Australian Commission on **Safety and Quality** in Health Care

AURA Antimicrobial Use and Resistance in Australia

Antibacterial use in general practice: 2015–2024

MedicineInsight highlights report

December 2025

safetyandquality.gov.au

Title: Antibacterial use in general practice: 2015–2024
ISBN: 978-1-923353-36-7
Preferred citation: Australian Commission on Safety and Quality in Health Care. Antibacterial use in general practice: 2015–2024. Sydney; ACSQHC, 2025.

Creative Commons Licence

Contents

Executive summary

Antimicrobials are an integral component of healthcare delivery and need to be readily available and effective. The more widely antimicrobials are used, the more likely it is that microorganisms will develop resistance. Antimicrobial resistance (AMR) is a critical risk to patient safety as it reduces the number of antimicrobials available to treat infections. It is a public health priority due to its serious and growing impact. AMR increases morbidity and mortality associated with infections caused by multidrug-resistant organisms. Hundreds of people in Australia die each year as a result of AMR.

The emergence of AMR and consequent reduction in the efficacy of antimicrobials has resulted in significant impacts on individuals receiving treatment for infections, and more broadly as AMR spreads through the community. As antimicrobials become ineffective, important treatments such as organ transplantation, a range of major surgical procedures, and chemotherapy for cancer may become limited, or no longer viable. Antimicrobial use also contributes to healthcare-associated impacts on the environment.

Since 2015, there has been an overall downward trend in antimicrobial use in the Australian community sector supplied under the Pharmaceutical Benefits Scheme and Repatriation Pharmaceutical Benefits Scheme (PBS/RPBS). However, it is an ongoing concern that antimicrobial use has trended up from 2022. These findings are consistent with analyses of antibacterials prescribed in general practices that participate in the MedicineInsight program.

While the exact quantity of antimicrobials dispensed privately is unknown (that is prescriptions not subsidised under the PBS/RPBS), MedicineInsight data have shown there has been an increasing proportion of private antibacterial prescriptions issued by general practitioners. In Australia, an unknown quantity of antimicrobials is supplied over-the-counter without a prescription and via expanded scope of practice by a range of registered clinicians, for which data are not reported nationally. However, this is currently likely to be very small.

Knowledge of the indication for antimicrobial prescribing is another gap in surveillance of antimicrobial use. However, MedicineInsight provides some data on this, which can be used to assess appropriateness of prescribing. Data have shown antimicrobials in general practice are often overprescribed and inconsistent with Australian guidelines, particularly for respiratory infections.

Although the overall decline in antimicrobial use in the community is encouraging, the recent upward trend and ongoing inappropriate prescribing are concerning. Urgent action is needed to improve these trends. Targeted and combined strategies of antimicrobial stewardship and infection prevention and control are the most effective ways to reduce inappropriate antimicrobial use and to prevent and control AMR, which contributes to the sustainability of health care in Australia.

Key findings and trends: MedicineInsight (2015–2024)

- Almost 1 in 3 patients were prescribed at least one antibacterial in 2024; consistent with pre-pandemic levels in 2018 and 2019.
- Private antibacterial prescriptions more than tripled from 2015 to 2024 (2.7% to 8.5%); private azithromycin prescriptions notably increased in 2024.
- Cefalexin, amoxicillin, doxycycline and amoxicillin–clavulanic acid remained the most frequently prescribed antibacterials in 2024.
- Antibacterial prescribing rates for respiratory-related illnesses remain higher than guideline recommendations.

Introduction

About this report and surveillance of antibacterial prescribing in general practice

This technical report presents highlights of MedicineInsight data analyses on antibacterial use and appropriateness in the Australian general practice from 2015 to 2024. The MedicineInsight program is designed to enhance the quality of primary care in Australia and captures prescribing data from participating general practices across Australia including data on private prescriptions and reasons for prescriptions.[1]

Community prescribing in general practice, community health services, aged care homes and other non-hospital settings accounts for the majority of antimicrobial use in human health in Australia – the Pharmaceutical Benefits Scheme and Repatriation Pharmaceutical Benefits Scheme (PBS/RPBS) are estimated to account for more than 90% of prescriptions issued in the community. This report is complementary to *Antimicrobial use in the community: 2024*[2], which presents analyses of antimicrobials supplied under the PBS/RPBS.

Monitoring the overall volume of use of antimicrobials, the term used for all medicines that treat and prevent infections, and the extent of inappropriate use is an important part of the approach to understand and address the risks associated with antimicrobial resistance (AMR). This surveillance is essential to inform antimicrobial stewardship (AMS) and infection prevention and control strategies to reduce patient harm, as well as reduce contributions to healthcare-associated impacts on the environment and improve sustainability and resilience of health care.[3]

These reports build on publications developed by the Australian Commission on Safety and Quality in Health Care (the Commission) including *Antimicrobial use and appropriateness in the community: 2020–2021*[4], and the series of national reports on the Antimicrobial Use and Resistance in Australia (AURA) surveillance program.[5-9]

Funding for the AURA surveillance program and for the preparation of this report is provided by the Australian Government Department of Health, Disability and Ageing (the Department), with further contributions from the states and territories by the collection and submission of their data on AMR and antimicrobial use in hospitals.

Prescriptions for antibacterials for systemic use (Anatomical Therapeutic Chemical [ATC] code J01) were analysed for this report. Almost all antimicrobial prescriptions supplied under the PBS/RPBS in Australia are systemic antibacterials. In this report, analyses refer to ‘antibacterials’, which are also often known as antibiotics. Both these terms have the same meaning that they are used to treat and prevent infections caused by bacteria.

Information about the MedicineInsight program, methodology and considerations for interpretation of these data and analyses are included in Appendix 1. Further information about the factors that may have influenced antimicrobial use, implications of findings and what the Commission will continue to do to promote reductions in antimicrobial use and improve appropriateness of antimicrobial prescribing in the community are explored in *Antimicrobial use in the community: 2024*.[2]

Results

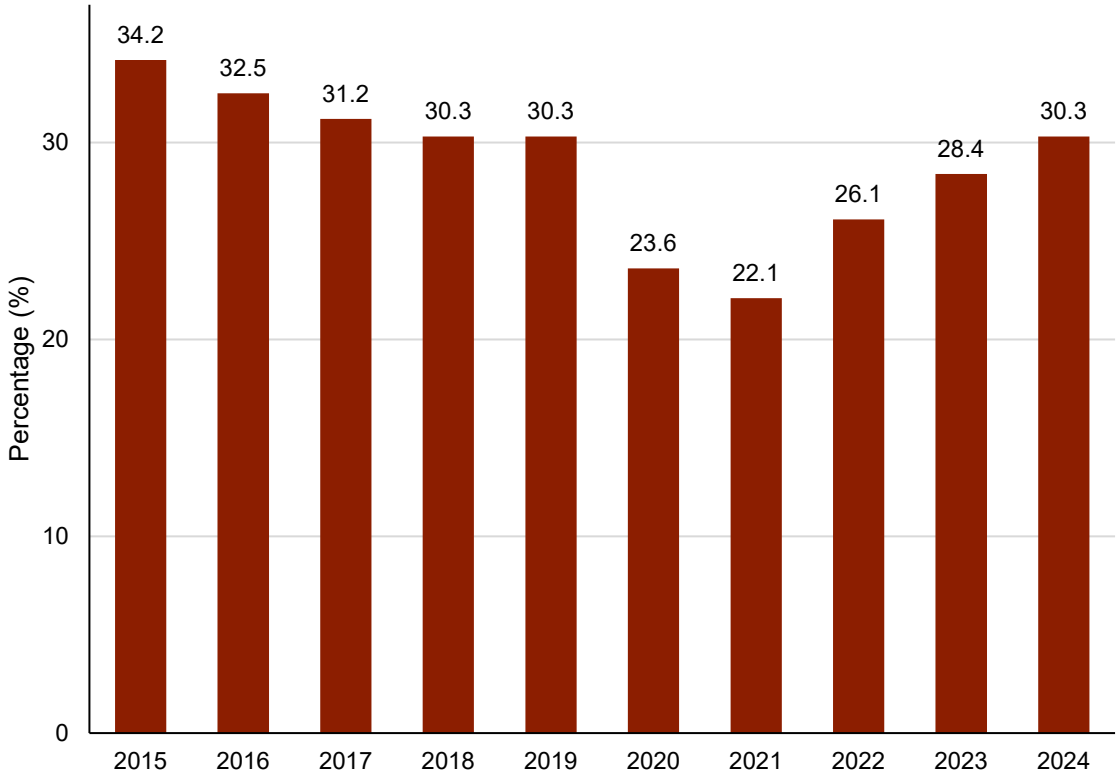
Prescribing in general practice: overall trends

The percentage of MedicineInsight patients prescribed at least one antibacterial in a year gradually declined from 2015 to 2019 then dropped dramatically in 2020 and further in 2021. From 2022 to 2024, the percentage increased but was still lower than 2015 (Figure 1).

In 2024, 30.3% (312,176/1,029,140) of patients were prescribed an antibacterial, consistent with 2018 and 2019 (Figure 1).

A similar trend has been observed in PBS/RPBS data analyses (see Appendix 1).[2]

Figure 1 Percentage of patients prescribed one or more antibacterials in each year, MedicineInsight practices, 2015–2024



Source: MedicineInsight

Rates of antibacterial prescribing among MedicineInsight practices varied across age groups. From 2015 to 2024, patients aged 65 years and over have had the highest rates of prescribing, except in 2015 when children aged 0–9 years had the highest rate (Figure 2).

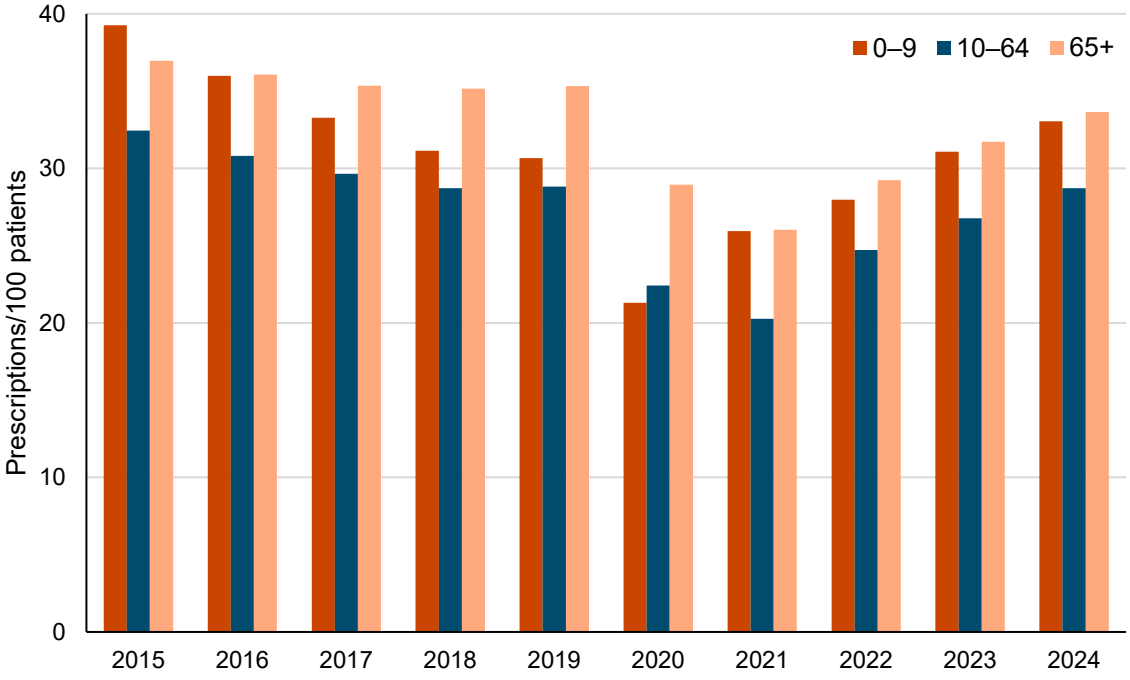
This is consistent with PBS/RPBS data that shows older Australians were dispensed the greatest number of antimicrobials.[2]

The number of private prescriptions that are not subsidised by the PBS or RPBS has increased since 2015 (Figure 3).

Private prescriptions more than tripled from 2.7% (21,136/791,587) in 2015 to 8.5% (58,897/690,340) in 2024. This volume is currently relatively small compared to PBS/RPBS prescriptions.[2]

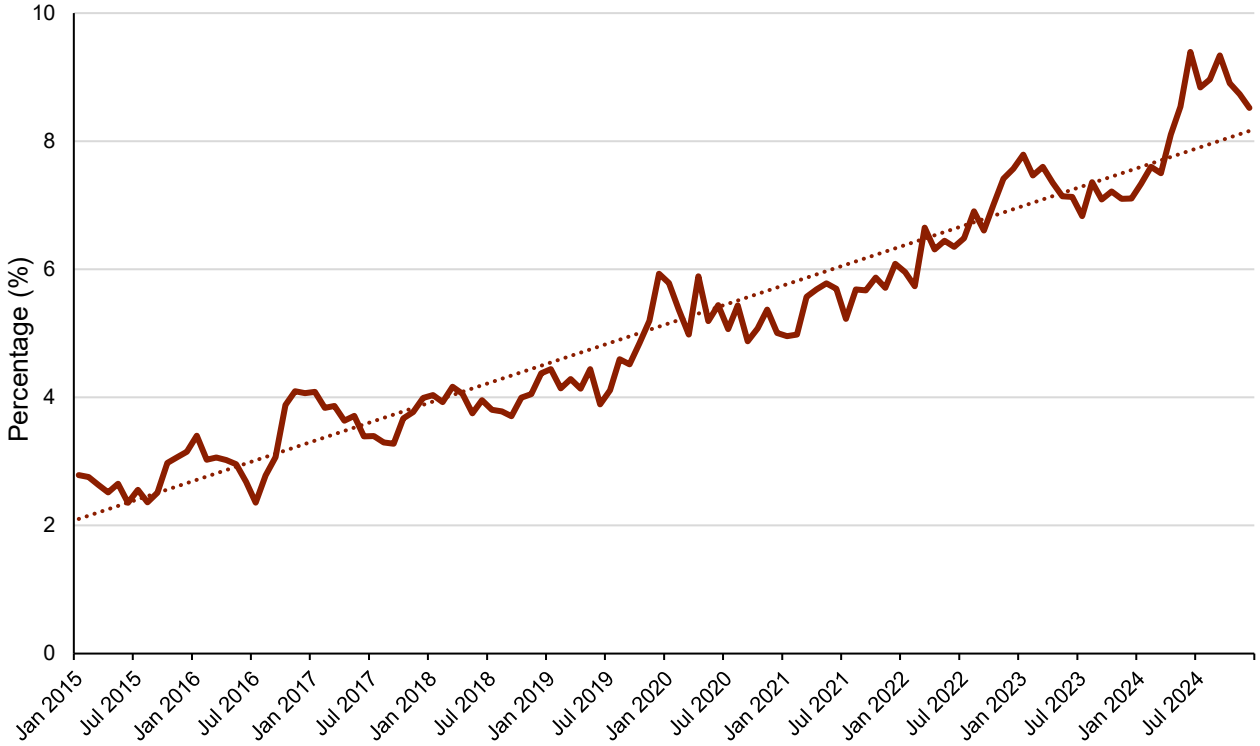
Outside of MedicineInsight, Australia lacks mechanisms to record and monitor rates of private antimicrobial prescribing, as well as at the time of dispensing. This continues to be an important gap in current surveillance of antimicrobial use in Australia.

Figure 2 Rate of patients prescribed one or more antibacterials per year, per 100 patients, by age group, MedicineInsight practices, 2015–2024



Source: MedicineInsight

Figure 3 Percentage of total antibacterial prescriptions that are issued as private prescriptions, MedicineInsight practices, 2015–2024



Note: Antibacterial prescriptions (original plus repeat prescriptions) that are private (not subsidised by the PBS/RPBS) as a percentage of total antibacterial prescriptions (original plus repeat prescriptions).

Source: MedicineInsight

Patterns of prescribing by antibacterial

The four most commonly prescribed antibacterials in MedicineInsight practices between 2015 and 2024 were amoxicillin, amoxicillin–clavulanic acid, cefalexin and doxycycline, which is consistent with PBS/RPBS analyses.[2] Cefalexin was the most commonly prescribed antibacterial in 2024 (Figure 4).

Figure 4 shows that from 2015 to 2024, there was an overall decline in prescriptions for the top four antibacterials, particularly from 2020 and notably for amoxicillin–clavulanic acid. Doxycycline, however, follows a different trend over this period where prescriptions peaked in July 2024.

Figure 4 also shows distinct seasonal variations for amoxicillin, amoxicillin–clavulanic acid, and doxycycline with peaks in winter months. This variation is most notable for amoxicillin and amoxicillin–clavulanic acid that have tended to follow the same pattern since 2015. The smaller variation observed for these antibacterials in 2020 and 2021 was not sustained.

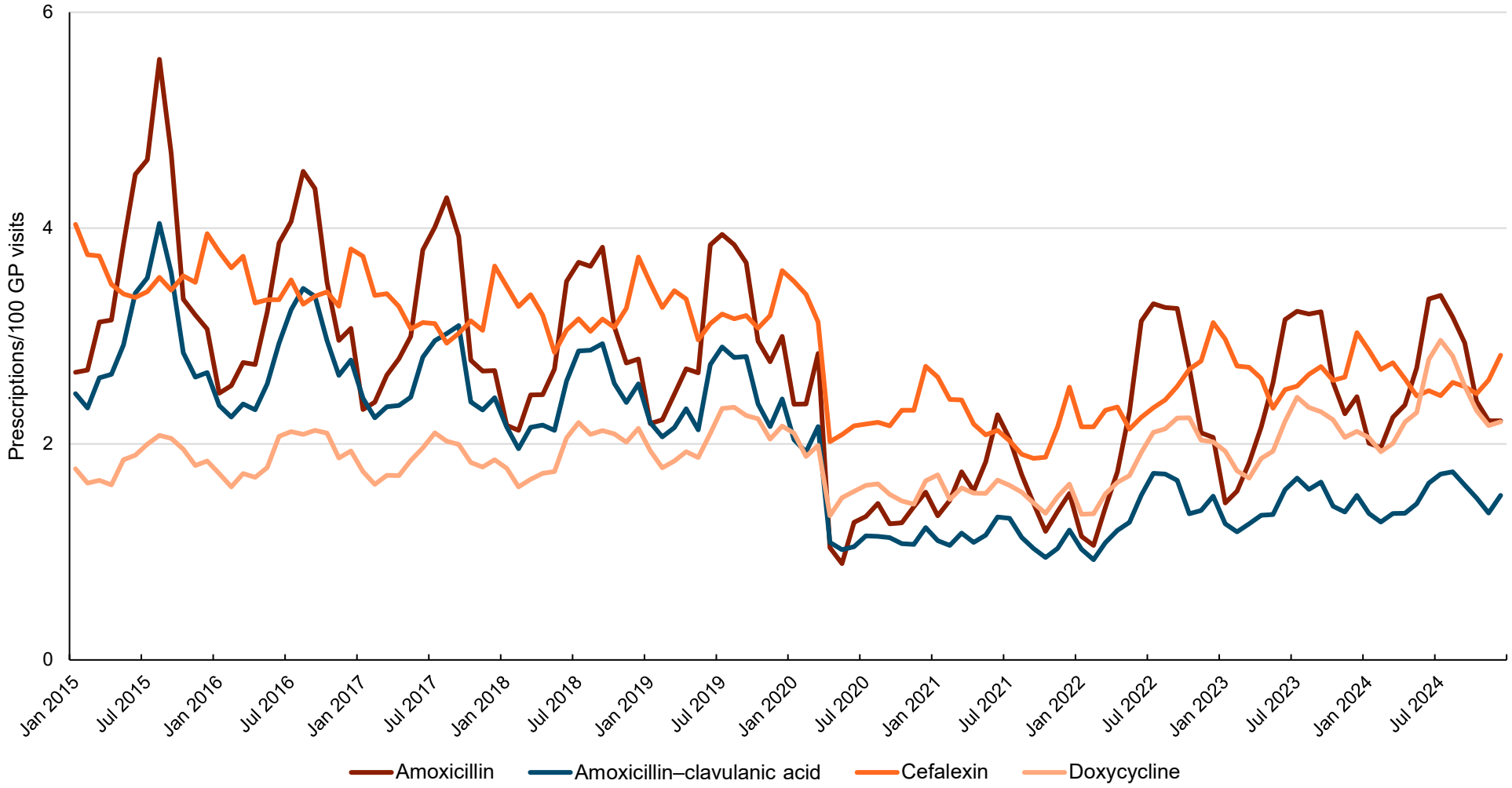
The seasonal variation is reversed for cefalexin, where prescribing peaks occur in the summer period. This may be because cefalexin is more commonly used to treat skin and soft tissue infections and urinary tract infections (UTIs) rather than respiratory tract infections (see Table 1). This may also reflect why cefalexin was the most prescribed antibacterial during the height of the COVID-19 pandemic restrictions in 2020 and 2021.[4]

Azithromycin and ciprofloxacin were the fifth and seventh most commonly prescribed antibacterials in 2024, respectively. PBS/RPBS benefits are restricted for these antibacterials, and they were prescribed at a much lower rate than the top four antibacterials (Figures 4 and 5). However, use of azithromycin in sexual health clinics to treat conditions such as chlamydia and gonorrhoea is not captured in MedicineInsight data.

There has been a marked increase in total prescriptions for azithromycin compared to ciprofloxacin since 2022, which steepened in 2024. The rate of private prescriptions for azithromycin has followed this trend, whereas private ciprofloxacin prescriptions have remained steady since 2015 (Figure 5).

The sixth most frequently prescribed antibacterial was roxithromycin in 2024.

Figure 4 Rate of prescriptions (total) for the top four antibacterials per 100 GP visits, MedicineInsight practices, 2015–2024

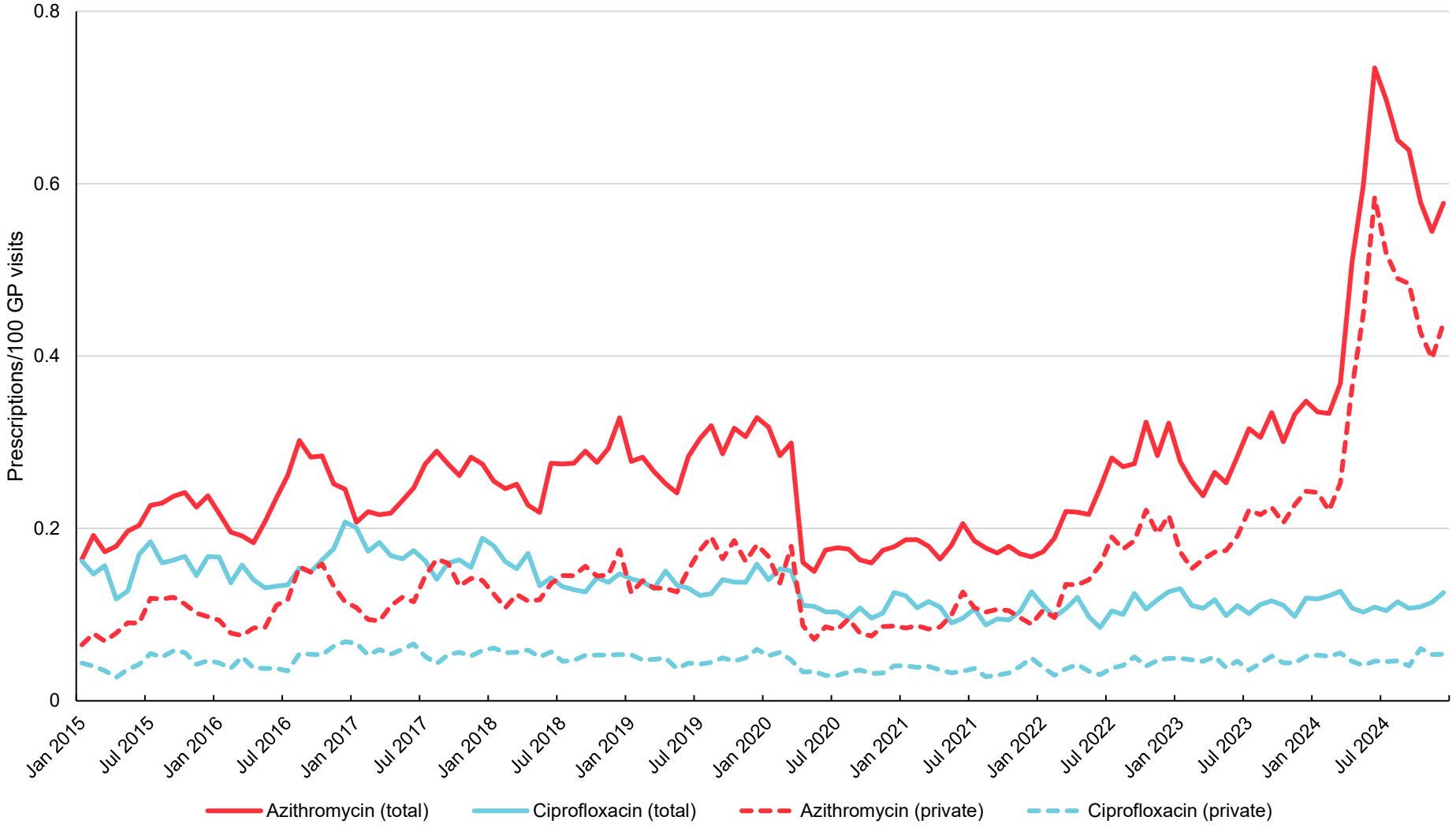


GP = general practitioner; total = original plus repeat prescriptions

Note: From 1 April 2020, PBS/RPBS repeats were not allowed for amoxicillin, amoxicillin–clavulanic acid, cefalexin, doxycycline and roxithromycin, which coincided with the full implementation of COVID-19 pandemic restrictions across Australia.[10]

Source: MedicineInsight

Figure 5 Rate of prescriptions (total and private) for azithromycin and ciprofloxacin per 100 GP visits, MedicineInsight practices, 2015–2024

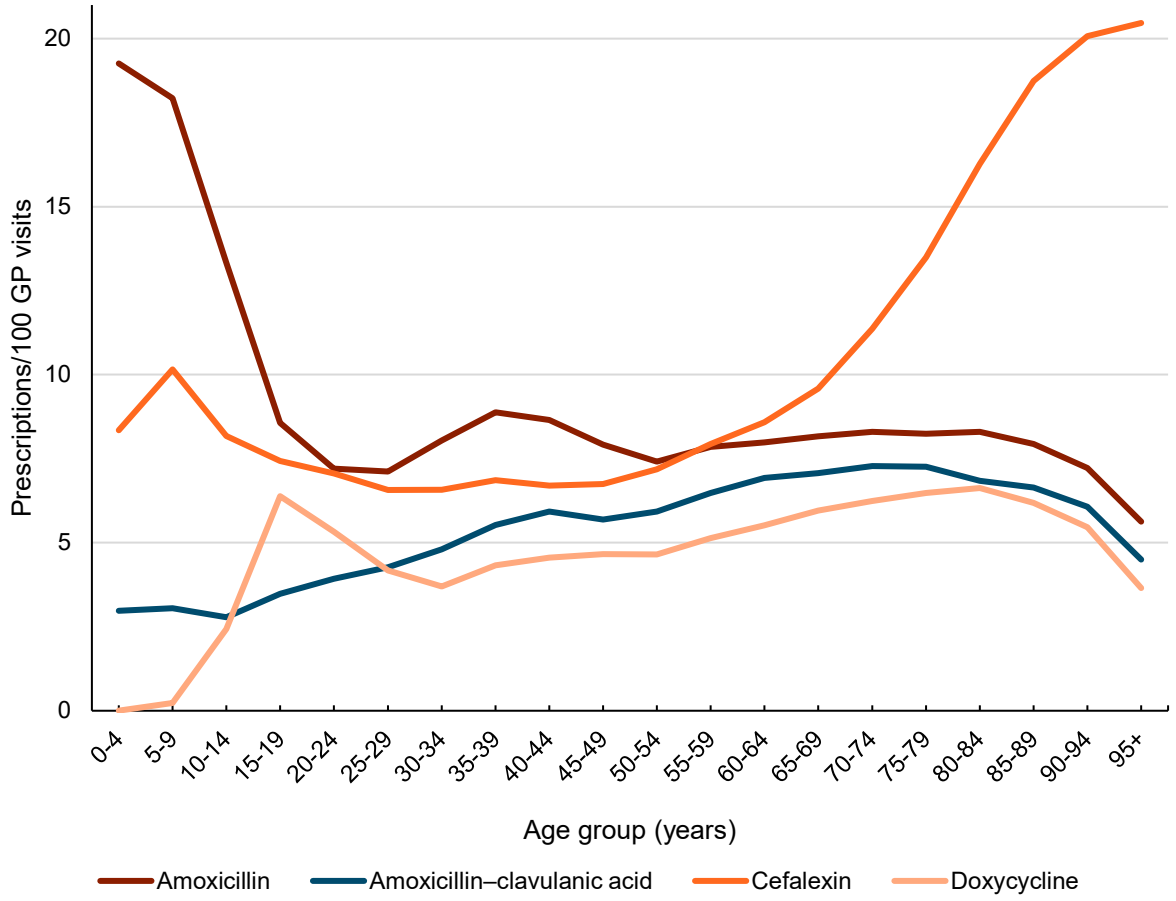


GP = general practitioner; private = non-PBS/RPBS original plus repeat prescriptions; total = original plus repeat prescriptions
Source: MedicineInsight

Differences in prescribing patterns for the top four antibacterials were observed across age groups in 2024. As with previous years[4], amoxicillin was commonly prescribed for patients aged less than 24 years, particularly for children under 10 years. Cefalexin was commonly prescribed for patients aged 55 years and over, with prescribing rates increasing with age (Figure 6).

This pattern of prescribing likely reflects the most common indications for which antibacterials were prescribed in these age groups (Table 1).

Figure 6 Rate of patients prescribed one or more top four antibacterials per 100 GP visits, by age group, MedicineInsight practices, 2024



GP = general practitioner
Source: MedicineInsight

Table 1 shows patterns of prescribing in 2024 for the seven most prescribed antibacterials in MedicineInsight practices. While the total volume of cefalexin prescriptions issued was higher, a greater number of patients were issued prescriptions for amoxicillin in 2024; this results in a higher percentage of patients receiving amoxicillin overall. This indicates that patients who were prescribed cefalexin were more likely to receive more than one prescription in the same year.

Cefalexin was most commonly indicated for skin or wound infections (20.3%), while 3.1% of prescriptions were for acute upper respiratory tract infections, which was the most common indication for amoxicillin (19.1%) (Table 1).

In 2024, nearly 40% of ciprofloxacin prescriptions did not have a clear indication, with ‘other infection’ and ‘unclassified reason for prescription’ being the most recorded indications. This has been an ongoing trend since 2019.[4,7-9] These indications are also common for

azithromycin (Table 1). As these antibacterials have a broad-spectrum of activity, recording indication is especially important to understand appropriateness of prescribing.

Table 1 Patterns of prescribing for the top seven antibacterials, MedicineInsight practices, 2024

Antibacterial	Patients issued a prescription (total)*	Most common indication (%)†	Highest rate of patient prescribing (age group, years)	Prescriptions (total) ordered with repeats	Prescriptions (private) ordered with repeats
Cefalexin	8.8%	• Skin/wound infection (20.3) • UTI (14.3) • Other infection (8.6) • Unclassified reason§ (3.5) • Acute URTI (3.1)	95+	7.3%	1.5%
Amoxicillin	9.5%	• Acute URTI (19.1) • Pneumonia (13.0) • Acute otitis media (9.6) • Sinusitis (7.0) • Acute bronchitis (3.3)	0–4	10%	2.0%
Doxycycline	4.5%	• Pneumonia (16.7) • Acne (9.1) • Acute URTI (6.0) • Sinusitis (4.6) • Unclassified reason§ (4.3)	80–84	56.7%	12.0%
Amoxicillin–clavulanic acid	5.3%	• Other infection (13.9) • Sinusitis (8.0) • Pneumonia (7.6) • Acute URTI (5.9) • Skin wound infection (4.7)	70–74	4.6%	4.6%
Azithromycin	2.0%	• Pneumonia (19.4) • Other infection (9.0) • Acute URTI (8.9) • Unclassified reason§ (4.3) • Travel (3.8)	10–14	13.2%	74.4%
Roxithromycin	1.0%	• Acute URTI (18.1) • Pneumonia (13.3) • Other infection (8.3) • Sinusitis (5.9) • Acute bronchitis (5.7)	80–84	1.4%	4.6%
Ciprofloxacin	0.3%	• Other infection (31.1) • Unclassified reason§ (8.4) • Skin wound infection (7.9) • UTI (7.3) • Pneumonia (6.8)	95+	21.7%	49.6%

GP = general practitioner; private = non-PBS/RPBS original plus repeat prescriptions; total = original plus repeat prescriptions; URTI = upper respiratory tract infection; UTI = urinary tract infection

* Percentage of patients who visited a MedicineInsight practice at least once in 2024 and were issued one or more prescriptions for the selected antibacterial issued on the day of the visit

† 24.6% of prescriptions in 2024 included an explicit reason for prescription recorded. If an explicit recorded reason for the prescription was incomplete, an association was assumed between the antibacterial prescribed and a reason for the encounter and/or a diagnosis that was recorded on the same day as the prescription (see Appendix 1)

§ Prescriptions with a recorded entry in the reason for prescription, or a reason for encounter or diagnosis on the same day that did not match an antibacterial-related indication

Source: MedicineInsight

Patterns of prescribing by indication

Treatment with antibacterials is generally not recommended for the common primary care conditions included in Table 2, with some exceptions. Although direct comparisons should be made with caution, Table 2 suggests that antibacterials are over prescribed for these conditions compared to recommendations in the *Therapeutic Guidelines: Antibiotic*[11] and relevant clinical pathways; a trend that has continued from previous reports.[4-9] For example, antibacterials were prescribed in 80% of acute bronchitis cases in 2024 despite not being recommended for management of this condition.

Table 2 also highlights that, for some conditions, antibacterial prescribing was often inconsistent with first-line recommendations in *Therapeutic Guidelines: Antibiotic*.[11] For example, less than a third of patients with sinusitis received guideline-recommended amoxicillin in 2024.

Table 2 Patterns of antibacterial prescribing for selected primary care conditions, MedicineInsight practices, 2024

		Patients prescribed an antibacterial			Expected new cases to be managed with antimicrobials*
Condition	**Patient group**	***n***	**%**	**95% CI**	**Range (%)**
Bronchitis (acute)	Aged 18–75 years	7,147	80.0	76.6–83.3	0
COPD	All patients	3,196	34.8	32.4–37.1	nd
Influenza/ Influenza-like illness	Older than 1 year	1,574	12.2	10.6–13.8	0
Otitis media (acute)	Older than 2 years	13,339	80.3	77.4–83.2	20–31
	Amoxicillin†	9,631	58.0	54.4–61.6	nd
Pneumonia	Aged 18–75 years	21,682	76.5	73.2–79.7	nd
	Amoxicillin or doxycycline (mild CAP)†	14,178	50.0	46.4–53.6	100
Sinusitis (acute/ chronic)	Older than 18 years	17,947	73.8	70.9–76.7	0.5–8
	Amoxicillin†	7,754	31.9	28.9–34.9	nd
Tonsillitis (acute)	Older than 1 year	9,745	80.4	77.3–83.5	19–40
	Penicillin V†	5,652	46.6	42.8–50.5	nd
URTI (acute)	Older than 1 year	43,424	38.6	35.9–41.3	nd
UTI	Females older than 18 years	22,333	81.2	78.9–83.6	nd
	Trimethoprim†	10,070	36.6	34.4–38.8	nd

CAP = community-acquired pneumonia; CI = confidence interval; COPD = chronic obstructive pulmonary disease; nd = not determined; URTI = upper respiratory tract infection; UTI = urinary tract infection

* Mean percentage of new cases to be managed with antimicrobials, based on guideline recommendations, where available[12]

† Patient group prescribed an antibacterial recommended by *Therapeutic Guidelines: Antibiotic*[11]

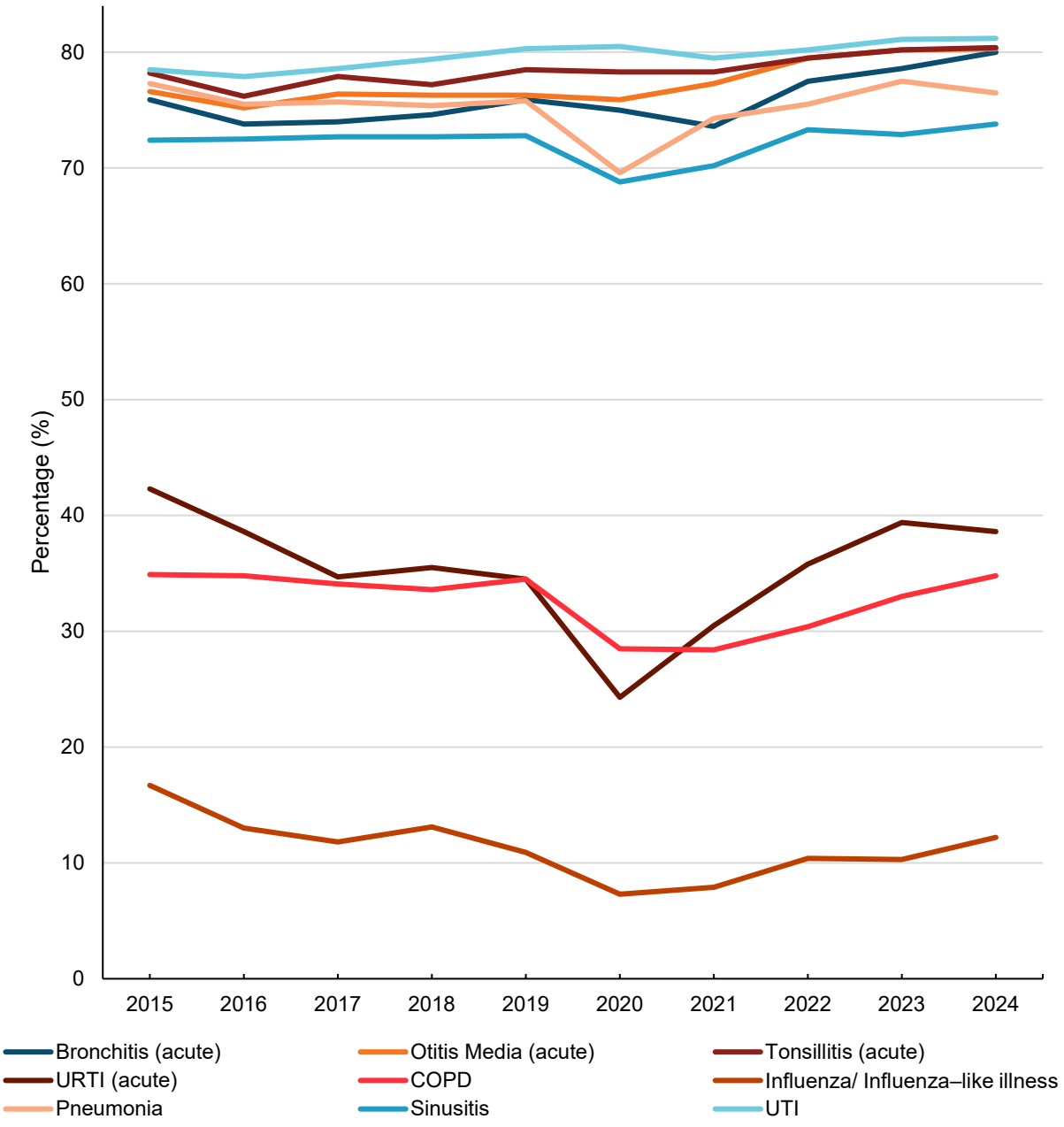
Notes:

1. MedicineInsight case definitions may differ slightly to McCullough et al.[12]
2. In the March 2025 update of *Therapeutic Guidelines: Antibiotic*, nitrofurantoin replaced trimethoprim as the first-line treatment for urinary tract infections.[11]

Sources: MedicineInsight; McCullough et al[12]

Prescribing rates for pneumonia, sinusitis, acute upper respiratory tract infection (URTI), chronic obstructive pulmonary disease (COPD) and influenza/influenza-like illness declined in 2020 in line with the COVID-19 pandemic but have since increased. In 2024, antibacterial prescribing for the common primary care conditions included in Figure 7 remains high and largely consistent with 2015. This indicates that the overall appropriateness of antibacterial prescribing in general practice has not improved over time.

Figure 7 Percentage of patients prescribed one or more antibacterials for selected primary care infections, MedicineInsight practices, 2015–2024

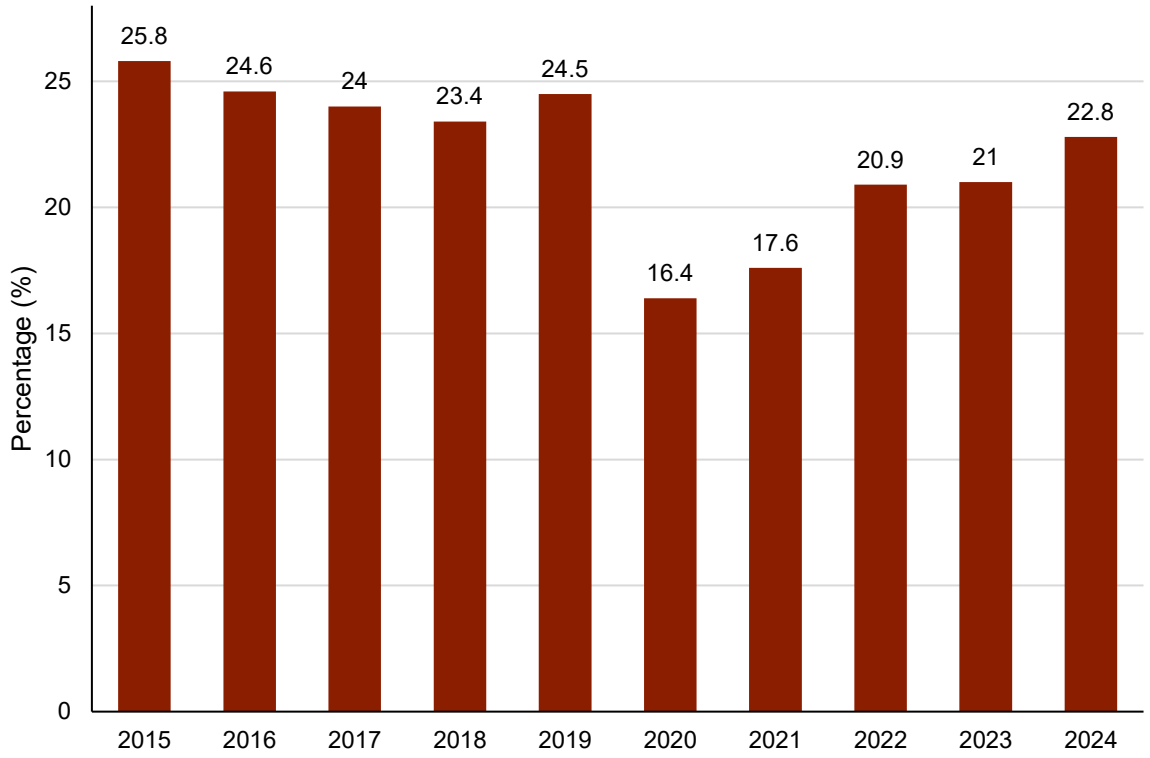


COPD = chronic obstructive pulmonary disorder; URTI = upper respiratory tract infection; UTI = urinary tract infection
Source: MedicineInsight

Figure 8 shows the percentage of all antibacterial prescriptions that were likely indicated for respiratory tract infections, including acute bronchitis, acute upper respiratory tract infection, influenza/influenza-like illness, pneumonia, and sinusitis.

From 2015 to 2019, approximately one quarter of all antibacterial prescriptions were issued for respiratory tract infections. Following the dramatic decline in 2020, which coincided with the COVID-19 pandemic and PBS/RPBS policy changes to restrict some repeat prescriptions[10], antibacterial prescriptions issued for respiratory tract infections has increased year-on-year. This is consistent with overprescribing patterns observed in Table 2 and Figure 7.

Figure 8 Percentage of antibacterials prescribed on the same day as presentations for respiratory tract infections, MedicineInsight practices, 2015–2024



Note: Respiratory tract infections include acute bronchitis, acute upper respiratory tract infection, influenza/influenza-like illness, pneumonia, and sinusitis.

Source: MedicineInsight

Conclusions

It is encouraging that overall antibacterial prescribing in general practice 2024 has remained below pre-pandemic levels. However, the upward trend is concerning particularly with the increasing proportion of private antibacterial prescriptions issued by general practitioners as Australia lacks robust reporting on non-PBS/RPBS antimicrobials.

While patterns of prescribing by age, by antibacterial and by indication are largely consistent with previously reported trends[4-9], ongoing high volume of prescribing and inappropriate prescribing is also concerning. This is particularly for prescribing antibacterials for conditions where there is little to no benefit, including viral infections and some bacterial infections.

These trends are especially concerning for broad-spectrum or other specialised agents, like azithromycin and ciprofloxacin, analysed in this report.

Analyses in this report are also consistent with the global trend of high prevalence of antibacterial prescribing in primary care, which has not declined significantly over the past 20 years despite the impact of the COVID-19 pandemic.[13] Further analyses show that Australia is estimated to have had consistently high antimicrobial prescribing rates relative to most other countries in the Organisation for Economic Co-operation and Development.[2]

A number of other factors have also influenced the prescribing and supply of antimicrobials in Australia, such as various PBS/RPBS policy changes implemented in 2020 and 2023 to 2024.[2,10,14,15]

To improve these trends in Australia, there are opportunities to enhance community understanding of the role of antimicrobials in treating infections, particularly the lack of benefit of antibiotics in treating viral infections like influenza, and to enhance community understanding of the positive impact of reducing inappropriate antimicrobial use on the sustainability and resilience of health care.[3]

The Commission will continue to reinforce messaging for consumers about the role of antimicrobials in AMR, the effects of antimicrobials on beneficial and harmful bacteria, and raise awareness of the potential impact of antimicrobials on the development of chronic conditions in children and adults.[16-19] The Commission will also promote infection prevention and control practices in the community to reduce the spread of AMR.

Combined strategies of AMS and infection prevention and control in the community appear to be most effective in reducing antimicrobial use and improving prescribing appropriateness, as well as reducing incidences of infections and healthcare-associated impacts on the environment. However, strategies must be dynamic to adapt to challenges like ongoing medicines shortages, and for particular settings and populations.

The Commission will continue to work with health service providers, clinicians and local and professional and other government organisations across community settings and use surveillance data to inform targeted strategies for improving antimicrobial use and patient safety. In addition, the Commission will continue to support the implementation of the national safety and quality standards for the primary and community and aged care sectors to promote effective programs for infection prevention and control and AMS.[20,21]

The Commission will also continue to explore opportunities with the Department and the Australian Centre for Disease Control to enhance surveillance of the volume and appropriateness of antimicrobial use in Australia. This could include addressing important gaps in current surveillance efforts such as the indications for use and supply of antimicrobials outside the PBS/RPBS from private prescriptions, emerging models of service delivery such as community pharmacy prescribing and expanded scope of practice for a range of registered clinicians; and in Aboriginal and Torres Strait Islander health services.

References

1. Australian Commission on Safety and Quality in Health Care. MedicineInsight. [Internet] Sydney: ACSQHC; 2025 [cited Nov 2025] Available from: https://www.safetyandquality.gov.au/our-work/indicators-measurement-and-reporting/medicineinsight.
2. Australian Commission on Safety and Quality in Health Care. Antimicrobial use in the community: 2024. Sydney: ACSQHC; 2025.
3. Australian Government Department of Health, Disability and Ageing. National Health and Climate Strategy. Canberra: Department of Health, Disability and Ageing; 2023.
4. Australian Commission on Safety and Quality in Health Care. Antimicrobial use and appropriateness in the community: 2020–2021. Sydney: ACSQHC; 2022.
5. Australian Commission on Safety and Quality in Health Care. AURA 2016: First Australian report on antimicrobial use and resistance in human health. Sydney: ACSQHC, 2016.
6. Australian Commission on Safety and Quality in Health Care. AURA 2017: Second Australian report on antimicrobial use and resistance in human health. Sydney: ACSQHC, 2017.
7. Australian Commission on Safety and Quality in Health Care. AURA 2019: Third Australian report on antimicrobial use and resistance in human health. Sydney: ACSQHC, 2019.
8. Australian Commission on Safety and Quality in Health Care. AURA 2021: Fourth Australian report on antimicrobial use and resistance in human health. Sydney: ACSQHC; 2021.
9. Australian Commission on Safety and Quality in Health Care. AURA 2023: Fifth Australian report on antimicrobial use and resistance in human health. Sydney: ACSQHC; 2023.
10. Australian Government Department of Health, Disability and Ageing. Revised PBS listings for Antibiotic use. [Internet] Canberra: Department of Health, Disability and Ageing; 2020 [cited Nov 2025] Available from: https://www.pbs.gov.au/news/2020/03/files/Antibiotics-factsheet-2020.pdf.
11. Antibiotic Expert Group. Antibiotic [published 2025 Sep]. In: *Therapeutic Guidelines*. [Internet] Melbourne: Therapeutic Guidelines Limited; 2025 [cited Nov 2025] Available from: https://www.tg.org.au/.
12. McCullough AR, Pollack AJ, Plejdrup Hansen M, et al. Antibiotics for acute respiratory infections in general practice: comparison of prescribing rates with guideline recommendations. Med J Aust. 2017 Jul 17;207(2):65-69.
13. Song Q, Li J, Zhou P, et al. Worldwide antibiotic prescription practices in primary care and associated factors: A systematic review and meta-analysis. American Journal of Infection Control. 2025 2025/08/16/.
14. Australian Government Department of Health, Disability and Ageing. Schedule of Pharmaceutical Benefits–Effective 1 March 2024. Canberra: Australian Government Department of Health, Disability and Ageing; 2024.
15. Australian Government Department of Health, Disability and Ageing. Schedule of Pharmaceutical Benefits–Effective 1 September 2024. Canberra: Australian Government Department of Health, Disability and Ageing; 2024.

16. Duong QA, Pittet LF, Curtis N, et al. Antibiotic exposure and adverse long-term health outcomes in children: a systematic review and meta-analysis. J Infect. 2022 Sep;85(3):213-300.

17. Aversa Z, Atkinson E, Schafer M, et al. Association of infant antibiotic exposure with childhood health outcomes. Mayo Clin Proc. 2021 Jan;96(1):66-77.

18. Trasande L, Blustein J, Liu M, et al. Infant antibiotic exposures and early-life body mass. Int J Obes (Lond). 2013 Jan;37(1):16-23.

19. Queen J, Zhang J, Sears CL. Oral antibiotic use and chronic disease: long-term health impact beyond antimicrobial resistance and Clostridioides difficile. Gut Microbes. 2020 Jul 3;11(4):1092-1103.

20. Australian Commission on Safety and Quality in Health Care. National Safety and Quality Primary and Community Healthcare Standards. Sydney: ACSQHC; 2021.

21. Aged Care Quality and Safety Commission. Strengthened Quality Standards. [Internet] Sydney: ACQSC; 2021 [cited Nov 2025] Available from: https://www.agedcarequality.gov.au/providers/quality-standards/stronger-standards-better-aged-care-program.

22. Australian Commission on Safety and Quality in Health Care. Quality Use of Medicines Stewardship program. [Internet] Sydney: ACSQHC; 2025 [cited Nov 2025] Available from: https://www.safetyandquality.gov.au/our-work/medicines-safety-and-quality/quality-use-medicines-stewardship-program.

23. Australian Government Department of Health, Disability and Ageing. About the Quality Use of Diagnostics, Therapeutics and Pathology. [Internet] Canberra: Department of Health, Disability and Ageing; 2024 [cited Nov 2025] Available from: https://www.health.gov.au/our-work/qudtp/about.

Appendix: Data source description

About MedicineInsight

The MedicineInsight program was established to support quality improvement by providing actionable real-world data directly back to general practices. Individual practice data can be compared to the aggregate of all MedicineInsight practices. Participating practices are offered customised quality improvement activities that support alignment with best practices and identify key areas for improvement.

MedicineInsight collects longitudinal, de-identified data from participating general practices across Australia and relies on the level of completeness and accuracy of those records. Patients are included from the first recording of their clinical encounters in the participating practices' clinical information systems (CIS). MedicineInsight data include patient demographic and clinical data entered directly into the system by general practitioners (GPs) and practice staff, which are collected from external sources (for example pathology test results), and system-generated data such as antibacterial prescription time and date of a patient encounter.

MedicineInsight data provide a unique capacity to monitor community antibacterial prescribing patterns and assess the appropriateness of antibacterial use in the community in Australia. The data can be used to analyse the use of medicines, switching of medicines, indications for prescribing, adherence to guidelines and pharmacovigilance to support post-market surveillance of medicine use in primary care.

Participation in MedicineInsight is voluntary and general practices that participate in the MedicineInsight program may be more likely to focus on quality use of medicines in their practice. As at 1 October 2025, there are approximately 133 million clinical encounters in the MedicineInsight data collection. There are currently two general practice clinical information software systems that can contribute data to MedicineInsight.

NPS MedicineWise operated MedicineInsight from 2011 until 31 December 2022. Responsibility for the operation of the MedicineInsight program and data custodianship was transferred to the Australian Commission on Safety and Quality in Health Care (the Commission) from 1 January 2023 as part of the 2022–23 Federal Budget initiative that included the redesign of the Quality Use of Diagnostics, Therapeutics and Pathology Program.[22,23]

Further information on MedicineInsight can be found on the Commission's website.[1]

Data source and criteria

This report analyses MedicineInsight data from 2015 to 2024 and complements previous analyses reported for the period 2009 to 2021. Table A1 outlines the data source, data analysis, setting, time-period, and population.

Table A1 MedicineInsight community antimicrobial use data source

Subject and type of surveillance	Targeted surveillance of antimicrobial use in the community
Data source	MedicineInsight program
Type of data	Appropriateness of prescribing, prescribing patterns (trends)
Setting	Participating Australian general practices
Coverage	National: All states and territories 2015: 221 general practices; 914,591 patients 2016: 233 general practices; 956,916 patients 2017: 234 general practices; 1,017,327 patients 2018: 239 general practices; 1,058,710 patients 2019: 240 general practices; 1,097,265 patients 2020: 239 general practices; 1,070,984 patients 2021: 244 general practices; 1,187,842 patients 2022: 245 general practices; 1,147,363 patients 2023: 243 general practices; 1,032,088 patients 2024: 239 general practices; 1,029,140 patients

Notes:
1. Following the transition of custodianship to the Commission, the current makeup of participant practices and patients differs from that at the time of NPS MedicineWise ceasing operations which should be considered when comparing year-on-year findings in this report, and the findings of this report with previous or any future releases.
2. Variation in data extraction also may occur due to onboarding new practices or technical issues affecting data downloads.
3. Not all MedicineInsight practices have billing software that is compatible with their clinical information system. Therefore, analyses that require billing data do not include all practices.
4. Data are sourced from medical records and rely on an appropriate level of completeness and accuracy of those records.
5. Specialist prescriptions and samples are not included.

Source: MedicineInsight[1]

The definitions in Table A2 are used for MedicineInsight in relation to the analyses conducted for this report.

Table A2 MedicineInsight community antimicrobial use data definitions

Term	Definition
Clinical encounter	An encounter provided by a doctor, when the visit type is not administrative (that is, not 'non-visit', 'practice admin' or 'email').
Condition	Conditions are described using fields in the clinical information system (CIS) that capture the patient's medical history, reason for encounter and reason for prescription. The CIS uses coding systems, such as DOCLE in Medical Director or PYEFINCH in Best Practice, for data entered into the system. Medical, pharmaceutical, and other experts in the MedicineInsight team develop algorithms to identify specific conditions and measures of interest in the MedicineInsight database, based on commonly accepted definitions.
General practice sites	One or more practices that share the same CIS. For example, a site may be one organisation that consists of a number of geographically diverse general practices that share the same CIS, or a site may be a single general practitioners (GP) practice.
Indication	Indications for prescribing are described using the 'reason for prescription' field in the first instance.
Patients	Patients included in the analysis had at least one clinical encounter with a GP during the year of analysis, were marked as active by the practice, and were not recorded as deceased.
Systemic antibacterial*	Antimicrobials with an Anatomical Therapeutic Chemical (ATC) code of J01, 'antibacterials for systemic use'. This excludes antibacterials that act systemically but are categorised under a different ATC (such as A02BD – 'combinations for eradication of *Helicobacter pylori*').

* The terms antibacterial and antibiotic have the same meaning that they are used to treat and prevent infections caused by bacteria. In this report, analyses refer to antibacterials

MedicineInsight data are sourced from GP medical records derived from monthly longitudinal, de-identified, whole-of-practice data extracted from the clinical information systems of consenting general practices across Australia and relies on the completeness and accuracy of those records and no technical disruptions to data downloads.

Only patients classified as active by the clinical information system with at least one visit during the year of analysis were included. Patients were included from the first recording of their clinical data in the participating practices' clinical systems. Patients recorded solely as emergency contacts or next of kin were excluded.

Analyses were conducted for antibacterials for systemic use, as per the World Health Organization (WHO) Anatomical Therapeutic Chemical (ATC) code J01. Additional analyses were conducted for up to seven of the most frequently prescribed antibacterials (top seven): amoxicillin, amoxicillin–clavulanic acid, azithromycin, cefalexin, ciprofloxacin, doxycycline and roxithromycin.

Information about the clinical indication for a prescription can be collected from general practice clinical information software in several ways for MedicineInsight. The typical approach is through the 'Reason for Prescription' field associated with the record for a clinical encounter. Completion of this field is not mandatory, and it is frequently left blank. Where a reason for prescription was not recorded, the analysis used information recorded on the same day as the antibacterial prescription from other fields – Reason for Encounter and Diagnosis – to identify the clinical indication(s). If there were no data in the 'Reason for Prescription' field that matched an identifiable condition, then the analysis included the 'Reason for Encounter and Diagnosis' recorded on the same day as the prescription to identify the indication.

Considerations for interpreting data

This report focusses on data on antibacterials for systemic use prescribed in general practices that participate in the MedicineInsight program. Prescribing data can differ from dispensing data because not all prescriptions may be dispensed, sometimes under the instruction of the treating clinician not to have the prescription filled unless the condition worsens. Similarly, dispensing data may differ from consumption data because not all prescriptions dispensed are consumed, as patients may not use any or all of the medicine supplied. Therefore, MedicineInsight data and Pharmaceutical Benefits Scheme and Repatriation Pharmaceutical Benefits Scheme (PBS/RPBS) data may not always correlate. Prescriptions may also be issued under the PBS/RPBS but dispensed privately.

The MedicineInsight program relies on voluntary participation and submission of data from general practices, resulting in non-random sampling, connection, practice involvement and other issues. Therefore, comparisons should be interpreted carefully. Percentages and other data may have changed compared to previous and other reports as more data have become available.

Both the number of GP visits and the number of patients prescribed an antibacterial are used as denominators. Prescribing patterns described using absolute numbers do not account for variations in the number of GP visits during the analysis period. This limitation should be considered when interpreting results based on absolute numbers. For comparisons between years, prescribing is presented as rates where applicable, rather than absolute numbers, to account for variations in GP visits, patient numbers, and practices. As the number of practices has changed is different year-on-year, the number of denominator patients will also change each year.

For the purposes of this report, appropriateness was assessed by drug choice and indication where an appropriate antibacterial is compliant with recommendations in *Therapeutic Guidelines: Antibiotic*.[11] Further information on dose, frequency, duration and other prescribing parameters, are not considered as they are not captured in these data.

This page has been left intentionally blank.

Australian
Commission on
Safety and Quality
in Health Care

T. +61 2 9126 3600
Level 5, 255 Elizabeth St
Sydney NSW 2000 Australia

safetyandquality.gov.au