General practitioner management of upper respiratory tract infections: when are antibiotics prescribed?

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Abstract

Aim. To assess General Practice (GP) description and management of upper respiratory tract infections (URTI), including conditions under which they prescribe antibiotics.

Method. A telephone survey of a randomised sample of Auckland GPs.

Results. There was a 61% response rate. 82 of the 100 GPs interviewed agreed that most patients presenting with URTI expected antibiotics. Persistent symptoms and indication of specific infection (tonsillitis, otitis media, sinusitis, pharyngitis, purulent sputum) were common reasons for prescribing. Patients travelling overseas, expecting or requesting antibiotics and prior use of over-the-counter (OTC) medications increased antibiotic prescribing-rates. Most GPs (95%) issued as-needed prescriptions on occasion; 13% did this often. Amoxicillin and amoxicillin/clavulanic acid were most commonly used. Despite wide-ranging antibiotic use for URTI (0 to 90%), only 6% of GPs felt they prescribed more antibiotics than others.

Conclusions. The results suggest over-prescription is common-place, but use of as-needed prescriptions to reduce antibiotic use is encouraging. Exploration of patient expectations in the consultation may assist in decreasing prescribing rates.

In spite of the knowledge that an upper respiratory tract infection (URTI), popularly known as the common cold, is viral in origin, there is evidence that many patients presenting to their GP receive antibiotics, regardless of efficacy.1,2 A New Zealand study examining computerised records of 100 222 consultations from seventeen general practices over one year found that 78% of patients with URTIs received antibiotics, about one-third of these being expensive broad spectrum medications.3 Other studies also suggest that broad spectrum antibiotics are used instead of narrow spectrum drugs.4-6

It has long been assumed that antibiotics have no place in the treatment of URTIs,7 a belief supported by two recent reviews. A Cochrane review of seven pooled studies found no benefit for antibiotics OR = 0.95 (95% CI 0.70-1.28), but an increase in adverse effects odds ratio OR = 2.72 (95% CI 1.02-7.27).8 Another review of the treatment of URTI in children found no benefit from antibiotics OR = 1.01 (95% CI 0.9-1.13) and no increase in side-effects compared with placebo.9

In the examination of consultation records study, URTI was the most common reason for a new consultation in general practice, and the second most common reason for prescribing an antibiotic (bronchitis being the most common).4 If ineffective, as has been long thought, there is concern that widespread use of antibiotics is not only a poor use of health funds but can induce adverse effects and contribute to the development of resistant strains.10-12

A number of articles report patient expectation of antibiotics.13-16 In a study of primary care practices in Kentucky, 72% of patients sought care with a condition of five days duration of cough, sore throat and discoloured nasal discharge.16 61% of the sample believed that antibiotics were effective for such a condition with a clear nasal discharge, while 79% believed that antibiotics would help with discoloured nasal discharge. Another American study found that patients who were smokers or who had purulent nasal discharge or green phlegm were much more likely to receive antibiotics for URTIs (82% had at least one of these factors).17 In a further US-based study, there was little difference in patient satisfaction between those who received antibiotics, those receiving advice only and those who received non-prescription medicine.11

A UK study examined the effect of giving an as-needed prescription for the treatment of sore throat.18 One group was given a prescription for antibiotics, one group got no antibiotic and the third group was asked to come back in three days if not improved to collect a prescription. The use of antibiotics in these three groups was 99%, 13% and 31% respectively. Patients receiving antibiotics were more likely to return for subsequent consultations for sore throat.

Prescribing for URTIs can be disquieting for GPs, and perceived patient expectations for treatment seems to be one of the main factors influencing their prescribing patterns.19 One author states that doctors consistently overestimate patients expectations for prescriptions.20 A recent survey of the New Zealand public indicated that over half of those attending GPs with URTIs wanted to have antibiotics.21 An American study of physicians prescribing antibiotics for URTIs in children found that high prescribers were significantly more years away from medical school graduation and had managed significantly more URTI episodes than low prescribers.22

Our study aimed to survey GPs in the Auckland region regarding management of URTIs, including specific criteria which might determine whether or not they prescribe antibiotics.

Methods

179 GPs were randomly selected from a list of Auckland-based practitioners supplied by the local diagnostic laboratory. The study was conducted during January and February 1998. GPs were contacted by telephone or fax and asked to participate in research into GP prescription of antibiotics for URTI. They were told that the telephone survey should not exceed ten minutes and their responses would be confidential. GPs were included until 100 were recruited. The interviewer was a research assistant working in the department. From previous surveys, the authors have found statistically significant differences with such a sample size.

Questions asked included their own definition of an URTI, conditions under which they would prescribe antibiotics; their use of ‘as-needed’ prescriptions; the specific antibiotic they would prescribe and symptomatic relief they would offer. Features of secondary bacterial infections warranting treatment were recorded, both as initial unprompted responses and also subsequent answers to specific (prompted) conditions. Results were analysed using the statistical software package SPSS for Windows, Version 9.0.

Results

From an initial randomised list of 179 GPs in the Auckland region, sixteen were unable to be contacted at the number
given. 52 GPs declined to participate, and a further eleven failed to call back after saying they would do so. Interviews were discontinued after 100 had been conducted. This gave a response rate of 61%.

Of the 100 GPs interviewed, 82% agreed that most patients who see a GP for an URTI expect to be given antibiotics. Just over a quarter of the GPs defined an URTI as an illness with a runny nose, fever, sore throat and cough, and a further 1-3% as an illness with just rhinitis and sore throat. In total, there were 27 different definitions, mostly varying combinations of other symptoms including cough, sneezing, pain and lymphadenopathy, and many included conditions such as sinusitis, pharyngitis, otitis media, tonsillitis and laryngitis.

When asked what would encourage them to prescribe antibiotics, a third identified persistent symptoms. The presence of specific infections was also mentioned frequently; otitis media (28%); sinusitis (20%); pharyngitis (16%); and tonsillitis (12%). Just over 10% also indicated they would prescribe antibiotics if the patient had purulent sputum or purulent nasal discharge. When asked about specific factors which would make them prescribe antibiotics, the vast majority would do so in the presence of signs suggesting sinusitis, tonsillitis, purulent sputum, lower respiratory tract infection or otitis media (Table 1). A significant minority volunteered these options unprompted. Nearly three-quarters would prescribe antibiotics if the patient was travelling overseas in the near future, and about half if the patient expected and asked for antibiotics, or had earlier tried OTC medications. When asked about signs and symptoms suggesting secondary bacterial infection, half specified elevated temperature or purulent sputum, about a third mentioned specific signs of infection in the sinuses, tonsils or lungs, and a quarter specified indications of middle ear infection.

To reduce unnecessary taking of antibiotics, most GPs on occasion (95%) issued prescriptions for antibiotics to patients with URTIs and instructed them only to fill the prescription if necessary. Half the GPs did this sometimes, but only 13% said they did so often. Nearly a third would do this rarely, and five GPs said never. The majority of GPs estimated that they would do this <10% of the time.

When issuing prescriptions, nearly half would advise patients to fill them if symptoms persisted or worsened over time (ranging from 24 hours through to two weeks). Other advice to fill the prescription included fever, purulent sputum or nasal discharge, or productive cough.

The proportion of patients for whom a GP would prescribe antibiotics (excluding as-needed antibiotics) ranged from 0-90%, with 45% saying they would give antibiotics 30-50% of the time. Despite this wide range of practice, almost all GPs felt they prescribed the same number (n=42) or less (n=35) antibiotics for URTIs than other doctors. Only 6% of those who responded to this question felt they prescribed more antibiotics than others.

The most common first-line antibiotic used was amoxicillin (37%), followed by augmentin (amoxicillin/clavulanic acid) (21%) and tetracyclines (15%). Only 12% used penicillin as first choice. Duration of treatment ranged from four to ten days, with a mean of seven days.

Analgesia, predominantly paracetamol, was the most frequently prescribed measure for symptom relief. Decongestants, nasal sprays or drops and cough medicine were mentioned by a third to half of GPs, and inhalants or gargles and mouth washes might also be recommended. Less common options included fluids, rest, antihistamines, lozenges or vitamin C. One GP prescribed echinacea and homeopathy. If a patient had symptoms of an URTI, plus bilateral chest ronchi, 44% would prescribe both a bronchodilator plus antibiotics; 37% would prescribe a bronchodilator alone and 19% antibiotics alone.

The majority of GPs worked full-time, with just under a quarter working 6/10 or less. Just over half (56%) were male and 60% were members of the RNZCGP. Years since graduation ranged from 3 to 42 (median of seventeen years).

Table 1. Factors which would encourage GPs to prescribe antibiotics to patients with URTIs (n=100)

<table>
<thead>
<tr>
<th>GP would prescribe antibiotics if the patient:</th>
<th>% unprompted</th>
<th>% prompted</th>
<th>% TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Had symptoms &amp; signs suggesting sinusitis</td>
<td>34</td>
<td>65</td>
<td>99</td>
</tr>
<tr>
<td>Had a positive throat swab for Streptococci</td>
<td>6</td>
<td>92</td>
<td>98</td>
</tr>
<tr>
<td>Had signs of tonsillitis</td>
<td>19</td>
<td>58</td>
<td>77</td>
</tr>
<tr>
<td>Had green or coloured sputum</td>
<td>28</td>
<td>64</td>
<td>92</td>
</tr>
<tr>
<td>Had lower respiratory tract signs (unilateral ronchi)</td>
<td>0</td>
<td>92</td>
<td>92</td>
</tr>
<tr>
<td>Had lower respiratory tract signs (bilateral rales)</td>
<td>0</td>
<td>87</td>
<td>87</td>
</tr>
<tr>
<td>Had a productive cough all day</td>
<td>0</td>
<td>78</td>
<td>78</td>
</tr>
<tr>
<td>Was planning an overseas trip in the near future</td>
<td>0</td>
<td>74</td>
<td>74</td>
</tr>
<tr>
<td>Was young and had recurrent otitis media</td>
<td>3</td>
<td>68</td>
<td>72</td>
</tr>
<tr>
<td>Had purulent nasal discharge</td>
<td>25</td>
<td>47</td>
<td>72</td>
</tr>
<tr>
<td>Had lower respiratory tract signs (bilateral ronchi)</td>
<td>0</td>
<td>71</td>
<td>71</td>
</tr>
<tr>
<td>Looked sick (eg febrile &amp; sweaty)</td>
<td>1</td>
<td>55</td>
<td>56</td>
</tr>
<tr>
<td>Expected antibiotics and asked for them</td>
<td>0</td>
<td>53</td>
<td>53</td>
</tr>
<tr>
<td>Had tried other medication before presenting</td>
<td>17</td>
<td>33</td>
<td>50</td>
</tr>
<tr>
<td>Had an elevated temperature</td>
<td>2</td>
<td>99</td>
<td>99</td>
</tr>
<tr>
<td>Had a productive cough in the morning</td>
<td>5</td>
<td>42</td>
<td>47</td>
</tr>
<tr>
<td>Was old*</td>
<td>4</td>
<td>37</td>
<td>41</td>
</tr>
<tr>
<td>Requested it</td>
<td>3</td>
<td>30</td>
<td>33</td>
</tr>
<tr>
<td>Was a smoker</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Was likely to get them from another Dr if not prescribed</td>
<td>0</td>
<td>27</td>
<td>27</td>
</tr>
<tr>
<td>Appeared to expect antibiotics</td>
<td>1</td>
<td>25</td>
<td>26</td>
</tr>
<tr>
<td>Had a persisting dry cough for some days†</td>
<td>2</td>
<td>19</td>
<td>21</td>
</tr>
<tr>
<td>Was young‡</td>
<td>5</td>
<td>14</td>
<td>19</td>
</tr>
<tr>
<td>Had a night cough</td>
<td>0</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Had white productive sputum</td>
<td>0</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Had clear rhinitis</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

*Ranged from 60 to 75, average age 65 years. †Ranged from 2 to 30 days, median 5.5 days. ‡Ranged from 4 weeks to 15 years, average age 3 years.
Discussion

This survey found that GPs frequently prescribe antibiotics for patients with URTIs. The issue of defining the common cold/URTI is complicated because many GPs included specific infections of the throat, tonsils, sinuses and middle ear, and antibiotic use was to treat (or perhaps prevent) secondary bacterial infection. 100% of GPs said they would not give antibiotics for an URTI with clear rhinorrhoea, yet three-quarters felt that purulent nasal discharge was an indication. While research suggests that patients with purulent nasal discharge are more likely to want antibiotics than those with clear discharge, there is evidence that antibiotics make no difference to this condition. A more conservative approach to giving antibiotics under these circumstances is warranted.

All but one GP indicated that they would give antibiotics for symptoms indicating sinusitis. A meta-analysis found that antibiotics benefited sinusitis that was confirmed radiologically or by sinus aspiration. However, there are issues about the clinical diagnosis of this condition in the absence of these investigations.

It was reassuring that only 21% and 6% of GPs prescribed antibiotics for dry cough and night cough, as there is no evidence that antibiotics help these symptoms, and indeed, night cough may be more related to bronchoospasm. The question of what medication to administer is interesting. In a study where 52% of patients had abnormal lung examination, patients did better on albuterol (Salbutamol) than on erythromycin. 41% of GPs would give antibiotics to smokers, although no benefit has been shown for this.

A meta-analysis of studies of antibiotic use in acute productive cough found a marginal benefit for antibiotics, relative risk 0.85 (95% CI 0.73-1.00). It is therefore understandable that 49% of GPs prescribed antibiotics for morning phlegm and 78% for all-day phlegm. However, this is a controversial area because in some studies the term ‘acute bronchitis’ is used, although most of the patients do not meet the criteria for bronchitis.

While 97% of GPs would use antibiotics to treat tonsillitis, there is debate whether they make any difference to symptoms. A recent audit of patients attending an accident and emergency clinic similarly found that 84% with sore throat, and 97% with tonsillitis, were prescribed antibiotics.

If the patient was febrile and looked ill, 67% of doctors thought antibiotics would help. The fact that less than half of the GPs would prescribe for elderly patients was surprising, given that older patients might be one group who derive benefit.

Perceived patient expectations influence prescribing behaviour. The majority of GPs agreed that most patients who see a GP for an URTI expect antibiotics, and about half would prescribe if the patient requested and asked for antibiotics, or if the patient had already obtained OTC symptom relief. A quarter would give antibiotics if they felt that their refusal would result in the patient seeking them from another doctor. This is consistent with findings in a British study, which found that doctors knew of the evidence for marginal effectiveness, yet often prescribed for good relationships with patients.

Antibiotics appear to be given as preventatives. They are likely to be given if the patient was travelling overseas in the near future, presumably to cover secondary infections of the sinuses or middle ear that might be affected by flying, or to allow for difficulties patients might experience in getting medical attention should symptoms flare while in transit. There was also use of ‘as-needed’ prescribing, with instructions to fill prescriptions if symptoms worsened over time, or if they developed specific symptoms indicative of secondary infection. This appeared to be a relatively uncommon strategy however, with most GPs estimating that they do this in <10% of cases. Several studies confirm that the majority of patients attending a doctor for an URTI want antibiotics, including a recent Auckland study of members of the public. The offer of an as-needed prescription may be more satisfactory to both patient and doctor.

Broad spectrum antibiotic use was prevalent, and penicillin was used as first choice in a minority of cases. This is a similar finding to the New Zealand case review study which found that amoxicillin and amoxicillin/clavulanic acid were the most frequently prescribed antibiotics for URTI, with penicillin used infrequently. The strength of this study is that a random selection of doctors was able to define the ‘common cold’, rather than having an artificial ‘case study’ as the definition. The response rate was similar to other recent New Zealand surveys. A weakness is that it recorded what GPs said they do, not what they do.

It is encouraging to see widespread use of as-needed prescriptions, as this has been shown to reduce antibiotic use and decrease subsequent visits. While overprescription seems to be the norm, there is a paradoxical benefit in the group who seem to benefit (for example, those >55 years). As Butler et al found, diagnosis is straightforward, but treatment is a very complicated issue. As Fahey suggested, adequate time is needed in the consultation to explore patient concerns about diagnosis and effects of antibiotic-prescribing, and offer adequate explanation and reassurance when antibiotics are not indicated.

In conclusion, our results suggest, that at times, GPs prescribe antibiotics for URTIs when they are probably aware of their marginal effectiveness. Factors such as patient expectations contribute to prescribing practices, and they may decide that maintaining a good patient/doctor relationship outweighs the theoretical risk to the community of developing resistant bacteria. Improving public knowledge to decrease demand for antibiotics would assist GPs to reduce unnecessary prescribing. GPs need to reconsider their prescribing practices if the rapid increase of micro-organism resistance is to be stemmed. As-needed prescribing may go a long way in reducing unwarranted antibiotic use.

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To examine this, we surveyed Dunedin school children in 1997 for predominant types of *S. pyogenes*, and compared the findings with those from a similar Dunedin study conducted in 1987-89,\(^7\) and with the findings of North Island studies.\(^4,8-10\)

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33. Hamm RM, Hicks RJ, Benben DA. Antibiotics and respiratory infections: are patients more satisfied when expectations are met. J Fam Pract 1996; 45: 56-62.

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Island populations. To examine this, we surveyed Dunedin school children in 1997 for predominant types of *S. pyogenes*, and compared the findings with those from a similar Dunedin study conducted in 1987-89,\(^7\) and with the findings of North Island studies.\(^4,8-10\)