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 AMR, AU 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 (see Box 1). Additional data sources include: the Pharmaceutical Benefits Scheme (PBS), the Repatriation PBS, NPS Medicinewise and the National Neisseria Network. 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.

**RESULTS**

Antimicrobial resistance

- Australia has different patterns of AMR to other countries. There are 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).
- Resistances and trends of concern include resistance to third-generation cephalosporins and carbapenems in Enterobacteriaceae, decreased susceptibility to ceftriaxone in Neisseria gonorrhoeae, resistance to ciprofloxacin in Staphylococcus species, and resistance to erythromycin in Streptococcus agalactiae.
- Vancomycin resistance in Enterococcus faecium causing serious infections is between 45 - 66%.
- 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-clavulanic acid and the third-generation cephalosporins is increasing.
- Macrolide, tetracycline 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 antibiotic usage across and between specialist areas.
- On any given day in 2014, around 38% of patients in Australian hospitals had a suspected or confirmed infection. 4.5% had a suspected or confirmed infection, with 46% of Australians being dispensed at least one prescribed antimicrobial in 2014.
- 40% were deemed inappropriate.
- 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 in Australia.