

The treatment of acute bronchitis by general practitioners in the UK

Results of a cross sectional postal survey

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BACKGROUND In Australia and the UK acute bronchitis is a common presenting problem in general practice. When symptoms persist management can be difficult and despite evidence that antibiotics are usually ineffective their use is widespread.

OBJECTIVE To describe prescribing behaviour for acute bronchitis by general practitioners in the United Kingdom.

METHOD Cross sectional postal survey of UK GPs.

RESULTS Four hundred and nineteen (73%) GPs responded. Purulent sputum, fever and crepitations/crackles on chest examination were the most important reasons for prescribing antibiotics: 89% of GPs said the colour of the sputum influenced their decision; amoxycillin was the first choice; 40% of GPs believed that at least one in five consultations for ARI were affected by patient factors, usually to maintain patient satisfaction. 47% of GPs advised the use of bronchodilators, and 96% recommended the symptomatic use of paracetamol and fluids.

CONCLUSION General practitioners are influenced to use antibiotics by patient symptoms and signs for which there is little evidence. Patient psychosocial factors influence prescribing. Until clearer research findings from new studies are available, GPs may opt for a 'just in case' prescription.

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In Australia and the United Kingdom, consultation for acute respiratory infection (ARI) is very common.^{1,2} Approximately 3.9% of all consultations for a new problem in Australia are for acute bronchitis (3.5 per 100 consultations), with antibiotics being prescribed in about 80% of cases.^{1,3} Acute bronchitis can have considerable impact on patients' lives.⁴ Antibiotics are thought to be over prescribed for these conditions⁵ and a recent systematic review of treatment for acute bronchitis, concluded that the benefit from antibiotic treatment was modest.⁶ Although it is recognised that

patient factors influence the prescription of antibiotics^{7,8} little is known about general practitioners preferred rather than actual behaviour with respect to the prescription of antibiotics and this knowledge could be useful when developing guidelines or educational material for GPs.

Methods

The study population was all GPs (576) in the Avon Health Authority, a population of approximately one million, including Bristol and Bath. The survey was a five page questionnaire with 14 questions and 83 items concerning the diagnosis and

treatment of acute bronchitis, and including GP demographic data.

We tested categorical variables using the chi-squared test and continuous variables using the unpaired *t* test to investigate if there were differences between responders and nonresponders. To assess thresholds for treatment using signs and symptoms GPs were asked to rate a list of eight terms in order of importance for deciding if a person (who was otherwise healthy) required antibiotics for ARI. They were allowed to give different signs and symptoms the same rating. To determine the rankings, each

Table 1. Demographic and practice characteristics of responders and nonresponders to a postal questionnaire about the diagnosis and treatment of acute bronchitis

GP characteristic	Responders n=419	Nonresponders n=157
Age (average)	44.1 years	46.8 years
Male	252 (60%)	104 (66%)
Years in general practice	13.6	11.4
Full time	361 (86%)	134 (86%)
Practice size (number of partners)	4.9	4.5
Is a senior partner	92 (22%)	42 (27%)
Belongs to a teaching practice	182 (43%)	67 (43%)
Belongs to a training practice	140 (33%)	38 (24%)
Has MRCGP	268 (64%)	80 (51%)

Table 2. The importance of symptoms and signs for deciding if a person (who is otherwise healthy) requires antibiotics for a respiratory tract infection

Sign or symptom*	Ranking
Crepitations or crackles (but no sign of consolidation) on examination	1st
Presence of fever	equal 2nd
Sputum type (eg. purulent/non/purulent)	equal 2nd
Rhonchi on examination	4th
Feeling unwell/time off work	equal 5th
Character of cough	equal 5th
Smoking status of patient	7th
Duration of cough	8th

* other was another choice but few GPs used this option

Table 3. Reasons for prescribing an antibiotic if patient pressure was thought to influence the decision to prescribe

Reason	Yes (n% of all GPs)	No (n% of all GPs)
Keep the patient happy	192 (46%)	88 (21%)
Maintain a good relationship with them	268 (64%)	60 (14%)
Stop them returning to see another GP	159 (38%)	114 (27%)
Prevent them from attending again	164 (39%)	123 (29%)
Because their usual GP prescribes them	145 (35%)	128 (31%)
To end the consultation	133 (32%)	135 (32%)

rating was assigned a value that took into account how many symptoms or signs were rated by each GP and whether different signs and symptoms were given the same rating (using the proc rank procedure in SAS). For the remaining questions we measured and compared proportions. We also analysed the data by the GPs' age and whether they belonged to a teaching practice.

Results

Four hundred and nineteen GPs returned the questionnaire. Their demographic and practice characteristics were compared with nonresponders (*Table 1*). Nonresponders were less likely to have the MRCGP ($p<0.01$), belong to a teaching ($p=0.001$) or training practice ($p<0.01$) and were more likely to be older ($p<0.001$). In a regression model using these characteristics, independent associations for nonresponse were: not being part of a teaching practice OR=2.01 (1.38–3.13); and increasing age OR=1.04 (1.01–1.07).

General practitioners were asked to rate a list of symptoms in order of importance for deciding if a patient required antibiotics for a ARI (*Table 2*). Many (89%) said sputum colour affected their decision to treat.

We asked how often GPs felt that patient pressure influenced their decision to prescribe antibiotics in consultations for respiratory infection: 6% thought it occurred for 1 in 3; 33% for 1 in 5; and 48% for 1 in 10. Less than 2% thought they were never influenced by patient expectation. To determine why they prescribed, GPs were given a choice of several possible reasons from which to choose (*Table 3*). About half (204, 49%) answered all the questions: no response was given by seven (2%). Most responded yes to one or both of the reasons centred on patient satisfaction with only 36 saying no to both reasons; and 50 not responding. Of these 86 GPs, 60 (70%) sometimes prescribed to stop reattendance either to

themselves or another doctor, eight (9%) because the patients' usual GP did so or to end the consultation and the remaining 18 responded with comments such as:

- 'because I can't get across that antibiotics won't work despite careful explanation'
- 'in case I am wrong'
- 'prevent out of hours visits' and
- 'if it is a Friday of a bank holiday weekend'.

When asked what other treatments they might advise for the treatment of acute bronchitis 47% would use bronchodilators, 38% over-the-counter medications (eg. cough mixtures), 23% would give a prescription for a cough suppressant or expectorant and 96% would advise the symptomatic use of paracetamol and fluids.

General practitioners were asked to rank their choices of antibiotics (for smokers and nonsmokers) 1–7 in order of preference (*Table 4*).

There were no differences by logistic regression analysis in these results between GPs by age or being in a teaching practice.

Discussion

While surveys of how GPs treat acute bronchitis have recently been reported from America⁹ and from Europe¹⁰ no equivalent survey has been undertaken in the UK or Australia. Furthermore these studies explored treatment choices not thresholds or reasons for treatment.

General practitioners place most importance on three specific clinical symptoms and signs: purulent sputum, fever and crepitations/crackles on chest examination when deciding when to treat ARI with antibiotics. This is consistent with the recorded behaviour of GPs in a study of acute lower respiratory tract infections (LRTI).¹¹ However, although an association between the presence of focal chest signs and radiographic pneumonia has been reported¹² the prognostic significance of sputum and chest signs has

Table 4. Choice of antibiotic for a patient with acute bronchitis who has no significant past medical history and no known allergies

Antibiotic	Number (%) of GPs choosing this rank			
	For a nonsmoking patient		For a smoking patient	
Amoxicillin	1st	405 (96.7%)	1st	354 (84.5%)
Erythromycin	2nd	271 (64.7%)	2nd	221 (52.7%)
Co-amoxiclav	3rd	134 (32.0%)	3rd	115 (27.4%)
Cephlosporin	4th	81 (19.6%)	equal 4th	83 (19.8%)
Clarithromycin	5th	87(20.8%)	equal 4th	83 (19.8%)
Doxycycline	6th	78 (18.6%)	6th	69 (16.5%)
Trimethoprim	7th	137(32.7%)	7th	123 (29.4%)

been questioned.^{13,14} Fever may be an important sign, but probably only in association with other factors such as age, respiratory rate, pulse and comorbidity.¹⁵

That most GPs report that sputum colour influences their decision to prescribe antibiotics is consistent with past research.¹⁶ However, there is no evidence that the appearance of sputum is related to bacterial colonisation or the efficacy of antibiotics.¹⁷ By contrast signs that may indicate a need for antibiotics (frequent cough and feeling ill),¹⁸ were not highly rated by most GPs.

Patient factors are clearly important in the decision to prescribe antibiotics. Similar data were obtained from a study of LRTI in which GPs were uncertain of the value of their own antibiotic prescription in 36% of patients.¹¹ The influence of patient expectations has been shown to affect the prescribing behaviour of GPs for both upper¹⁹ and lower⁸ ARI. These expectations may be driven by the patient view that they have an 'infection' and therefore require antibiotics.⁸ When added to the evidence that patient expectations also affect reconsultation rates,^{20,21} it is clear how a self sustaining cycle of illness behaviour can be established if antibiotics are prescribed.

Many GPs believe prescribing an antibiotic assists maintenance of a good relationship with their patient. However, patient satisfaction is not always

increased when an antibiotic is prescribed,²² depends more on doctor–patient communication than on antibiotic treatment and it may be that the GPs opinion about patient expectation is the strongest determinant for prescribing.^{23,24}

When GPs do prescribe an antibiotic it is usually amoxicillin. This is consistent with data from Australia,³ UK¹¹ and US.⁹ But German GPs favour tetracycline, Italian cephalosporins and Spanish macrolides.¹⁰ These differences could be due to differences in training, local advertising or patient preferences.

What are the alternatives to antibiotics? Most GPs suggest fluids and paracetamol and many also use bronchodilators, although their use has recently been questioned. Ruling out a serious cause for symptoms may be all that patients want.²⁵ Furthermore simple strategies such as delayed prescribing and patient information leaflets decrease antibiotic use and reconsultation.^{20,26} But if it is unclear what the benefits of treatment are, patients may be justified in having unrealistic expectations and GPs forgiven for over prescribing antibiotics.

There are several limitations of the study. Postal questionnaires may be subject to bias. But there was a high response rate and, moreover, although comparison of responders with nonresponders indicated that older GPs and those not in a teaching practice were less

likely to return the questionnaire, analysis examining differences in response between groups (in those who returned the questionnaire) indicated no significant differences. Additionally while reported and actual behaviour may differ and socially desirable answers given — especially in face-to-face interviews — the questionnaire was confidential and our results consistent with the literature.

This study shows that there are differences between GP behaviour and existing evidence. There is a need to clarify who should receive what treatment. This can only be achieved by large, well designed, randomised controlled trials of treatment in patient groups that are defined by clinical signs and symptoms and not diagnostic labels that are subject to between practitioner variation.²⁷

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Conflict of interest

No conflict of interest.

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Implications of this study for general practice

- The use of antibiotics for acute bronchitis is determined by the presence of purulent sputum, fever or chest signs that are only partly evidence based.
- Psychosocial patient factors heavily influence prescribing for acute bronchitis.
- Amoxicillin is the antibiotic of choice for acute bronchitis.
- Most GPs suggest other symptomatic treatments, including paracetamol and fluids.

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