

## Antibiotic resistance and prescribing in Australia: current attitudes and practice of GPs

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**Abstract.** *Background:* Antimicrobial resistance is a growing public health issue influenced by inappropriate prescribing and use. In Australia the prevalence of antibiotic-resistant bacteria in hospital, nursing home and community settings is on the rise. To address this issue, a 5-year program focuses on reducing the prescribing and inappropriate use of antibiotics. In order to inform development of the program, a cross-sectional survey was conducted.

*Methods:* The survey was sent to a random sample of 1570 Australian general practitioners (GPs), and data was collected on GP knowledge, attitudes, awareness and self-reported behaviour in relation to antibiotic resistance, medical imaging referrals and antibiotic prescribing.

*Results:* 730 GPs participated in the survey (46.5% response rate). While GPs perform very well in many areas, especially in recommending symptomatic management rather than prescribing an antibiotic, there is some possible confusion amongst GPs about the factors that increase antibiotic resistance. The results showed that patient expectation also plays a role in the decision to prescribe antibiotics, with almost 40% of respondents admitting that they would prescribe antibiotics to meet a patient's expectations. Antibiotic resistance is generally not discussed with patients (only half [50%] of respondents would always or often discuss the issue of antibiotic resistance).

*Conclusion:* Programs to address the prescribing of antibiotics must be informed by existing knowledge, attitudes, awareness and practice of GPs. There is room for improvement in GPs' knowledge of prescribing behaviours that decrease antibiotic resistance. GPs should be encouraged to discuss the issue of antibiotic resistance with patients and to not provide an antibiotic prescription to be dispensed at a later date or to meet patient expectation.

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### Introduction

Antimicrobial resistance is an increasing public health issue influenced by inappropriate prescribing and use. The strong association between antibiotic-prescribing practices in primary care and the rate of antibiotic resistance<sup>1</sup> suggests that GPs have an important role in maintaining the efficacy of antibiotics. A study in 21 European countries<sup>2</sup> evaluated population-adjusted use of antimicrobial agents in ambulatory care and the resistance trends of *Streptococcus pneumoniae* and *Escherichia coli* over 6 years (2000 to 2005). Prescribed drugs were grouped by the active substance as the number of defined daily doses (DDD) per 1000 inhabitants (DID). Total outpatient antimicrobial drug use differed significantly between countries: for example, in 2004, Greece's

consumption (33.4 DID) was much higher than the Netherlands (9.7 DID). Similarly, resistance proportions, in 2005, differed for penicillin non-susceptible *S. pneumoniae* isolates: France (36%) was much higher than the Czech Republic (2%); and for fluoroquinolone resistance in *E. coli*, Portugal (29%) was much higher than Iceland (3%)—showing resistance correlating with the use of those agents.<sup>1</sup>

In Australia, the prevalence of antibiotic-resistant bacteria in hospital, nursing home and community settings is on the rise. An increase in the prevalence of antibiotic resistance in common pathogens causing respiratory tract infections (RTIs) over the past 20 years has been demonstrated in the Australian Group on Antimicrobial Resistance (AGAR) surveys.<sup>3</sup> The rate of resistance to macrolides (erythromycin,

### Implications

- Programs to address antibiotic resistance must be informed by current prescribing behaviours and practice and specifically address these behaviours.
- Further support for GPs in relation to dealing with patient expectation in regard to antibiotics should be provided.

roxithromycin, clarithromycin, azithromycin) in *S. pneumoniae* increased from 8.7% in 1994 to 20.4% in 2007 and continues to increase.<sup>4</sup> Multi-resistant strains (resistant to two or more classes of antibiotics) were identified in 12.7% of non-invasive *S. pneumoniae* isolates, which further reduces treatment options.<sup>4</sup> By contrast, fluoroquinolone resistance remains uncommon in Australia because of restrictions placed on their use.

Over 19 million prescriptions for 11 selected antibiotics (amoxicillin, cefalexin, amoxicillin with clavulanic acid, roxiithromycin, doxycycline, cefaclor, erythromycin, clarithromycin, phenoxymethylpenicillin, ciprofloxacin and cefuroxime) were dispensed in 2009–10. Use of antibiotics (DDD per 1000 population per day) has increased by almost 10% over the last 10 years and reached 19.8 in 2009–10. This has increased to 24 over the past few years and respiratory system illness has become the most frequently managed problem in general practice in Australia with more than half of antibiotic ordering in primary care for respiratory tract infections.<sup>6</sup> In 2009–10, the two most common problems for which antibiotics were prescribed or supplied in Australian primary care were generalised upper respiratory tract infection (URTI), mostly the common cold (14.0%), and acute bronchitis or bronchiolitis (14.0%).

In order to address the issue of antibiotic resistance in Australia, a 5-year program was launched in February 2012 and directed at health professionals and consumers. The program focuses on reducing antimicrobial resistance through the appropriate prescribing and use of antibiotics. The overall program target is to reduce antibiotic usage by 25% over 5 years, from 24 to 19 DDD per day based on 5% per annum reductions to achieve concordance with international best practice and the Australian Commission on Safety and Quality in Health Care (ACSQHC) recommended benchmarks. It is assumed empirically that a corresponding reduction in the incidence of new antibiotic resistance will ensue.

A cross-sectional survey of general practitioners (GPs) was conducted before the program launch and will be repeated at the end of the 5-year program. This paper presents the results of the GP survey.

### Methods

The aim of the cross-sectional survey is to identify any short- to medium-term improvements in GP knowledge, attitudes, awareness and self-reported behaviour in relation to antibiotic

resistance and prescribing, as well as medical imaging referrals.

The survey is a self-completed, paper-based questionnaire of a random sample of Australian GPs who have participated in any National Prescribing Service (NPS) intervention in the last 5 years ( $n = 20\,120$ ). The number of registered Australian GPs as of June 2011 was 24 720.<sup>5</sup>

The survey questions relate, where possible, to the objectives of the 5-year program. However, the questions needed to be specific and therefore the topic of upper respiratory tract infections (URTI) was used for specific case scenarios and questions. This topic was selected as the focus of activities for the first year of the program.

The paper-based survey was pre-tested with six GPs and then mailed to 1570 GPs around Australia (number based on sample size calculation) at the end of November 2011. The survey was in field for 10 weeks, and two reminder letters were posted. On completion of the 5-year program, the same questionnaire will be mailed to a random sample of Australian GPs. For each year of the program several interventions will be conducted and the GPs who participate in interventions will be surveyed via a retrospective pre-survey with a control group to assess changes based on individual interventions. These results will be reported at a later date.

### Results

#### Survey response

The survey achieved a response rate of 46.5% ( $n = 730$ ). The majority of GP respondents were male, working in a multiple GP practice and had been practicing as a GP for an average of 20 years. The first reminder letter was successful in doubling the initial response rate from 18.2% to 36.4%, with a further 10.1% increase achieved after the second reminder. The proportion of respondents by state corresponded to the proportions of GPs practicing in each state. Over half of respondents (56%) indicated that a significant proportion of patients in their practice were concession card holders.

#### Antibiotic resistance

When asked about antibiotic resistance, 55% ( $n = 361$ ) of respondents agreed or strongly agreed that antibiotic resistance was a problem in the community serviced by their practice, with 29% neither agreeing nor disagreeing. Forty-six percent ( $n = 302$ ) believed antibiotic resistance was more of a problem in hospitals, against evidence suggesting antibiotic resistance to be an issue in both the community and the hospital setting.<sup>7</sup> Forty-three percent ( $n = 279$ ) of respondents took a neutral stance on whether antibiotic resistance may last up to 12 months in an individual after a single use, despite evidence showing this to be the case.<sup>7</sup>

Respondents were asked about behaviours believed to increase antibiotic resistance (see Fig. 1). Respondents were asked to select all the behaviours they believed increased antibiotic resistance. When asked about behaviours believed to increase resistance, 35% of respondents believed that self-

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