

# Acute bronchitis in Australian general practice

## *A prescription too far?*

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### OBJECTIVE

To quantify how frequently general practitioners in Australia prescribe antibiotics for acute bronchitis, which antibiotics are used, and whether there are subgroups of patients who might benefit from their use.

### DESIGN AND SETTING

A retrospective descriptive study using 3 sets of data: Australian Sentinel Practice Research Network, the Bettering the Evaluation and Care of Health (BEACH) Program, and the General Practice Research Network (GPRN).

### RESULTS

Over 50% of all patients with 'acute bronchitis' had either chest or one or more systemic signs on physical examination. The rate of antibiotic prescribing for acute bronchitis was 79.6% of acute bronchitis visits using BEACH data 2001–2002 and varied from 68.6 (95% CI: 62.8–74.5%) in 2001 to 78.7 (95% CI: 72.2–85.2%) in 1999 using GPRN data. Penicillins, followed by macrolides, were the most commonly prescribed antibiotics.

### DISCUSSION

Australian GPs frequently prescribe antibiotics for 'acute bronchitis' despite guidelines to the contrary. One reason may be that many patients present with chest or systemic signs.

**A**cute bronchitis is a common illness in Australia. In 1990, it was the fifth most frequently managed problem by general practitioners,<sup>1</sup> and often leads to an antibiotic prescription.<sup>2</sup> This use may still continue<sup>3</sup> despite guidelines to the contrary.<sup>4</sup> Patient factors may be responsible for some prescriptions but GPs may use antibiotics 'just in case'.<sup>5</sup> Is there any justification for antibiotics?

One systematic review of the treatment of acute cough concluded that any benefit from antibiotics was marginal and probably offset by potential side effects,<sup>6</sup> while a more recent Cochrane review of acute bronchitis concludes that 'there may be modest benefits, at least for some patients' and suggests that ongoing research efforts be directed at 'the identification of subsets of patients who are most likely to benefit from antibiotic treatment'.<sup>7</sup>

We sought to establish how frequently GPs in Australia prescribe antibiotics for acute bronchitis, which antibiotics are used, and whether there are subgroups of patients who might benefit from their use.

### Methods

The study used 3 sources of data. The Australian Sentinel Practice Research Network (ASPREN) is a national network of about 80 GPs sponsored by The Royal Australian College of General Practitioners (RACGP).<sup>8</sup> Information about specific clinical conditions is collated weekly. The Bettering the Evaluation and Care of Health (BEACH) Program continuously collects data from

**Table 1. Definition of acute bronchitis used by GPs (ASPREN Network, 2002)**

**Acute bronchitis:** Acute cough of less than 14 days duration and at least 1 other symptom of a respiratory infection such as symptoms of URTI, sore throat, sputum production, dyspnoea, wheeze, chest pain, for which there is no other explanation.

**Exclude** patients that have a history of chronic respiratory illness that requires ongoing treatment such as COPD, bronchiectasis or asthma.

**Chest signs** are focal or generalised such as crepitations, crackles, coarse breath sounds or wheeze in nonasthmatics. Exclude patients with signs of consolidation (pneumonia).

**Systemic signs are:** temperature >38°, respiratory rate >20, pulse >100, or being confined to bed.

**Acute bronchitis with chest and systemic signs:** As defined above with 1 or more chest signs and 1 or more systemic signs. Record once only per episode.

**Acute bronchitis with chest signs:** As defined above with 1 or more chest signs but no systemic signs. Record once only per episode.

**Acute bronchitis with systemic signs:** As defined above with 1 or more systemic signs but no chest signs. Record once only per episode.

**Acute bronchitis without signs:** As defined above without any chest signs or systemic signs. Record once only per episode.

**Table 2. Percentage of 2002 consultations and patients presenting with acute bronchitis (using ASPREN data)**

	Totals	Percentage of consultations (%)
Total number of consultations	<b>297 342</b>	-
Average number of consultations per week	<b>111</b>	-
Number of patients with cough without any signs	<b>4918</b>	<b>1.65</b>
Number of patients with cough and chest signs	<b>2721</b>	<b>0.92</b>
Number of patients with cough and systemic signs	<b>1359</b>	<b>0.46</b>
Number of patients with cough, chest and systemic signs	<b>1272</b>	<b>0.43</b>
<b>Total</b>	<b>10 270</b>	<b>3.45</b>

**Table 3. Rate of antibiotic prescribing for acute bronchitis (using GPRN data, 1999-2002\*)**

Year	Number of GPs	Number of visits for acute bronchitis	Rate of antibiotic prescribing, % (95% CI)
1999	179	5291	78.7 (72.2-85.2)
2000	304	17 538	73.3 (66.5-80.1)
2001	310	22 006	68.6 (62.8-74.5)
2002	302	22 719	75.7 (71.8-79.6)

\* Only data from GPs enrolled for the full year were included

**Table 4. Type of antibiotic prescribed (recorded by GPRN GPs, 2001)**

	n (%)						
	Bronchitis	Chest infection	Cough	LRTI			
Penicillin	4591 (39)	1742 (39)	262 (28)	1892 (43)			
Macrolide	3852 (33)	1495 (34)	426 (45)	1478 (34)			
Cephalosporin	1822 (16)	818 (19)	136 (14)	685 (16)			
Tetracycline	1277 (11)	257 (6)	112 (12)	250 (6)			
Sulphonamide or trimethoprim	107 (1)	29 (1)	8 (1)	36 (1)			
Quinolone	28 (0)	76 (2)	1 (0)	23 (1)			
<b>Total</b>	<b>11 677</b>	<b>100</b>	<b>4417</b>	<b>100</b>	<b>945</b>	<b>100</b>	<b>4364</b>

Australian general practice from approximately 1000 randomly selected GPs every year.<sup>9</sup> The General Practice Research Network (GPRN) is a random sample of about 300 Australian GP users of one electronic patient record called 'Medical Director'. Longitudinal de-identified patient data are extracted and captured for demographics, prescribing, reasons for prescribing, reasons

for visit, patient history, pathology and radiology requests and clinical measurements (eg. blood pressure, height, weight).<sup>10</sup> We determined the proportion of patients presenting to their GP with a standardised definition of acute bronchitis (*Table 1*) from ASPREN data, calculated the number of antibiotic scripts written by GPs for acute bronchitis from BEACH data from 2001-2002, and GPRN

data from 1999-2002; determining the type of antibiotic prescribed from GPRN morbidity data (2001).

## Results

We were able to determine from ASPREN data the presence of local and systemic signs in those diagnosed with acute bronchitis (*Table 2*). All had cough; nearly 49% had no signs, 27% chest signs, 13% systemic signs, and 12% had both signs.

Acute bronchitis/bronchiolitis represented 15.3% (2118) of all BEACH problems managed with antibiotics in 2001-2002 and 1.9% of all problems managed (n=139 973) or 2659 problems. From this we calculated a rate of antibiotic prescription for acute bronchitis/bronchiolitis of 79.6% (2118/2659). Similar calculations using GPRN data yielded rates between 68.6% (95% CI: 62.8-74.5%) and 78.7% (95% CI: 72.2-85.2%) in different years (*Table 3*). GPRN data from 2001 were used to determine the type of antibiotic prescribed for acute bronchitis: out of 2.24 million prescriptions, 337 132 were for antibiotics (15.1%), of which almost 5% were for acute bronchitis. Penicillins and macrolides were most often prescribed for these conditions (*Table 4*).

## Discussion

This study has a number of limitations. The data from each of the sources may not have been representative of Australian general practice. Both BEACH and the GPRN randomly selected GPs, but ASPREN did not. We did not validate any clinical findings or diagnoses, although ASPREN GPs had precise diagnostic criteria. Results could particularly be biased toward overestimating antibiotic use if GPs included acute exacerbations of chronic obstructive pulmonary disease (COPD). However, it is evident from the age range of patients with chest/systemic signs that acute bronchitis was no more common in the 45 years or more age group (those at risk of COPD) than in younger patients. Finally, our results for the percentage of consultations for acute bronchitis (3.5%) is consistent with the Australian GP Morbidity Survey in 1990 (3.9%).<sup>1</sup>

The results on diagnosis relied on the validity and reliability of chest signs. The identification of wheezes and crackles in patients with pneumonia is fairly reliable.<sup>11</sup> Previous

community based studies have used similar definitions to ours and it is clear that GPs are influenced by their presence.<sup>5</sup> We accepted the terms bronchitis, chest infection, cough and lower respiratory tract infection (LRTI) as being equivalent to acute bronchitis in data from the GPRN because in previous work, using case vignettes, these were the terms that GPs used to label a group of symptoms and signs consistent with acute bronchitis.<sup>12</sup>

We found that Australian GPs frequently prescribe antibiotics for acute bronchitis despite concerns that they are overused,<sup>13</sup> the emergence of bacterial resistance is a real concern,<sup>14</sup> and guidelines do not recommend their use.<sup>4</sup> General practitioners may be keen not to under treat serious respiratory tract infections, such as community acquired pneumonia,<sup>15</sup> and believe that many cases of acute bronchitis need antibiotics.<sup>16</sup> Acute bronchitis can certainly cause serious illness: a patient's cough can persist for an average of 2 weeks, over 25% have not returned to their usual daily activities 2 weeks later,<sup>17</sup> and 36% confine themselves to bed for days.<sup>18</sup> Perhaps this is why patients also believe they need antibiotics,<sup>19</sup> with these expectations affecting the prescribing behaviour of GPs for upper<sup>20</sup> and lower acute respiratory infections.<sup>21</sup>

The choice of a penicillin by GPs – with a macrolide a close second – is similar to that reported in the United Kingdom.<sup>5</sup> A recent study of LRTI suggests a mixed viral, bacterial and atypical picture<sup>22</sup> with *M. pneumonia*, *B. pertussis* and *C. pneumonia* often isolated (*M. pneumonia*, *B. pertussis* as part of epidemics) and *S. pneumonia*, *H. influenza* and *M. catarrhalis* possibly having a role in secondary bacterial infections.<sup>22,23</sup> Amoxycillin is the treatment of choice for community acquired pneumonia, so it appears that GPs are at least covering potential organisms and complications while minimising potential side effects.

It has been speculated that subgroups of patients may benefit from antibiotics.<sup>24</sup> Age and comorbidity,<sup>17</sup> an elevated C reactive protein,<sup>25</sup> smoking,<sup>7</sup> combinations of tachycardia above 100/minute, respiratory rate >24/minute, temperature >38°C and focal chest signs,<sup>22,24</sup> may predict poorer outcomes. Conversely GP prescribing is influenced by the presence of coloured sputum,<sup>26</sup> which is neither predictive of bacterial infection nor antibiotic effectiveness.<sup>27</sup>

Clearly we need better data. We hypothe-

sise that there may be 2 groups of patients with acute bronchitis, 'uncomplicated' (not benefiting from antibiotics) and 'complicated' (with poorer outcomes and benefiting from antibiotics). If we could identify subsets of patients from their symptoms, signs and investigations, our prescribing would be more rational and cost effective and GPs could be more certain whom to treat, and therefore who not to treat.

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