



National Prescribing Service Limited

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000001* 000
Dr Sam Sample
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Prescribing
Practice Review

No. 36
Judicious
antibiotic
use

Dear Dr Sample,

Antibiotics are a valuable resource requiring our continuing careful stewardship. While the discovery and development of novel antibiotics has slowed significantly, bacterial resistance to available antibiotics is increasing.¹

This edition of the *Prescribing Practice Review* (PPR) examines strategies for judicious antibiotic use. Included are your prescribing data for antibiotics, along with practice points for your review.

Provide a treatment plan for symptom management

Patients are increasingly well-informed about the appropriate use of antibiotics. Patient information sheets and symptomatic management pads support you in providing each patient with a treatment plan for their respiratory tract infection. Reassure the patient by outlining the natural course of the illness and time for resolution.

Use an antibiotic only where a clear benefit exists

Antibiotics provide clear benefit in many conditions, however most viral or minor bacterial diseases are self-limiting. Immunising 'at risk' patients against influenza viruses and *Streptococcus pneumoniae* bacteria reduces the risk of disease-related complications.

Reserve macrolides, cephalosporins and quinolones for selected indications or where drug hypersensitivity exists

Judicious prescribing slows down the emergence of antibiotic resistance, which is slow to reverse and in some cases is irreversible.

If an antibiotic is required, specify the number of days of treatment

Use up-to-date guideline recommendations when determining for how many days an antibiotic is necessary.

The clinical audit *Targeted use of antibiotics* is available as an additional tool to help you review your prescribing. See the insert for enrolment details if you wish to participate.

Yours sincerely,

Dr Roger Boyd
Chair, National Prescribing Service Limited

1. World Health Organization. WHO global strategy for containment of antimicrobial resistance. Geneva: World Health Organization http://www.who.int/csr/resources/publications/drugresist/WHO_CDS_CSR_DRS_2001_2_EN/en/ (accessed 31 October 2006).

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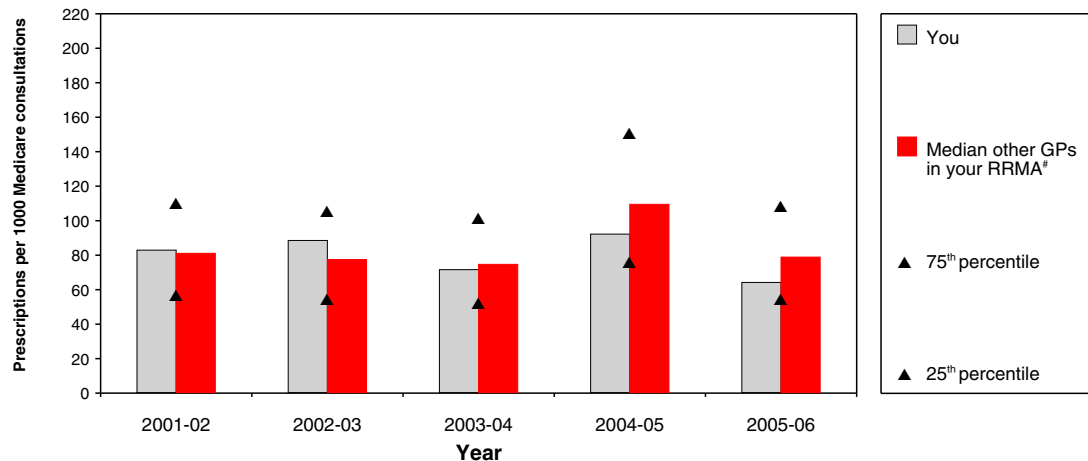
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Your confidential prescribing data

The data presented from Medicare Australia include all oral antibiotics dispensed for concession cardholders and items above the general patient co-payment dispensed for general patients. Oral antibiotics above the co-payment for this period are ciprofloxacin, fusidic acid, moxifloxacin and rifampicin. As most antibiotics are under the co-payment, the data below mostly reflect prescribing for concession cardholders.

Total subsidised oral antibiotic* use 2001-02 to 2005-06



Practice points

- Over the past 5 years, there has been a 4.9% reduction in subsidised oral antibiotic prescriptions written by GPs from 9,631,772 in 2001-02 to 9,162,772 in 2005-06.
- Has your prescribing decreased to the minimum level necessary for appropriate management? For example antibiotics are not routinely required in sore throat and in immunocompetent patients with acute bronchitis.

Selected oral antibiotics as a percentage of total subsidised oral antibiotic use

Antibiotic	You (n %)				Other GPs in your RRMA# (%)	
	2004-05		2005-06		2004-05	2005-06
Amoxicillin	28	19%	37	22%	22%	22%
Amoxicillin + clavulanic acid	26	18%	19	12%	13%	13%
Cefaclor	1	1%	2	1%	6%	6%
Cefuroxime	0	0%	2	1%	0%	0%
Cephalexin	31	21%	41	25%	17%	18%
Ciprofloxacin	1	1%	2	1%	1%	1%
Clarithromycin	3	2%	2	1%	3%	3%
Dicloxacillin and flucloxacillin	3	2%	10	6%	3%	3%
Doxycycline	17	11%	19	12%	6%	6%
Erythromycin and roxithromycin	10	7%	11	7%	14%	14%
Phenoxymethylpenicillin	3	2%	2	1%	2%	2%
Trimethoprim	10	7%	4	2%	3%	4%
Trimethoprim + sulfamethoxazole	1	1%	0	0%	2%	2%
Others**	14	9%	14	8%	7%	7%
Total	148		165			

Practice points

- The high rate of amoxicillin use is consistent with guidelines as it is first-line for many conditions, such as acute otitis media (AOM) and acute sinusitis where treatment is indicated.
- Reserve amoxicillin + clavulanic acid for conditions where amoxicillin alone does not treat the likely organism/s e.g in bites and clenched fist injuries, as adverse effects occur more frequently than with amoxicillin alone.
- Reserve cefuroxime or cefaclor for recommended indications e.g. in AOM and acute bacterial sinusitis where patient is hypersensitive to penicillin.
- Macrolides (azithromycin, clarithromycin, erythromycin and roxithromycin) are recommended only as alternatives to penicillins and cephalosporins in people allergic to these drugs and for mycobacterial and chlamydial infections, pertussis, and eradication of *H. pylori* (clarithromycin with omeprazole).

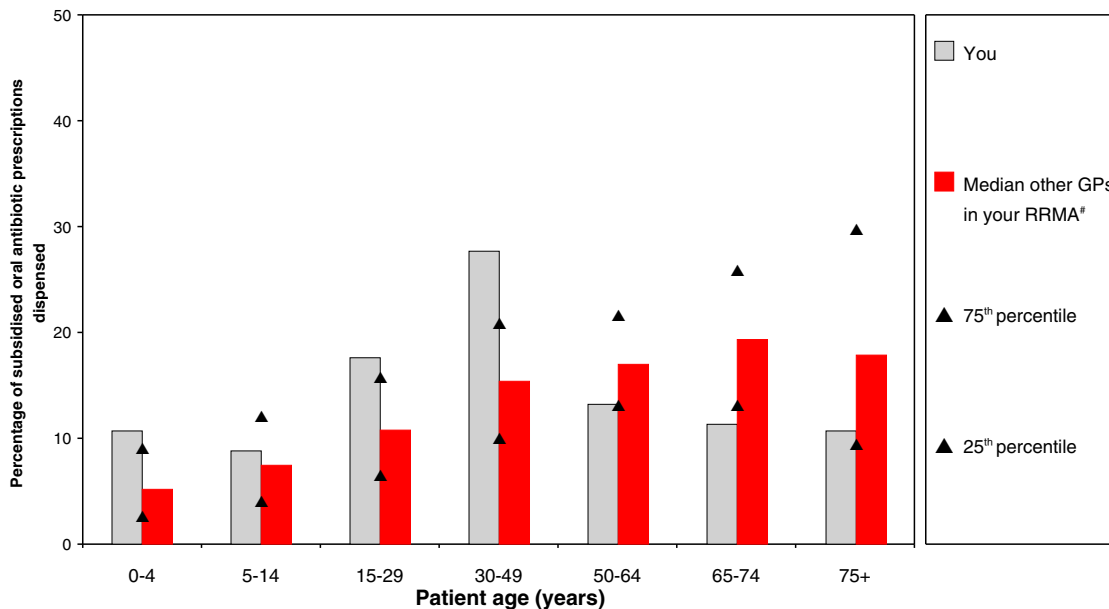
Prescription repeats for oral antibiotics most commonly used for upper respiratory tract infections (URTIs)*** 2005-06

Number of prescriptions for oral antibiotics most commonly used for URTIs***	Percentage of prescriptions where a repeat was prescribed and dispensed	
	You (n)	Other GPs in your RRMA # (%)
129	6%	21%

Practice points

- For most of the antibiotics recommended for URTIs, the original pack contains adequate supply for the recommended treatment duration. For example in adults, phenoxymethylpenicillin in a pack of 50 tablets / capsules provides supply for the recommended 10 day treatment in acute tonsillitis and amoxicillin in a pack of 20 tablets / capsules provides supply for the 5-7 day treatment in acute bacterial sinusitis, where treatment is indicated.
- Specify the antibiotic course duration on the prescription and advise the patient.

Percentage total subsidised oral antibiotic* use by patient age 2005-06

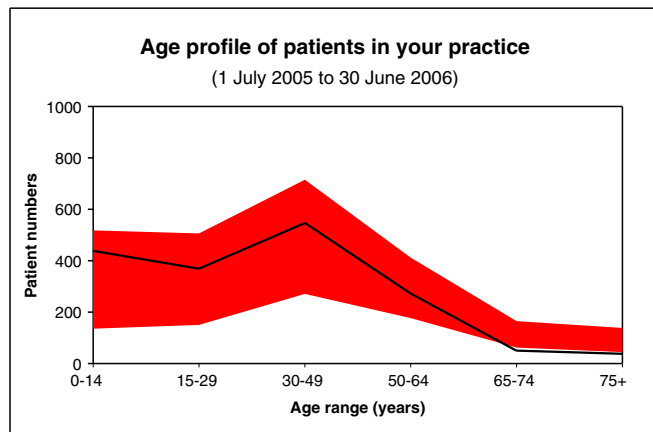


Practice point

- Consider that the need for antibiotic therapy may vary with patient age. For example
 - Antibiotics are indicated in all children aged <6 months with AOM, whereas antibiotics should not be used routinely for AOM in children aged ≥ 2 years.
 - Antibiotics may be indicated in acute exacerbations of chronic obstructive pulmonary disease - a condition usually occurring in the elderly. The cardinal symptoms of acute bacterial exacerbations are purulent sputum plus increased sputum volume and/or dyspnoea.

Practice profile

Some data shown earlier are presented as prescribing rates (per 1000 Medicare consultations) to adjust for volume of service. Age profile and concession cardholding status of patients in your practice are provided to assist you to interpret your prescribing data. The number of concession cardholders provides an indication of the limitations of the data capture for items under the general patient co-payment.



The black line represents the age profile of patients in your practice. 25% to 75% of other GPs in your RRMA[#] fall within the shaded area.

Medicare patients and concession cardholders in your practice
(1 April 2006 to 30 June 2006)

Patients	You	Median other GPs in your RRMA [#]
Total Medicare	531	644
Concession cardholders^{**}	109	171

(^{##}includes those reaching Safety Net)

Data from a three month period (1 April 2006 to 30 June 2006) that best represent your patient mix have been provided.

Notes

@ Data shown are an aggregate for all your provider locations.

* Total subsidised oral antibiotics: all oral antibiotics on the PBS schedule except hexamine hippurate and isoniazid.

[#] The comparator group "other GPs in your RRMA" includes all prescribers who are currently located in a similar geographical region i.e 1. capital cities, 2. other metropolitan centres, 3. large rural centres, 4. small rural centres, 5. other rural centres, 6. remote centres and 7. other remote centres.

Your RRMA peer group is 1.

▲ 25% to 75% of "other GPs in your RRMA" fall in the range shown by the triangular symbols.

** Others: ampicillin, azithromycin, clindamycin, fusidic acid, metronidazole, minocycline, moxifloxacin, nitrofurantoin, norfloxacin, rifampicin, tetracycline, tinidazole.

*** Oral antibiotics most commonly used for URTIs: amoxicillin, amoxicillin + clavulanic acid, ampicillin, cefaclor, cefuroxime, cephalexin, clarithromycin, doxycycline 100 mg, erythromycin (all salts), phenoxymethylpenicillin, roxithromycin, tetracycline, trimethoprim + sulfamethoxazole (in packs not intended for chronic use or restricted to other indications).

Confidentiality

NPS has a contract with Medicare Australia to provide your prescribing feedback data directly to you. NPS does not have access to these data. The data contained in this feedback are not used for any regulatory purposes.

Discrepancies may occur between the data provided and your own prescribing practice. This may be due to either inaccurate recording of your prescriber number in the pharmacy or your prescription pad having been used by another doctor.

If you consider your individual data to be incorrect or for other data queries please contact NPS on 02 8217 8700 or by email at info@nps.org.au

Judicious antibiotic use in general practice

Key Messages

- Provide a treatment plan for symptom management
- Use an antibiotic only where a clear benefit exists
- Reserve macrolides, cephalosporins and quinolones for selected indications or where drug hypersensitivity exists.
- If an antibiotic is required, specify the number of days of treatment

Provide a treatment plan for symptom management

What does your patient expect?

Prescribing antibiotics for self-limiting conditions can reinforce some patients' erroneous beliefs that antibiotics are 'cure-alls' for infections — this encourages future consultations in similar circumstances.¹

Discuss the benefits and harms of antibiotic use with your patient

Explain why an antibiotic will not help, and use the term respiratory tract illness (rather than infection) to modify expectations. Reassure the patient by outlining the natural course of the illness and the time for resolution.

Emphasise the risks of unnecessary antibiotics — such as side effects, and the potential for developing resistant organisms and passing them to others.

Discourage sharing antibiotics with others or using antibiotics left over from a previous infection.

Suggest alternatives to manage symptoms

Suggest alternatives to manage symptoms — such as analgesics, decongestants and hydration where appropriate, and give detailed instructions. Arrange easy access for review if the condition deteriorates — or if necessary consider writing a prescription that can be filled if symptoms worsen.

Provide educational materials such as the NPS patient materials

The NPS patient materials support both doctors and pharmacists to explain to consumers the most effective way to treat the symptoms of colds and flu without using antibiotics (see Box 1). These are available for download from www.nps.org.au/healthpro > Topics and Resources > Products > Patient materials. You can also order symptomatic management pads by faxing the enclosed form.

Box 1: NPS patient materials for health professionals

- Symptomatic management pad for acute URTIs and acute bronchitis
- *Common colds need common sense* brochure
- My child has a middle ear infection: is an antibiotic necessary?
- I've got a troublesome cough: will an antibiotic make me better
- I've got a sore throat: will an antibiotic make me better?

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Use an antibiotic only where a clear benefit exists

Some patients will benefit from antibiotic treatment

Patients likely to benefit from antibiotics either have symptoms that are probably due to bacterial (rather than viral) infection, or are at risk of complications from the infection.¹

Some acute exacerbations of COPD require antibiotic treatment

There is no evidence to support the use of prophylactic antibiotics in COPD.² However, start antibiotics when there is purulent sputum plus increased sputum volume and/or dyspnoea.² If pneumonia is suspected, investigate and treat as for community-acquired pneumonia.

Prescribe amoxicillin or doxycycline for 5–10 days^{2,3}

Only use macrolides (e.g. erythromycin, roxithromycin), cephalosporins or amoxicillin+clavulanic acid if there is no response to amoxicillin or doxycycline — they are no more effective and are not first-line therapy.^{2,3} Macrolides are less likely to inhibit *Haemophilus influenzae* so early relapse is more likely; only use if this pathogen has been excluded.³

Eradication of colonising bacteria is not required for acute exacerbations of COPD

The goal of antibiotic therapy in an acute exacerbation of COPD is to reduce the volume and purulence of sputum.³ A recent review showed antibiotics reduced the risk of short-term mortality and treatment failure, with a small increase in the risk of diarrhoea.⁴

When antibiotics do more harm than good ...

Most viral or minor bacterial diseases — such as sore throat⁵, sinusitis⁶, uncomplicated bronchitis⁷ and the common cold⁸ — are self-limiting.^{1,3,9} Antibiotics are not effective in viral infections and frequently cause adverse effects (e.g. vomiting, diarrhoea or rash).¹

Acute sore throat is usually self-limiting

Antibiotics are not necessary for most patients with sore throat.^{1,3} Acute sore throat resolves within a week in most patients — whether or not they are treated with antibiotics.⁵ Reassure patients and suggest paracetamol or another simple analgesic for symptomatic relief.³

Campaigns to reduce the unnecessary use of antibiotics in the common cold have been effective

The NPS *common colds need common sense* campaign has been repeated yearly since 2000. The campaign has achieved consistent positive changes in consumer awareness, beliefs, attitudes and behaviours for treating the common cold¹⁰; these positive changes need to be reinforced. This winter the campaign will focus on parents and carers of children aged 2–9 years and women aged under 35 years.

Immunising 'at risk' patients reduces the risk of disease-related complications^{9,11}

Influenza vaccination is effective in up to 70% of recipients.³

Pneumococcal pneumonia is the most common adult presentation of invasive pneumococcal disease.¹¹ Up to 1 in 5 Australian *Streptococcus pneumoniae* strains are resistant to 2 or more classes of antibiotics.¹²

Concomitant influenza and pneumococcal vaccination (may be given at the same visit⁹) reduces hospitalisation (from pneumonia) and all-cause mortality by half in adults over 65 years.¹¹

Immunise 'at risk' patients against Influenza each year

Annual influenza vaccination (best given in autumn, from February⁹) is recommended for:

- all individuals over 65 years
- children (≥ 6 months) and adults with chronic cardiac conditions, chronic suppurative lung disease, or chronic illnesses who required regular medical follow-up or hospitalisation in the preceding year
- persons with immune deficiency, including HIV
- residents of nursing homes and other long-term care facilities
- contacts of high risk patients.¹¹

Refer to *The Australian Immunisation Handbook* (www9.health.gov.au/immhandbook/) for vaccination, booster and re-vaccination schedules

The pneumococcal vaccines available in Australia are:

- 23vPPV (23-valent vaccine) for older children and adults. Over 90% of healthy adults show a 4-fold increase in antibodies 2–3 weeks after vaccination.
- 7vPCV (7-valent vaccine) for infants and children aged from 6 weeks to 9 years.¹¹

23vPPV is recommended for:

- all individuals over 65 years
- Aboriginal and Torres Strait Islander people over 50 years
- children over 5 years with underlying chronic illnesses, asplenia or CSF leaks
- persons with immunodeficiency
- tobacco smokers
- as a booster dose following a primary course of 7vPCV.¹¹

Reserve macrolides, cephalosporins and quinolones for selected indications or where drug hypersensitivity exists

Judicious use reduces selection pressure and so slows the emergence of resistance^{13,14}

Choose an antibiotic with proven efficacy and the narrowest spectrum. Then consider the adverse effect profile and cost-effectiveness.⁹ When practical, take a specimen or swab for culture and sensitivity before starting antibiotic therapy. *Therapeutic Guidelines: Antibiotic*³ provides advice on antibiotic selection.

Macrolides cause clinically significant interactions

Macrolides — alternatives for penicillin or cephalosporin hypersensitive patients — cause clinically significant interactions by inhibiting the cytochrome P4503A4 enzyme.⁹ Between 1995 to 2004, ADRAC received 31 reports of a suspected interaction out of 597 erythromycin reports, 80 (out of 737) for roxithromycin, 18 (out of 193) for clarithromycin and 6 (out of 111) for azithromycin.¹⁵

Reserve quinolones for selected indications

Prescribe quinolones for infections where alternatives are ineffective or contraindicated (e.g. complicated urinary tract infections), because there is increasing worldwide resistance.⁹ Use quinolones with caution in children under 14 years, pregnant or breastfeeding women.³

Amoxicillin is the drug of choice for severe acute bacterial sinusitis

When prescribing an antibiotic for severe acute bacterial sinusitis (see below), amoxicillin is still the first choice.³ Penicillin-hypersensitive patients may be treated with cefuroxime, cefaclor or doxycycline.³ Treat for 5 to 7 days.

Consider antibiotic therapy when there are at least 3 of the following features:

- persistent mucopurulent nasal discharge (> 7 to 10 days)
- facial pain
- poor response to nasal decongestants
- tenderness over the sinuses, especially unilateral maxillary tenderness
- tenderness on percussion of maxillary molar and premolar teeth that cannot be attributed to a single tooth.³

If an antibiotic is required, specify the number of days of treatment

Use up-to-date guideline recommendations when determining treatment duration

Consider the nature and severity of the infection and the person's clinical state.^{3,9} *Therapeutic Guidelines: Antibiotic*³ and *Australian Medicines Handbook*⁹ include the duration of antibiotic treatment as part of their recommendations. If clinical response is slower than expected, review the initial diagnosis and/or treatment choice.⁹

For example, *Therapeutic Guidelines: Antibiotic*³ has updated the management of moderate-to-severe traveller's diarrhoea. They now recommend a single dose of azithromycin 1 g or norfloxacin 800 mg for initial treatment. If symptoms do not improve, or if fever or bloody stools are present after this single dose, acute treatment for 2–3 days with azithromycin or norfloxacin or ciprofloxacin is recommended.

Outline the duration of the antibiotic course to your patient

Advise your patient of the duration of antibiotic course. Explain that taking antibiotics for less time than recommended can cause treatment failure, but prolonged exposure increases the risk of adverse effects and selecting for resistant bacteria.

In some instances, quantities supplied can exceed the intended course, for example:

- paediatric syrup formulations may have more doses than are needed for a small child
- penicillin V (phenoxymethylpenicillin) can be prescribed in a PBS-listed pack size of 50 when only 20 doses are required for a 10-day, twice daily regimen for severe tonsillitis.¹⁶

Include the duration of the course on the prescription

Specify the duration on the prescription so that the pharmacist can reinforce this when dispensing.

Expert reviewer

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References

1. National Prescribing Centre. MeReC Bulletin 2006/2007;17(3):1–20.
2. Australian Lung Foundation and Thoracic Society of Australia and New Zealand. The COPD-X Plan: Australian and New Zealand Guidelines for the management of Chronic Obstructive Pulmonary Disease. Brisbane: The Australian Lung Foundation, 2006. <http://www.copdx.org.au> (accessed 17 January 2006).
3. Therapeutic Guidelines: Antibiotic, Version 13, 2006.
4. Ram FSF, et al. Cochrane Database Syst Rev 2006;(2):CD004403.
5. Del Mar CB, et al. Cochrane Database Syst Rev 2006;(4):CD000023.
6. Williams Jr JW, et al. Cochrane Database Syst Rev 2003;(2):CD000243.
7. Fahey T, et al. Cochrane Database Syst Rev 2004;(4):CD000245.
8. Arroll B, Kenealy T. Cochrane Database Syst Rev 2005;(3):CD000247.
9. Australian Medicines Handbook, 2006.
10. Wutzke SE, et al. Health Promot Int 2006;doi:10.1093/heapro/dal034.
11. Australian Technical Advisory Group on Immunisation. The Australian Immunisation Handbook. Canberra: National Health and Medical Research Council, 2003. <http://www9.health.gov.au/immhandbook/> (accessed 16 January 2007).
12. Turnidge JD, et al. Med J Aust 1999;170:152–5.
13. World Health Organization. WHO global strategy for containment of antimicrobial resistance. Geneva: World Health Organization http://www.who.int/csr/resources/publications/drugresist/WHO_CDS_CSR_DRS_2001_2_EN/en/ (accessed 31 October 2006).
14. Ferguson J. Australian Prescriber 2004;27:39–42.
15. Adverse Drug Reactions Advisory Committee. Australian Adverse Drug Reactions Bulletin 2006;25:1–4.
16. Department of Health and Ageing. PBS for Health Professionals. Canberra, 2007. www.pbs.gov.au (accessed 16 January 2007).

Online citations available at www.nps.org.au/healthpro

The information contained in this material is derived from a critical analysis of a wide range of authoritative evidence. Any treatment decisions based on this information should be made in the context of the clinical circumstances of each patient.



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