At a glance

Australia has very high overall rates of community antimicrobial use compared with some countries. In 2013–14, more than 30 million prescriptions for antimicrobials were dispensed. Many of these were unnecessary because antimicrobials are frequently used to treat infections for which they provide little or no benefit. The rate of total antimicrobial dispensing was over 11 times more in the area with the highest rate compared to the area with the lowest rate. High community use of antimicrobials increases the risk that bacteria will become resistant to these medicines and they will cease to be effective against serious life-threatening conditions. Even when the areas with highest and lowest rates were excluded, the rate was nearly twice as high in some parts of Australia than others. Western Australia appears to be much more successful than other parts of the country in keeping rates of antimicrobial dispensing relatively low – the highest rate for any area in Western Australia was lower than the Australian average rate.

Use of a specific class of antimicrobials called quinolones was low compared with other countries because their use is restricted in Australia. Nevertheless, more than 350,000 prescriptions were dispensed for these antimicrobials in 2013–14, and considerable variation was seen across Australia. The rates of quinolone dispensing were over 8 times more in the area with the highest rate compared to the area with the lowest rate. Even when the areas with the highest and lowest rates were excluded, rates of dispensing of quinolones were over 2.5 times more in some areas of Australia than in others.

There was variation in dispensing across the country for amoxycillin, the most commonly dispensed antimicrobial in Australia, and for amoxycillin-clavulanate, a modified version of amoxycillin. Combined, these two antimicrobials accounted for more than 10 million prescriptions dispensed under the Pharmaceutical Benefits Scheme (PBS) in Australia in 2013–14. The rates of amoxycillin dispensing were 20.5 times more in the area with the highest rate compared with the area with the lowest rate, and 2.7 times when the highest and lowest rates were excluded. The rates of amoxycillin-clavulanate dispensing were 16 times more in the area with the highest rate compared with the area with the lowest rate, and 2.2 times when the highest and lowest rates were excluded.
Antimicrobial dispensing

Recommendations

1a. The Australian Government Department of Health develops national benchmarks for best practice prescribing of antimicrobial agents. Findings from the atlas should be used to identify variations from these benchmarks and target interventions to reduce inappropriate use.

1b. The Pharmaceutical Benefits Advisory Committee examines the use of topical quinolones and access to amoxycillin-clavulanate on the PBS.

1c. Antimicrobial stewardship programs are implemented in general practice in line with recommendations in the National Antimicrobial Resistance Strategy to reduce the use of amoxycillin and amoxycillin-clavulanate.

1d. The relevant clinical colleges support incorporation of decision support software in prescribing software, and review the current default repeat prescriptions option.

1e. Primary health networks and local health networks track and compare antimicrobial prescribing rates where they do not do so already.

1f. National boards and the Australian Health Practitioner Regulation Agency consider what can be done to ensure relevant registered health practitioners have up-to-date knowledge of prescribing guidelines for antimicrobials.

Background

Antimicrobials are a ‘miracle’ of modern medicine. Although the term antimicrobial includes medicines such as antivirals and antifungals, for this chapter it refers to medicines with primarily antibacterial activity.

Countless lives have been saved since the arrival of the first antimicrobial, penicillin, in the early 1940s. However, the miracle is being squandered by treating infections for which antimicrobials provide little or no benefit. This includes nearly all upper respiratory tract infections and acute bronchitis. Most of these infections are caused by viruses, against which antimicrobials are ineffective. In addition, many bacterial upper respiratory tract infections generally resolve spontaneously and without complication. Unnecessary use of antimicrobials exposes patients to adverse effects and increases antimicrobial resistance in both individuals and the general population.

Antimicrobial resistance is the ability of microorganisms, such as bacteria, to evolve to stop an antimicrobial from working effectively. As a result, standard antimicrobials become ineffective, and infections may persist and spread to others. Although antimicrobial resistance is a natural feature of bacterial evolution, inappropriate use of antimicrobials has increased the development of antimicrobial resistance not only in humans, but in animals and agriculture. Examining variations in the use of antimicrobials in the community will increase our understanding of how they are used and enhance our ability to improve their use.

Chapter overview

This chapter includes the following data items:

- antimicrobial dispensing
- quinolone dispensing
- amoxycillin and amoxycillin-clavulanate dispensing.

Antimicrobials include quinolones, which have been restricted for many years, and amoxycillin and amoxycillin-clavulanate. The latter two are among the most commonly prescribed antimicrobials.
and are often used interchangeably, according to prescriber preference.

The data item on antimicrobial dispensing includes systemic and topical antibacterials and antifungals, which have been included because the resistance issue is similar to that of antibacterials.

**International comparisons**

Compared with many other developed countries, historically Australia has had high rates of community use of antimicrobials based on the international standard of comparison: defined daily dose (DDD) per 1,000 inhabitants per day (DDD/1,000/day). In 2013, Australia’s DDD/1,000/day for systemic antibacterials was 22.8. When compared with 27 member countries from the European Centre for Disease Prevention and Control, Australia ranks 11th in consumption.

Australia’s rate is slightly higher than England’s rate of 21 DDD/1,000/day, but is more than twice that of the Netherlands at 10 DDD/1,000/day (Figure 1). The Netherlands has the lowest level of community use in Europe. Assuming that the pattern and prevalence of infections in Europe do not differ greatly from that of Australia, the Netherlands might be considered an international benchmark due to its low use of antimicrobials and low levels of resistance.

The total estimated number of systemic antimicrobial prescriptions dispensed is another measure of use. In 2013–14, 1,199 prescriptions were dispensed per 1,000 people in Australia. This number was higher than in the United States, where 842 prescriptions were dispensed per 1,000 people in 2011, and almost double that of Canada, where 642 prescriptions were dispensed per 1,000 people in 2012–13. These figures confirm that Australia has high antimicrobial use compared with many other countries of similar socioeconomic status.

**Australian initiatives**

Australia’s National Antimicrobial Resistance Strategy has been developed to combat antimicrobial resistance in people, animals, food and agriculture. As part of this strategy, the Commission is coordinating the development of a national antimicrobial resistance surveillance system through the Antimicrobial Use and Resistance in Australia (AURA) Project.

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*Figure 1: Comparing DDD/1,000/day for systemic antibacterial use in Australia and Europe*

![Bar chart comparing DDD/1,000/day for systemic antibacterials in various European countries and Australia.](image)

Note: Adapted from ‘Consumption of antimicrobials for Systemic use (ATC group J01) in the community (primary care sector) in Europe’, reporting year 2013.
Antimicrobial dispensing

The Commission is also addressing inappropriate antimicrobial use and antimicrobial resistance through the standard on preventing and controlling healthcare-associated infections in the National Safety and Quality Health Service Standards and the Antimicrobial Stewardship Clinical Care Standard. The Clinical Care Standard aims to ensure the appropriate use and review of antimicrobials to optimise a patient’s health outcomes, lessen the risk of adverse effects and reduce the emergence of antibiotic resistance.

About the data

The data for this chapter is sourced from the 2013–14 PBS and reported as prescriptions dispensed per 100,000 people. It is not possible to compare this measure with DDD/1,000/day. The measures are calculated differently and there are no defined daily dose rates for topical antimicrobials. For instance, Australia’s DDD/1,000/day rate was 22.8 in the calendar year 2013, while the total number of prescriptions dispensed for systemic antimicrobials (administered orally or by injection) was 29.2 million.

While the PBS aims to provide Australian residents with affordable and reliable access to a range of medicines, the ready availability of antimicrobials has fuelled unnecessary use. The PBS aims to curb unnecessary antimicrobial use through restriction mechanisms (‘Restricted Benefit’ or ‘Authority Required’). However, the PBS facilitates affordable access to the commonly prescribed antimicrobials so that they are still available in case of benefit.

A number of limitations are implicit in the atlas data, including:

- the average dispensing rate, which does not necessarily represent best practice
- variations at a local level, which may reflect chance variations and can be influenced by clustering of high-risk individuals or many episodes of infection for some individuals
- the data have not been linked to investigate how rates of dispensing relate to health outcomes
- repeat prescriptions, which may be dispensed for individuals within the year and are counted more than once
- dispensing from some remote area Aboriginal Health Services, which are not captured in the PBS, resulting in artificially low rates of dispensing in many remote communities. Aboriginal Health Services distributed about 280,000 antimicrobial packs in 2013
- not knowing the reasons for prescribing as this is not captured in the PBS
- PBS data exclude a large proportion of public hospital medicine dispensing.

2 Kenealy T, Arroll B. Antibiotics for the common cold and acute purulent rhinitis. Cochrane Database of Systemic Reviews 2013. Issue no. 6: Art. no. CD000247.