resistance
- National Antimicrobial Prescribing Survey (NAPS) and the pilot Aged Care NAPS
- National Antimicrobial Utilisation Surveillance Program
- Queensland Health OrgTrx System

Additional data sources used for AURA 2016 Report:
- The National Neisseria Network
- Office of Health Protection, National Notifiable Disease Surveillance Branch
- Australian Mycobacterium Reference Laboratory Network
- Pharmaceutical Benefits Scheme (PBS) and the Repatriation PBS
- NPS MedicineWise Medicines Insight Program
- Sullivan Nicolasdes Pathology

RESULTS

Antimicrobial resistance

- Australia has different patterns of AMR to other countries. There is a number of organisms, mainly gram-positive, of particular concern (Figure 1).
- Others, mainly gram-negative, show a lower rate of resistance, possibly due to restricted use of some antimicrobials (Table 1).
- Resistance and trends of concern include resistance to third-generation cephalosporins and carapenems in Enterobacteriaceae, decreased susceptibility to ceftriaxone in Neisseria gonorrhoeae, resistance to ciprofloxacin in E. faecalis and E. faecium, and resistance to erythromycin in Streptococcus agalactiae.
- Vancomycin resistance in Enterococcus faecium causing serious infections in Australia is now established.
- Community strains of MRSA now cause a significant proportion of infections in the community and are resulting in hospitalisation, with community-associated MRSA clones (includes nursing homes) now overtaking hospital-associated clones in hospital onset staphylococcal sepsis.
- At present, Australia has low rates of resistance to fluoroquinolones in Escherichia coli compared with other countries, reflecting the restricted use of this antimicrobial class locally.
- By contrast, resistance to the β-lactams available in the community, including amoxicillin, amoxicillin-clavulanate cefaclor and the third-generation cephalosporins is increasing.
- Macrolides, tetracyclines and co-trimoxazole resistance in Streptococcus pneumoniae is now 20-30%, limiting second-line treatment options for bacterial lower respiratory tract infections in the community.

Antimicrobial use and appropriateness of prescribing

- Australia has a high rate of AU compared with many other countries and this use can often be inappropriate. There is also significant variation in across states and territories and local areas.
- On any given day in 2014, around 38% of patients in Australian hospitals were receiving antimicrobial therapy. Around 23% of these prescriptions were considered inappropriate, and around 24% were non-compliant with guidelines.
- Prescriptions for surgical prophylaxis are a significant concern—this indication is the commonest reason for prescribing antimicrobials in hospitals (13% of all prescriptions), of which over 40% were deemed inappropriate (21-26%).
- Antimicrobial prescribing is high in the community, with 46% of Australians being dispensed at least one antimicrobial in 2014. More than 50% of people with colds and upper respiratory tract infections were prescribed antimicrobials unnecessarily in 2014.
- In residential aged care facilities in 2015, 11.3% of residents were on antimicrobial therapy, but only 4.5% had a suspected or confirmed infection.

CONCLUSION

Antimicrobial use is a key driver of antimicrobial resistance—the more we use antimicrobials, the more likely it is that resistance will develop. Appropriate use of antimicrobials can be life-saving, but inappropriate use needs to be monitored and minimised to prevent and contain AMR.

The AURA Surveillance System will continue to build on the AURA 2016 report by further exploring, enhancing and reporting on a range of data collections which examine the use and resistance patterns for antimicrobials across Australia.

AURA 2016 provides the first national reference point for future trends in use and resistance. This information will inform antimicrobial resistance prevention and containment strategies nationally and in all Australian states and territories.

Table 1. Antimicrobial resistance for priority organisms, 2014

<table>
<thead>
<tr>
<th>Organism</th>
<th>Resistance Rate (2014)</th>
</tr>
</thead>
<tbody>
<tr>
<td>S. aureus (MRSA)</td>
<td>5%</td>
</tr>
<tr>
<td>Pseudomonas aeruginosa</td>
<td>10%</td>
</tr>
<tr>
<td>Enterococcus faecalis</td>
<td>30%</td>
</tr>
</tbody>
</table>

Additional references:
- Antimicrobial resistance for priority organisms, 2014
- Australian Commission on Safety and Quality in Health Care, 2016
- Canadian Antimicrobial Use and Resistance in Human Health

© Commonwealth of Australia 2016

This work is copyright. It may be reproduced in whole or in part for study or teaching purposes subject to the inclusion of an acknowledgment of the source. Requests and inquiries concerning reproduction and rights for purpose other than those indicated above requires the written permission of the Australian Commission on Safety and Quality in Health Care, GPO Box 5480 Sydney NSW 2001 or mail@afetyandquality.gov.au. The AURA Program is funded by the Australian Government Department of Health.