

5.1 Antimicrobial medicines dispensing, all ages

Context

This section examines antimicrobial medicines dispensing in Australia from 2013–14 to 2016–17 for people of all ages.

Antimicrobial medicines are used to treat microbial infections. They include antibiotics (or antibacterials), antivirals and antifungals. Use is often driven by factors such as physician experience, patient factors, the incidence of infection, and the prevalence of antimicrobial resistance.¹

The rate of antimicrobial dispensing per 100,000 people in all age groups was mapped in the first *Australian Atlas of Healthcare Variation*, published in November 2015. The first Atlas reported that, in 2013–14, more than 30 million Pharmaceutical Benefits Scheme (PBS) prescriptions for antimicrobial medicines were dispensed in Australia. Dispensing rates tended to be higher in areas with socioeconomic disadvantage. This is consistent with poorer health outcomes and higher infection rates observed in areas with socioeconomic disadvantage. Dispensing rates were lower in areas with socioeconomic advantage, as well as in remote communities. Low dispensing rates in remote communities were partly attributed to medicines dispensed by remote-area Aboriginal health services not being captured in the PBS database.¹

The data item on antimicrobial dispensing included systemic and topical antibacterials and antifungals, because the resistance issues for antifungals are similar to those for antibacterials. It did not include antivirals.

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Why is it important to monitor antimicrobial use nationally?

Improving the use of antimicrobials is a national priority because of the ongoing concern about antimicrobial resistance (AMR) and because inappropriate use is exposing patients unnecessarily to the adverse effects of these medicines.

Antimicrobial-resistant microorganisms can stop an antimicrobial from working effectively. AMR is a concern because, as antimicrobials become ineffective, the ability to treat infections becomes more limited. With few new antimicrobials under development, especially for infections that occur in the community, AMR has been declared by the World Health Organization as one of the greatest threats to human and animal health, as well as to food and agriculture.² Without effective antimicrobials, there is the possibility of a post-antibiotic era when minor infections can no longer be treated. Use of antimicrobials is one of the biggest drivers of resistance in the individual and wider community – the more they are used, the more likely it is that resistance will develop. For example, an individual prescribed an antibiotic for respiratory tract infection is 2.4 times more likely to acquire bacteria resistant to that antimicrobial and carry it for up to 12 months.³

Prescribing antimicrobials inappropriately – for example, for longer than necessary – contributes to resistance and exposes patients unnecessarily to the adverse effects of these medicines.

Examining how antimicrobials are being used will help inform strategies to minimise resistance and adverse effects in patients.

Australia continues to have very high overall rates of community antimicrobial use compared with other countries. In 2015, almost half the Australian population in the community setting had at least one antimicrobial dispensed under the PBS or Repatriation Pharmaceutical Benefits Scheme (RPBS). The 11 most commonly dispensed antimicrobials made up 84% of all use, and were most often dispensed to young children, or those aged over 65 years. Use in all age groups was also higher in winter months, suggesting that they are potentially being used for respiratory tract infections. Most antimicrobial use in the Australian community is unnecessary, because they are frequently used to treat infections for which they provide little or no benefit.^{4,5}

What initiatives have taken place since 2015?

Increased antimicrobial use has prompted a number of policy and regulatory responses in Australia since publication of the first Atlas in 2015. Australia has taken a One Health approach, coordinating responses from all sectors that use antimicrobials. Responses have included:

- Development of Australia's First National Antimicrobial Resistance Strategy, as part of a global response to combat AMR²
- Development of the Antimicrobial Use and Resistance in Australia (AURA) Surveillance System by the Australian Commission on Safety and Quality in Health Care (the Commission) to inform strategies to prevent and contain AMR⁶
- Establishment of the National Alert System for Critical Antimicrobial Resistance (CARAlert) by the Commission, as part of AURA, to collect close to real-time data on critical resistances to the last-line antimicrobials⁶
- Establishment of the National Centre for Antimicrobial Stewardship, to promote the rational use of antimicrobials across Australia⁷
- Implementation of antimicrobial stewardship programs in all health service organisations across Australia, under the requirements of the National Safety and Quality Health Service Standards⁸
- Continued delivery of the NPS MedicineWise Resistance Fighter campaign (2012–2017) – a national initiative to help raise awareness of AMR and encourage reduction in antibiotic use where appropriate and safe to do so⁹
- Letters from Australia's Chief Medical Officer to general practitioners prescribing high amounts of antimicrobials, prompting audit of their antimicrobial prescribing practice to identify areas for quality improvement.¹⁰

About the data

Data are sourced from the PBS dataset. This dataset includes all prescriptions dispensed under the PBS or the RPBS, including prescriptions that do not receive an Australian Government subsidy. Note that some dispensed medicines may not be consumed by the patient.

The dataset does not include prescriptions dispensed for patients during their hospitalisation in public hospitals, discharge prescriptions dispensed from public hospitals in New South Wales and the Australian Capital Territory, direct supply of medicines to remote Aboriginal health services, over-the-counter purchase of medicines, doctor's bag medicines and private prescriptions.

This analysis was not undertaken by Aboriginal and Torres Strait Islander status because this information was not available for PBS data at the time of publication.

Changes have been made to the data specification used in the first Atlas to improve the robustness of comparing rates over time. The main change is the addition of sex standardisation, as the data specification for the first Atlas standardised for age only. These changes have resulted in small differences in the rates reported for 2013–14 in the first Atlas and this Atlas. The rates reported in this Atlas should be used to monitor changes over time.

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What do the data show?

Magnitude of variation*

In 2016–17, the rate of dispensing of antimicrobial medicine prescriptions was **4.8 times as high** in the area (Statistical Area Level 3 – SA3) with the highest rate as in the SA3 with the lowest rate. The magnitude of variation **increased** from 2013–14, when there was a 4.6-fold difference between the highest and lowest rates (Figure 5.3).

Rate of prescriptions dispensed

In 2016–17, there were 29,147,238 PBS prescriptions dispensed for antimicrobial medicines, representing an Australian rate of **115,894** prescriptions dispensed per 100,000 people of all ages. The Australian rate **decreased** from 2013–14, when 126,864 prescriptions per 100,000 people were dispensed (Figure 5.3).

People dispensed at least one prescription

In 2016–17, there were **43,215** people per 100,000 people nationally who had at least one prescription dispensed for an antimicrobial medicine. The number of people nationally who had at least one prescription dispensed in a year **decreased** from 2013–14, when 45,411 people per 100,000 people nationally had at least one antimicrobial medicine prescription dispensed (Table 5.1).

Table 5.1: Number of people dispensed at least one PBS prescription for an antimicrobial medicine per 100,000 people of all ages, age and sex standardised, 2013–14 to 2016–17

	2013–14	2014–15	2015–16	2016–17
Australian rate	45,411	46,032	44,866	43,215

Volume of antimicrobial medicine use

In 2016–17, there were 23.21 defined daily doses[†] (DDDs)[†] of antimicrobial medicines per 1,000 people dispensed on any given day. The national DDD rate per 1,000 people per day was relatively **stable** between 2013–14 and 2016–17 (Table 5.2).

Table 5.2: Number of defined daily doses of antimicrobial medicines dispensed per 1,000 people of all ages per day, age and sex standardised, 2013–14 to 2016–17

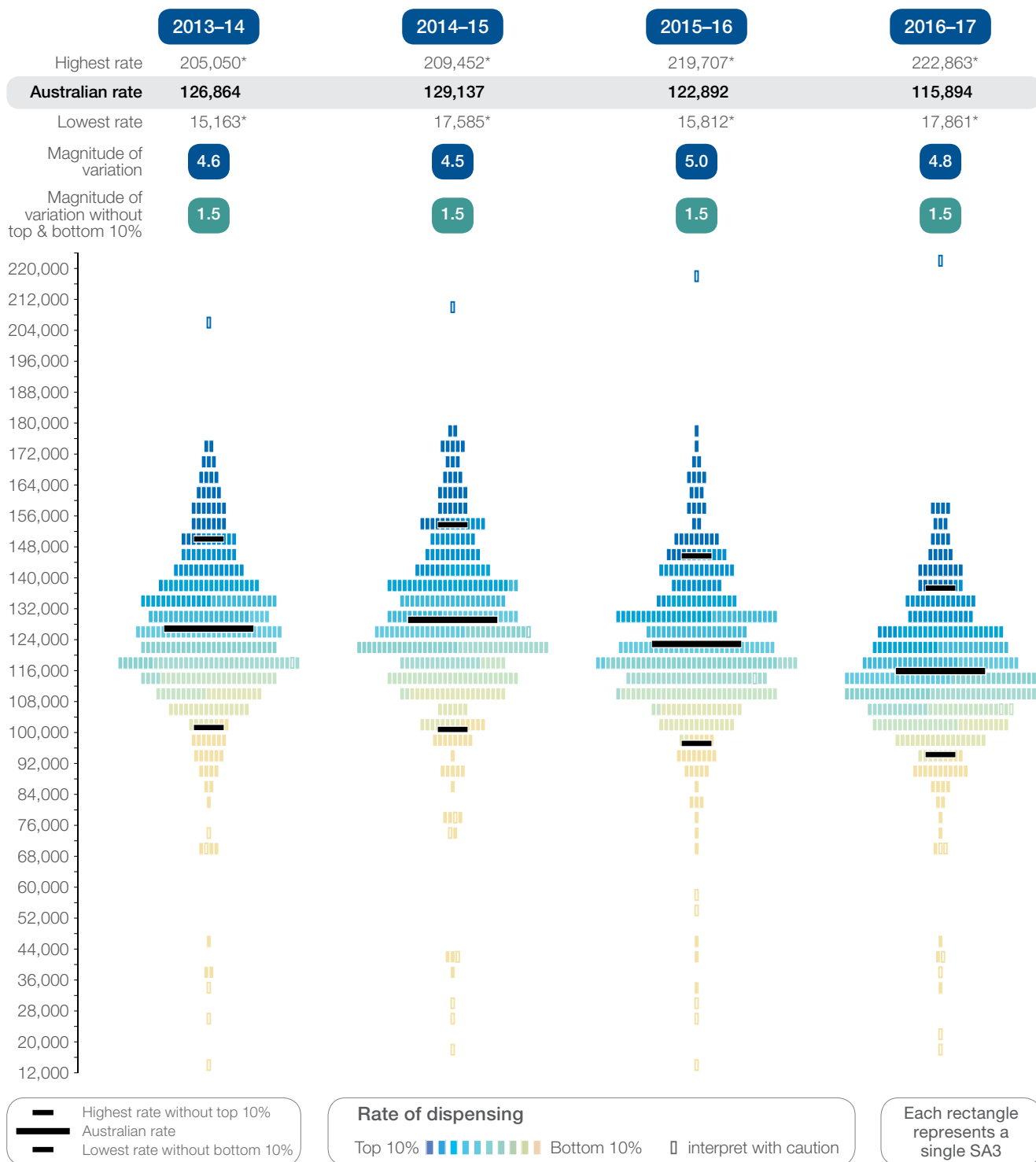
	2013–14	2014–15	2015–16	2016–17
Australian rate	23.55	24.16	23.64	23.21

* Some of the published SA3 rates were considered more volatile than others. These rates are excluded from the calculation of the difference between the highest and lowest SA3 rates in Australia.

† A defined daily dose (DDD) is a measure of medicines use that allows comparison between different therapeutic groups, and between countries. The DDD is based on the average dose per day of the medicine when used for its main indication by adults. Refer to the Technical Supplement for more information.

Rates across years

Figure 5.3: Number of PBS prescriptions dispensed for antimicrobial medicines per 100,000 people of all ages, age and sex standardised, by Statistical Area Level 3 (SA3) of patient residence, 2013–14 to 2016–17



Notes:

Hollow rectangles (□) and asterisks (*) indicate rates that are considered more volatile than other published rates and should be interpreted with caution. These rates are excluded from the calculation of the difference between the highest and lowest SA3 rates in Australia. For further detail about the methods used, please refer to the Technical Supplement.

Sources: AIHW analysis of Pharmaceutical Benefits Scheme data and ABS Estimated Resident Population 30 June 2013 to 2016.

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Interpretation

Between 2013–14 and 2016–17, the rate of antimicrobial prescriptions dispensed per 100,000 people nationally decreased by 9%, and the rate of people dispensed at least one prescription for an antimicrobial also decreased. While this is encouraging, the volume of antimicrobials used in the Australian community, as indicated by the DDD per 1,000 people per day, remained relatively stable, indicating that there was little change in the amount of antimicrobial medicines supplied during the four-year period. Further, the magnitude of variation in dispensing rates also increased, which might indicate changes in antimicrobial medicine use in some areas but not others.

Potential reasons for this pattern include:

- The number of authority prescriptions dispensed – for example, a rise in these types of prescriptions for an increased quantity supplied could lower rates of prescriptions dispensed
- Changes in guidelines and prescribing behaviours, affecting the type of antimicrobial chosen and dose dispensed (as different conditions might require courses with a different dose or the same condition may be treated with a higher dose, which will not affect the rate of prescriptions dispensed, but will affect the DDD).

To explore this, further analysis could potentially focus on:

- Types of antimicrobials, reasons for prescribing and doses being dispensed
- Quantities of antimicrobials being dispensed on authority prescriptions
- The context in which antimicrobials are dispensed – for example, in patients with chronic disease.

Is there more to be done?

Although antimicrobial dispensing rates fell in Australia between 2013–14 and 2016–17, the findings suggest that further efforts to improve antimicrobial use are needed. The magnitude of variation in dispensing rates increased, which is unlikely to be explained by infection rates. Despite reduced dispensing rates, this has had little effect on the overall volume of antimicrobial medicines supplied on any given day in the Australian community during the four-year period. Improving antimicrobial prescribing requires a sustained, multi-pronged approach. Australia's first National Antimicrobial Resistance Strategy describes the collaborative efforts required to bring about practice change where appropriate, and to implement initiatives that support improvement in antimicrobial use in all settings of health care.²

The Commission will publish a further report of these data in 2019, including analyses by state and territory, and local area. This information will help to identify whether changes in antimicrobial use are occurring in some areas and not others, and what further targeted strategies are needed to promote safe and appropriate use of antimicrobials in Australia.

References

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