

## **A new look at respiratory illness in general practice**

**A reclassification of respiratory illness based on antibiotic prescribing**

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**T**HE recent growth of interest in the process of teaching in general practice (Marinker, 1971; *The Future General Practitioner—Learning and Teaching* (The Royal College of General Practitioners, 1972)), coupled with the increasing attention to the concept of general practice audit (McWhinney, 1972; Honigsbaum, 1972) has highlighted the need to establish criteria of correctness in clinical general practice.

Beard (1967) emphasised the teacher's duty to define '... the behaviour which the teaching is intended to lead to'. If such definitions of correct behaviour exist for general practice, not only should they represent the standard to be taught but also that against which competence of care should be judged. If correct behaviour has not been defined, this requires to be done.

The emphasis on developing the previously neglected behavioural sciences in relation to general practice has overshadowed the many areas of clinical activity where the absence of consensus of clinical action creates problems for general-practitioner teacher and student alike. Until recently the teacher has taught mainly from his personal experience, but increasing professionalism will require this experience to be balanced by a baseline constructed from pooled experience of other doctors, from results of relevant research, and from hospital teaching.

In the section on *Diseases of the Respiratory System*, the Royal College of General Practitioners (1972) states correctly, 'the decision whether or not to give an antibiotic is a daily problem' (page 78); it does not, however, suggest what should be taught nor where evidence might be found to allow identification and discussion of the areas of disagreement between hospital teaching and what is commonly practised outside hospital.

Recent work (Howie *et al.*, 1971) has confirmed the wide difference between general practitioners in their use of antibiotics for respiratory illness and has related the persistence of this to the unsatisfactory use of diagnostic labels in general practice (Howie, 1972). From retrospective studies it has already proved possible to define areas of agreement which have been used as a contribution to changing behaviour of trainees (Richardson and Howie, 1972).

Many clinical classifications of respiratory illness have been proposed and these and the problems of clinical classification are reviewed well by Bridges-Webb (1968). Most classifications incorporate an aetiological element (influenza; coryza) and an anatomical element ranging from the upper to the lower respiratory tract illness and recognising otitis media, sinusitis, tonsillitis and croup as special entities.

The classification problems caused by evolution of illnesses within such a classification or by illnesses being accurately described by more than one part of the classification at the same time have not been satisfactorily overcome. The classification of episodes of illness at their conclusion although statistically preferable does not help

RESPIRATORY ILLNESS IN GENERAL PRACTICE - PRESENTING SYMPTOMS AND SIGNS

Code number: \_\_\_\_\_

1. PATIENT COMPLAINTS		2. EXAMINATION		3. GENERAL	
	Tick <input type="checkbox"/> <input type="checkbox"/>	Tick if examined <input type="checkbox"/> <input type="checkbox"/>	Findings	Self-medication for this illness	
	Yes			No	Any other features influencing current treatment (e.g. asthmatic chronic bronchitic)
' The cold '					
' Flu '			Chest		
Vaguely unwell			Throat		
Loss of appetite			Glands		
Vomiting			Nose		
Diarrhoea			Sinuses		
Crying			Ears		
Headache					
Sore ears					
Sore throat					
Hoarseness					
Cough					
Night cough					
Spit					
Purulent spit					
Wheeze					
Chest pain					
Breathlessness					
Nasal symptoms					
Other (please specify)					
If symptom <i>not</i> mentioned by patient or by you —please leave blank.					
				4. TREATMENT	
				Nature of advice (Please specify drugs, e.g. penicillin/ 'Benylin' (but not dosage)	
				Bed rest	
				Stay off work/school	
				Steam inhalation	
				Nasal drops	
				Cough mixture	
				Antibiotic	
				Other treatment e.g. 'Aspirin,' paracetamol, etc.	
				Please state: Any laboratory tests or x-rays requested:	
				Febrile on clinical grounds Yes <input type="checkbox"/> No <input type="checkbox"/>	
				If temperature taken, please indicate reading: .....	
				Other signs (e.g. breathlessness):	
				5. SUMMARY	
				Age of patient: .....	
				Sex: .....	
				Seen: at home <input type="checkbox"/> In surgery <input type="checkbox"/> (Please tick)	
				Occupation (of parent, if child): .....	
				Date of consultation: .....	
				Diagnosis: .....	

Figure 1. Form used to collect information

discussion of acute management—the primary function of the clinician. The classification developed here deals with features of illness as they present to the general practitioner, and is constructed by reference to the principal treatment prescribed (in this case antibiotics), the hypothesis being that significant clusters of information may relate more closely to the treatment prescribed than to the diagnosis made (Howie, 1972).

After describing this classification, I examine the variability in doctor behaviour within its groupings, hoping to define areas of consensus, which may be used as standards for teaching, and areas of disagreement which indicate priorities for research.

### Method

Sixty-two experienced family doctors in the North-east of Scotland agreed to record positive or negative information volunteered by patients or elicited by themselves in the normal course of new consultations for respiratory illness on the form shown in figure 1. The period of study was November 1971 to April 1972 and doctors were asked to record for one week each month, continuing beyond that time if less than 20 forms had been completed but stopping sooner if 35 had been completed. Doctors were asked to include consecutive consultations (at home visits and surgery consultations) when time permitted but this was not a condition of the study.

I coded the information, a sample was checked for consistency, and the material was analysed by the Department of Social Medicine at the University of Aberdeen.

### Results

The 62 doctors contributed a total of 7,515 records, the number per doctor ranging from 43 to 190. Forty-nine doctors returned forms in all six months; 56 returned forms in five of the six months.

#### *Classification—stage 1*

The frequency with which antibiotics were prescribed for each symptom, sign and background feature shown in figure 1 was calculated. High frequency was associated with the presence of (1) purulent spit, (2) chest signs, (3) inflamed ear drums, (4) throat abnormality associated with a diagnosis such as tonsillitis or pharyngitis, and (5) a past history of respiratory illness.

A preliminary classification of material was thus obtained as shown in figure 2. A small number of patients diagnosed as having asthma or chronic bronchitis with no implication of current acute infection were classed separately, as were those with non-respiratory intercurrent illness (diabetes, ischaemic heart disease, malignant disease) and those in whom social or psychological features were stated to have influenced treatment.

#### *Classification—stage 2*

The 2,986 patients remaining were regarded as suffering from minor respiratory illness and for them each symptom and sign was again examined separately for treatment with antibiotics. The presence of throat abnormality was found to be the most likely feature to influence treatment and patients were thus again regrouped as 'throat normal' or 'throat abnormal'. The symptoms and signs of those patients with normal throats were analysed once more and the presence of sinus tenderness, hoarseness or fever were all noted to be associated with above average prescribing of antibiotics. This analysis resulted in the construction of figure 3.

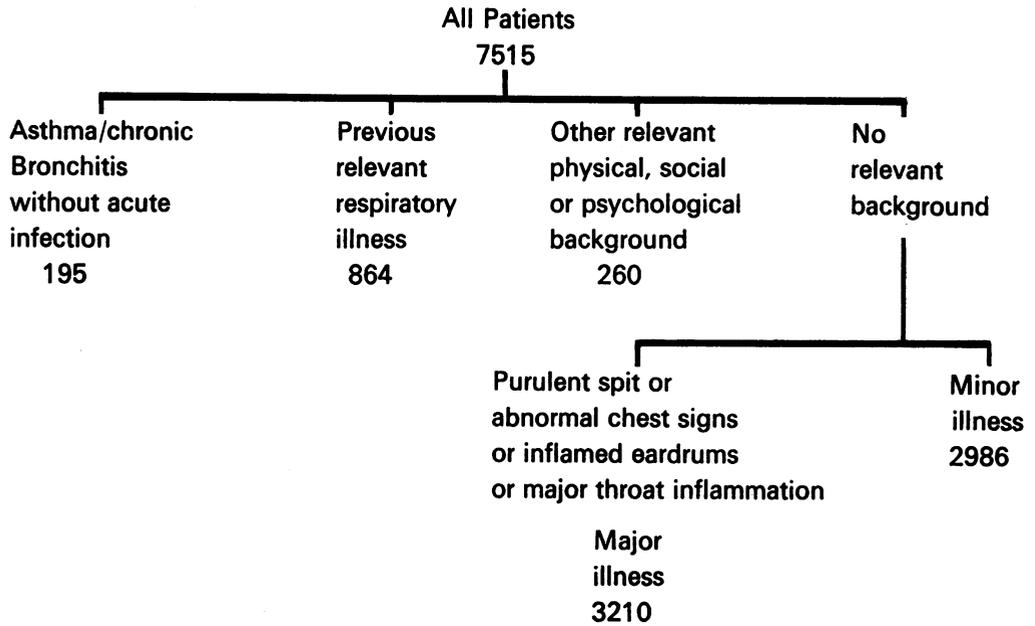


Figure 2  
First analysis of material

*Classification—stage 3*

The group described in figure 3 as 'no other features' was again examined for signs or symptoms influencing antibiotic prescription and no important contributing factors were identified.

A complete analysis of the material was then constructed (figure 4). Each group in the classification was allocated a letter from A to M.

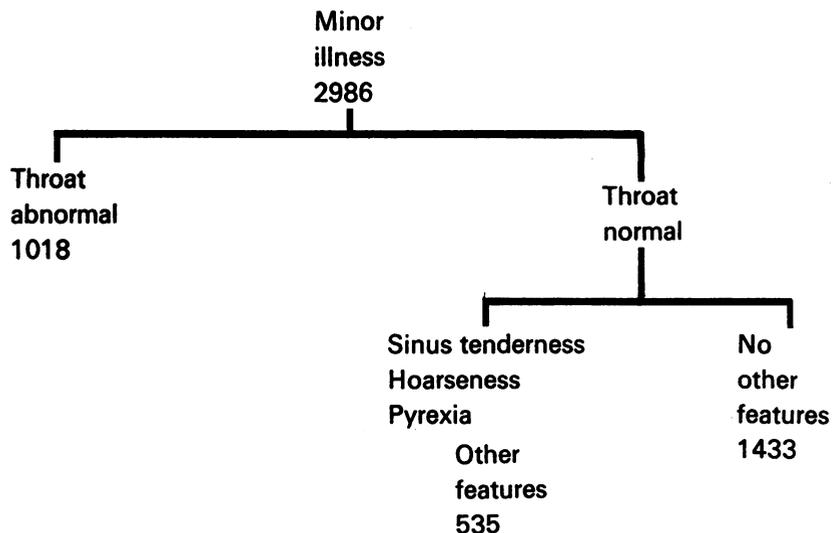


Figure 3  
Second analysis of material

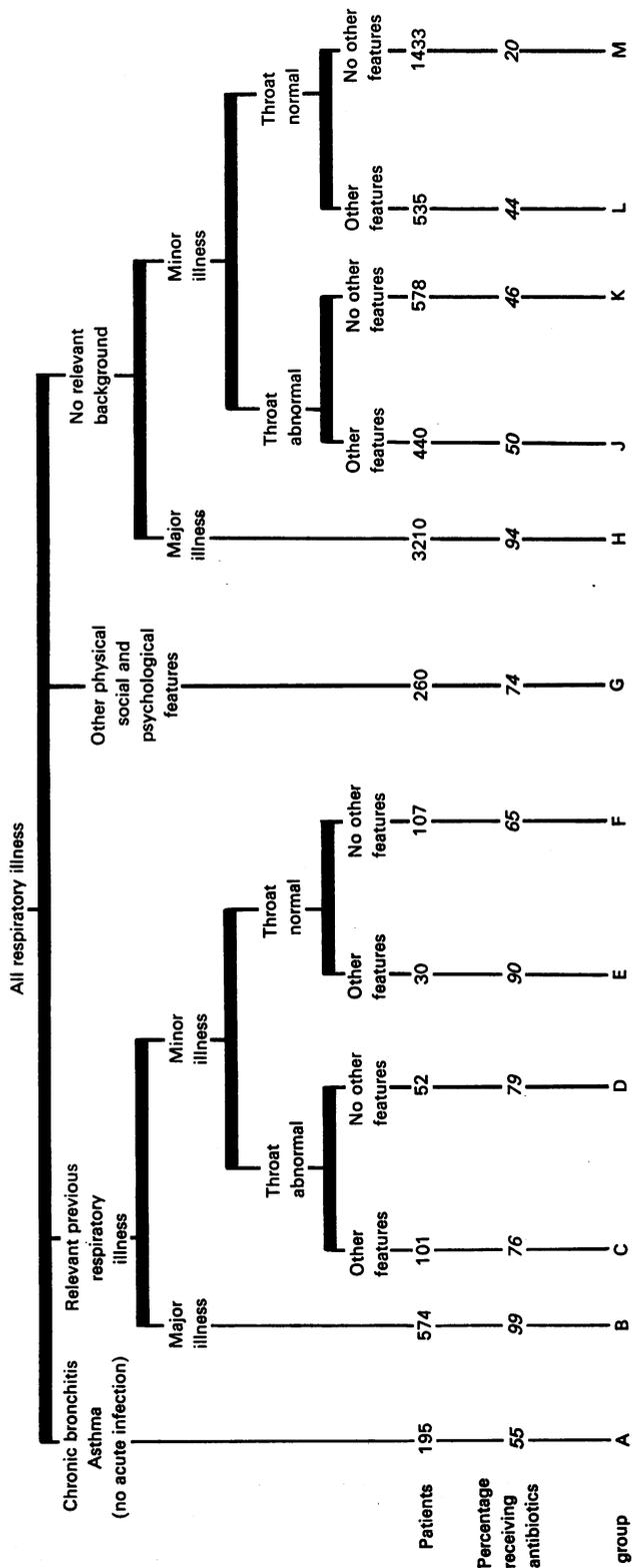


Figure 4  
Classification of material showing percentage of patients in each group receiving antibiotics

*Doctor variability*

Antibiotics were prescribed at 5,101 of the 7,515 consultations (68 per cent), the variation between doctors being from 33 per cent to 96 per cent. Forty-two of the 62 doctors had taken part in a previous study (Howie, Richardson, Durno and Gill, 1971) in which the prescribing of antibiotics for respiratory illnesses had been recorded. High consistency was found between antibiotic prescribing patterns for individual doctors the two studies (measure of association 0.597,  $P < 0.01$ ).

The overall percentages of antibiotics prescribed in the categories A to M is shown in figure 2.

(1) *Doctor variability in groups with 'previous respiratory illness' background (B to F).* Ninety-nine per cent of patients in group B received antibiotics and clearly all doctors prescribed antibiotics uniformly in this group. The number of patients in groups C, D, E and F were too small to identify small variations of doctor behaviour, but when the groups were combined it was seen that all doctors behaved similarly in management of those illnesses. When groups C, D, E and F were compared with patients differing only in respect of background history (J, K, L, M) the significance of past history in determining antibiotic treatment was re-affirmed ( $P$  for each comparison  $< 0.01$ ).

(2) *Doctor variability in groups with no relevant previous history but with major symptoms or signs (H) or with absence of any significant symptoms or signs (M).* The use of antibiotics in groups H and M was analysed by doctor and the patterns of prescribing are shown in figure 5.

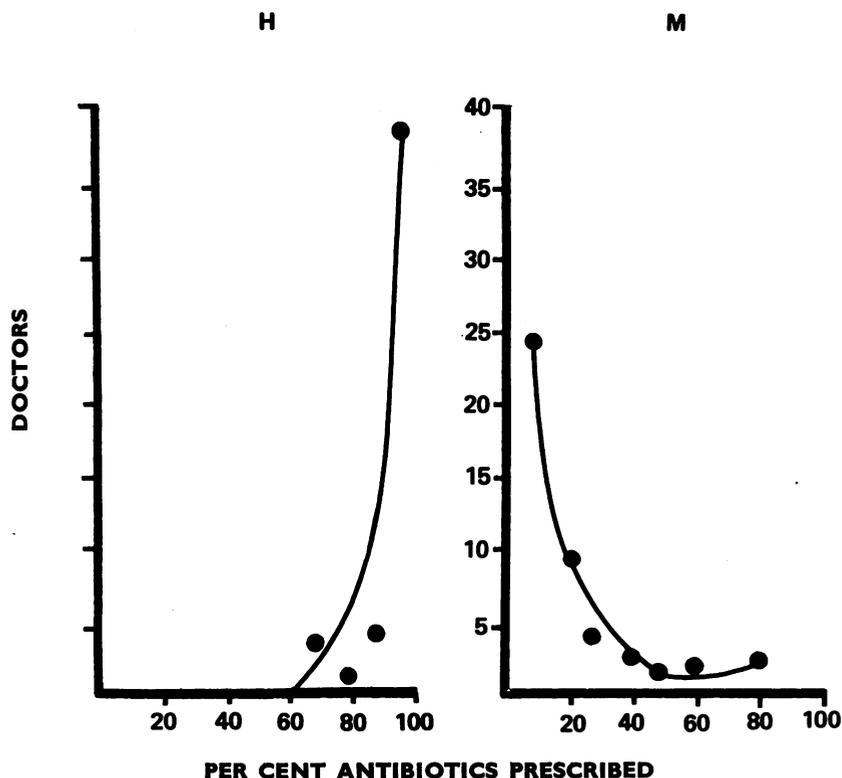


Figure 5  
Doctor variation in percentage use of antibiotics for patients in groups H and M  
(See text and Figure 2).

Strong majority opinions can be identified towards using antibiotics in the area of group H (3,210 patients) and against their use in group M (1,433 patients). All eight doctors prescribing antibiotics at under 90 per cent of patients in group H had experience of general practice in the pre-antibiotic era and study of those illnesses relating to the presence of abnormal chest signs or purulent spit seen by these eight doctors showed that their use of antibiotics for such illnesses was 157/224 (71 per cent), compared with 947/986 (94 per cent) for the rest of their colleagues. For all doctors the management of red ear-drums and major throat inflammation was almost invariably with antibiotics, generally of the penicillin group.

(3) *Doctor variability in groups with minor illnesses, including throat abnormalities or hoarseness or pyrexia or sinus tenderness (J, K, L).* When groups J, K and L were examined for doctor-variation, quite different patterns emerged. Figure 6 shows that in each a total lack of consensus exists, and that for this sizeable total of illness (1,553 of 7,515 or 20 per cent) treatment depended more on the doctor than on the nature of the illness.

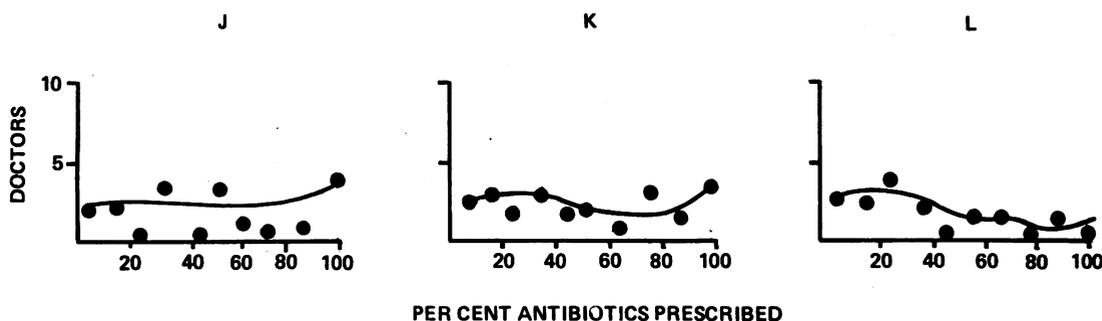


Figure 6

Doctor variation in percentage use of antibiotics for patients in groups J, K and L  
(See text and Figure 2).

#### *Comparison with analysis of treatment using diagnostic labels*

Using the classification described above, 5,507 of 7,515 (73 per cent) patients fall into a grouping for which a clear policy on antibiotic treatment can be identified. When the material was examined using the diagnostic labels given by the doctor, only 4,141 of 7,515 (55 per cent) patients were allocated to a diagnosis which was associated with the use or non-use of antibiotics in four fifths of patients so diagnosed.

Many of the diagnostic labels such as 'coryza', 'U.R.T.I.', 'influenza', 'tracheitis', for example, were found to describe patients in all or almost all of the groups from B to M. In these cases the management of patients related more closely to that of the group defined in figure 2 than to that of all patients assigned to these diagnoses. Table 1 shows this pattern.

#### **Discussion**

The study of respiratory illness in general practice involves recording information during the busiest part of the doctor's year. This study has been carried out, not on the assumption that all positive information would be recorded, but believing that the most important information would be most likely to be entered and that all the information recorded would be reliable.

The repetition of patterns of diagnosis and treatment comparable with those observed in earlier studies encourages the belief that the material is able to support this assumption. Discussion with many of the participating doctors and with students attached during periods of recording confirms this belief.

TABLE 1  
 PERCENTAGE OF PATIENTS DIAGNOSED AS HAVING 'CORYZA', 'INFLUENZA', 'U.R.T.I.', AND 'TRACHEITIS', AND WHO RECEIVED ANTIBIOTICS WHEN REGROUPED ACCORDING TO THE CLASSIFICATION SHOWN IN FIGURE 2

Classification (Fig. 4) Group by signs and symptoms	Diagnosis recorded by doctor			
	Coryza 842 patients (27)	Influenza 892 patients (35)	U.R.T.I. 674 patients (37)	Tracheitis 328 patients (65)
B (99)	92	88	90	
C (76)				
D (79)	92		73	
E (90)				
F (65)	81	90	61	
H (94)	69	73	79	85
J (50)	39	30	51	61
K (46)	27	32	39	73
L (44)	30	23	26	68
M (20)	12	15	13	41

Figures in parenthesis indicate percentage antibiotics prescribed for all patients so classified. No entry = <10 patients.

The method of classification used is open to criticism on one main subdivision, that being where throat abnormalities are divided into two groups, one being regarded as a major illness. Patients whose findings were described as 'tonsillitis' were initially separated from those others in whom a diagnosis was made which implied the throat was abnormal ('pharyngitis', 'strep. throat'), with a third group being recognised in which throat abnormality was described as part of an illness in which this finding was not consistently present (for example, 'coryza', 'influenza'). Further analysis of the second group ('pharyngitis') showed closer similarities in terms of presenting symptoms and treatment used to the 'tonsillitis' group than to the third group. It thus appeared reasonable to include the 'pharyngitis' patients in the same group as the 'tonsillitis' patients, the terms being in any case apparently used interchangeably by some doctors.

Classification on this basis allows identification of three clearly different patterns of management. The first is dependent on features related to the patient's background (1,319 of 7,515 patients, or 18 per cent) and reflects the emphasis placed by general practitioners on the importance of considering the patient's background. The second appears to have been influenced by the nature of the illness (4,643 of 7,515 patients (62 per cent) and allows clear identification of the areas of consensus, both towards and from the use of antibiotics. The potential of consensus teaching as an aid to general-practitioner education has already been referred to and further evidence is being gathered in support of this technique.

At the same time as identifying consensus patterns, note must be made of the possible correctness of minority points of view. Of particular interest is the lower use of antibiotics by more senior doctors in patients with chest signs and purulent sputum, and this is one area that requires further examination.

The third, and possibly most important, pattern identified is that where management is influenced not by any identifiable feature of the illness but by the choice of doctor attended. The three areas (J, K, L in figure 2) under this heading contribute 20 per cent of all patients studied (1,553 of 7,515 patients) and the clear identification of these three substantial areas of disagreement allows planning to be started for close prospective examination of the different points of view shown to exist in these areas.

The classification used, is, of course, crude (for example, no allowance is made for the baby who, although developing pneumonia, is afebrile and shows no physical signs) but its aims are to define problems rather than solve them.

All projects pose as many problems as they solve. The aim of this study has been, at least in part, to pose sharper problems, thus paving the way for better teaching and more effective research.

### Conclusions

A study of signs, symptoms and background features of 7,515 patients with respiratory tract illness seen by 62 doctors is described.

Agreement on clinical care has been shown, as follows:

- (1) Patients with chest signs (excluding asthma or chronic bronchitis in the non-infective phase) or purulent sputum will receive antibiotics (but see (8) below).
- (2) Patients with inflamed ear-drums will receive antibiotics (normally a penicillin).
- (3) Patients with severe throat inflammation, usually associated with the predominating symptom of sore throat, will receive antibiotics (normally a penicillin).
- (4) Patients in whom no background history affects prognosis, and in whom chest, ears, throat and sinuses are normal on physical examination, who appear afebrile and have neither hoarseness nor purulent spit will not receive antibiotics.
- (5) A background history of previous relevant respiratory illness (usually asthma or chronic bronchitis) may influence doctors to use antibiotics for treatment of an illness not normally requiring such treatment.

These conclusions could act as a basis for standard teaching until evidence is produced to suggest a contrary policy; they might also be used as a basis for internal audit.

Disagreement on clinical care appears to exist, as follows:

- (6) Patients with no relevant background history, without major illness as described in (1), (2) or (3) above, but with red throats irrespective of other symptoms or signs.
- (7) Patients similar to (6) above, but having normal throats who present with hoarseness, tender sinuses or pyrexia.
- (8) Older doctors use antibiotics less often than younger doctors for the management of illness with chest signs or purulent spit as the main presenting features.

These areas appear to require prospective research.

### Addendum

Another area of agreement identified during analysis of this project but not reported above includes:

- (9) Agreement that tetracycline should not be prescribed for children.

### Acknowledgements

It is a pleasure to acknowledge my gratitude to the 62 general practitioners who, during a winter which included an influenza epidemic, responded so magnificently and made the project possible. I am also grateful to Miss I. Dingwall-Fordyce for willing guidance on statistical matters, and to the staff of the Research and Intelligence Unit of the Department of Social Medicine, University of Aberdeen for help with the analysis. This work was financed by a research grant from Imperial Chemical Industries Limited, whose help through Mr I. C. Beale is also gratefully recorded.

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