

2023 AURA



Thursday, 16 November 2023

AURA 2023: Key Findings

Latest data on antimicrobial use and resistance in Australia

Find out the most compelling data findings in a major new report, [AURA 2023: Fifth Australian report on antimicrobial use and resistance in human health](#), released by the Australian Commission on Safety and Quality in Health Care in November 2023.

Antimicrobial use and appropriateness

Hospitals: acute care

- In 2021, the National Antimicrobial Utilisation Surveillance Program (NAUSP) data showed that the aggregate usage rate for total-hospital systemic antibacterials for all acute care hospitals was 739.4 defined daily doses (DDD) per 1,000 occupied bed days (OBD), excluding emergency department and operating theatre usage.
- In Australian acute care hospitals, the most used oral antibacterials in 2021 were amoxicillin–clavulanic acid, doxycycline, cefalexin and amoxicillin. The use of broad-spectrum antibacterials such as amoxicillin–clavulanic acid has the potential to increase antimicrobial resistance.
- Systemic antifungal usage in Australian hospitals has increased annually since reporting commenced in 2017, which increases the risk of resistance, particularly to the azole class of antifungals.
- In 2021, the Hospital National Antimicrobial Prescribing Survey (Hospital NAPS) data showed the overall appropriateness of prescribing in Australian hospitals to be 74.5%, which was similar to previous years. Considerable variation in the appropriateness of antimicrobial prescribing was observed across hospital peer groups.
- In 2021, the Surgical National Antimicrobial Prescribing Survey (Surgical NAPS) data showed compliance with Therapeutic Guidelines or local guidelines for 68.3% of antimicrobials administered for procedural surgical prophylaxis and 39.1% of antimicrobials administered for post-procedural surgical prophylaxis.

Community: primary care

- In 2022, just over one-third (36.6%) of the Australian population had at least one antimicrobial supplied under the Pharmaceutical Benefits Scheme (PBS) or Repatriation Pharmaceutical Benefits Scheme (RPBS); up from 32.9% in 2021.
- In 2022, 21,848,005 antimicrobial prescriptions were supplied under the PBS and RPBS, a 9.6% increase compared with 2021. This was still 18.1% below the volume of antimicrobials dispensed in 2019 (n = 26,669,561) before the COVID-19 pandemic.
- The average number of antibacterial prescriptions in participating MedicineInsight practices more than halved from 16 per 100 general practitioner (GP) visits in 2019 to 7 per 100 GP visits in 2020 and 2021.

- Antibacterials were prescribed at a lower rate in telehealth consultations compared with face-to-face consultations in participating MedicineInsight practices in 2020 and 2021.
- Private (non-PBS and non-RPBS) prescriptions for antibacterials more than doubled from 2.5% in 2015 to 5.3% in 2021 in participating MedicineInsight practices.
- Prescribing rates for respiratory-related illnesses in participating MedicineInsight practices were higher than expected as antimicrobials are rarely required in respiratory illnesses that are usually viral, but showed improvement in appropriateness; for example, only 4.9% of cefalexin prescriptions were for respiratory-related conditions in 2020 and 2021.
- In 2022, prescribing rates for urinary tract infections (UTIs) and acute otitis media remained high while appropriateness of prescribing for these conditions remained low in participating MedicineInsight practices.

Community: residential aged care

- In 2021, the Aged Care National Antimicrobial Prescribing Survey (Aged Care NAPS) data showed that on the survey day 13.7% of residents were receiving antimicrobials, there was a steady increase from 2017 to 2021 in the prevalence of residents prescribed one or more antimicrobials (from 9.2% to 13.7%), and 3.1% had signs and/or symptoms of a suspected infection.
- Prolonged antimicrobial usage (more than six months) was observed for 42.1% of prescriptions, which is rarely recommended.
- Just over one-third (35.1%) of antimicrobials prescribed were for pro-re-nata (as required or PRN) administration, which is inconsistent with guidelines.
- Around one-fifth (22.3%) of all antimicrobials prescribed were for prophylactic use, which is recommended only in limited circumstances.

Source: AURA 2023 report, pp.29-30

Antimicrobial resistance

- National rates of antimicrobial resistance (AMR) for many priority organisms have not changed substantially from those reported in AURA 2021. However, several changes in resistance are important to consider for infection prevention and control, and antimicrobial prescribing.
- In *Escherichia coli*, resistance to ciprofloxacin declined in all states and territories except Tasmania. The rate of resistance began to stabilise, except in remote and very remote areas, where resistance continued to increase. Meropenem resistance has remained low. In blood culture isolates, ciprofloxacin resistance decreased nationally by just under a quarter from 2020 to 2021.
- In *Enterobacterales*, rates of resistance were lower in the community than in hospitals for most antimicrobial agents. The rates were similar for public and private hospitals, except for resistance to cefazolin, which was higher in private hospitals. The rates in aged care homes were as high as, or higher than, rates in hospitals. Carbapenem resistance remains uncommon and is found more often in the *Enterobacter cloacae* complex than in *E. coli* or *Klebsiella pneumoniae*.
- In *Neisseria gonorrhoeae*, the rates of azithromycin resistance have declined since 2017, with resistance at 4.7% in 2021. The total number of notified cases also declined in 2021.
- In *N. meningitidis*, the lowest number of notified cases was reported in 2021 since 1991 when records began. Reduced susceptibility to benzylpenicillin has declined from 44.9% in 2017 to 13.0% in 2021. Full resistance to benzylpenicillin was not observed in 2021.
- In *Salmonella*, ciprofloxacin resistance in typhoidal species (*Salmonella* Typhi and *Salmonella* Paratyphi) exceeded 74% in 2020, confirming that ciprofloxacin should no longer be relied on for empirical treatment.
- In *Staphylococcus aureus*, patterns of methicillin resistance continue to evolve. Clones that were previously dominant are being replaced by other clones, and community-associated methicillin-resistant *S. aureus* (MRSA) has become prominent across all states and territories. This demonstrates the need for a renewed focus on infection prevention and control in both community and acute

settings. As a percentage of all MRSA strains, community-acquired MRSA clones increased to 85% in 2020–2021, compared with 77% in 2018.

- In *Streptococcus agalactiae*, resistance to erythromycin and clindamycin has steadily increased to around 35% in 2021. In *S. pyogenes*, macrolide resistance has more than doubled since 2017 to 9% in 2021, reducing the utility of these second-line agents.
- In *Shigella sonnei*, resistance to ceftriaxone, ciprofloxacin and ampicillin has reduced since 2020. Rates in 2021 were similar to those of 2017, after rapid increases in 2018 and 2019.

Source: AURA 2023 report, pp.105-106

Critical Antimicrobial Resistances (CARs)

- Carbapenemase-producing *Enterobacterales* (CPE) was the most commonly reported critical antimicrobial resistance (CAR) in 2021 and 2022.
- Nationally, there was a 37.4% increase in CPE reports in 2022 compared with 2021. In contrast, 2020 reports decreased 26.6% compared with 2019.
- Three carbapenemase types comprised 97% of Enterobacterales with a confirmed carbapenemase (IMP, NDM and OXA-48-like) – either alone or in combination – in 2021 and 2022, with over half having IMP genes.
- CPE comprised 57–76% of all blood specimen CARs, highlighting the clinical spectrum of CPE infections compared with other CARs. Oral therapies may not be available for many of these infections, and intravenous therapy may be the only treatment option.
- Reports of multidrug-resistant *Shigella* species increased. Extended-spectrum β -lactamase (ESBL)-producing *S. sonnei* reports increased from 17 in 2021 to 62 in 2022.
- Reports of ceftriaxone-nonsusceptible *Neisseria gonorrhoeae* increased sharply in 2022 compared with 2021, highlighting the importance of ongoing monitoring of resistance to both azithromycin and ceftriaxone and their impact on current treatment guidelines.
- Across 2021 and 2022, *Candida auris* was reported by all states and territories except the Australian Capital Territory (ACT) and Tasmania.
- CARs reported from aged care settings were predominantly CPE or daptomycin-nonsusceptible *S. aureus*.

Source: AURA 2023 report, pp.180

Focus Areas

Antifungal drug susceptibility for common *Candida* group species and *Aspergillus fumigatus* complex

- Antifungal resistance among common *Candida* species and *Aspergillus fumigatus* complex remains uncommon.
- However, small numbers of *Candida* group isolates, particularly *Nakaseomyces (Candida) glabratus*, were anidulafungin- and micafungin-resistant. Four *N. glabratus* isolates (0.6%) that were echinocandin-resistant or had intermediate susceptibility were also co-resistant to azoles.
- Azole resistance among *C. tropicalis* and *N. glabratus* may be emergent (both approximately 8%).
- Voriconazole resistance among *A. fumigatus* complex was uncommon (<5%).

International comparisons of antimicrobial use

- Australian hospital antimicrobial use is estimated to be nearly three times that of the European country with the lowest use, the Netherlands, and considerably higher than Canada, which has a comparable healthcare system.
- Australia ranks seventh highest compared with European countries, the United Kingdom and Canada in its use of antimicrobials in the community.

International comparisons of antimicrobial resistance in bacteria

- Australia's rates of fluoroquinolone resistance in *E. coli* and *Klebsiella pneumoniae* remain very low compared with most European countries.
- Australia's rates of resistance to third-generation cephalosporins were lower than European rates.
- Australia's rates of resistance in key gram-positive pathogens such as *S. aureus* were moderate to high compared with European countries.
- Australia's rates of vancomycin resistance in *Enterococcus faecium* remain higher than in more than 20 European countries, but are slowly reducing.

Source: AURA 2023 report, pp.213

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