

How often do general practitioners prescribe antibiotics for otitis media and the most common respiratory tract infections?

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ABSTRACT

Objective: To examine how frequently general practitioners actually prescribe antibiotics for patients contacting them for otitis media, and the most common respiratory tract infection diagnoses, – by the type of doctor-patient contact during prescribing, and patients' age and sex.

Design: Cross sectional, multipractice study.

Setting: GPs in the Norwegian county of Møre & Romsdal. Data were recorded during two months.

Material: 8610 physician-patient contacts, and 4909 antibiotic prescriptions for otitis media, upper respiratory tract infection, tonsillitis, sinusitis, acute bronchitis, and pneumonia.

Results: Antibiotics were issued during 57% of all contacts for the included diagnoses, ranging from 22% (upper respiratory tract infection) to 91% (tonsillitis). All patients who had first time office consultations for tonsillitis, acute bronchitis and pneumonia, were prescribed antibiotics. One out of three patients who consulted the doctor on the telephone for these diagnoses, were also prescribed an antibiotic.

Conclusion: Except for upper respiratory tract infection, antibiotic treatment is the rule not an exception, for all the diagnoses studied. In general practice, improved communication- and prescribing-skills are probably essentials for implementing a more evidence based treatment of otitis media, and the common respiratory tract infections. The significance of patient related factors for seeing a GP (or not) and for (not) expecting antibiotics for otitis media and the common respiratory tract infections should be explored in future research.

Key words: Antibiotics, general practice, diagnoses, respiratory tract infections, otitis media, pharmacoepidemiology

INTRODUCTION

Due to the world-wide increase in resistant bacteria, concerns have repeatedly been raised about the antibiotic (AB) overuse. In Scandinavia this especially applies to the general practice setting, because the vast majority (i.e. 85-90%) of all AB prescriptions here are issued by general practitioners (GPs).¹⁻²

Based on a general practice survey in a Norwegian county, we have previously reported GPs' prescribing patterns for ABs in relation to the GPs' diagnostic indications for prescribing.³ One of the findings was that more than half of all AB prescriptions were for respiratory tract infections, most of which generally have a viral origin (e.g. acute bronchitis).³ In that study, however, we did not take into account contacts for corresponding diagnoses where patients did *not* receive AB treatment. Furthermore, some of the diagnoses listed in that study were clustered, e.g. *ear infections* did both include otitis media and external otitis.³

In general, AB therapy should *not* be initiated without a positive answer to the following three key questions:⁴

- does this patient suffer from an infection?
- is the etiology of the infection most likely to be bacterial?
- is antibiotic treatment necessary?

It is unlikely that it is possible to make this assessment without seeing the patient. Nevertheless, in a study from Denmark, Mabeck⁵ reported that AB treatment was prescribed in almost one out of four cases based on telephone consultations with the GP. This applied in particular for sinusitis and acute bronchitis, less frequently for otitis and pneumonia.⁵

The aim of this study was to investigate how often GPs actually prescribe ABs to patients encountering for otitis media, and the most common respiratory tract infection diagnoses, – by the kind of doctor-patient contact during prescribing, and patients' age and sex.

METHODS AND MATERIALS

This article is based on data from a pharmacoepidemiological survey, the Møre & Romsdal Prescription Study (MRPS) conducted in general practice in the Norwegian county Møre & Romsdal.^{3,6-7} The design and methods for the MRPS are described in more detail elsewhere.^{3,6-7} Briefly, during the survey (November 1988 and November 1989), the GPs in the county recorded all contacts with patients (office consultations, house calls, telephone consultations with the GP, indirect contact via a third person), diagnosis for encounter and whether this was a first time or follow-up contact for the diagnosis, and drug prescription data including diagnostic indication for each drug issued. The GPs were asked to choose diagnoses from a list consisting of the most commonly used diagnoses according to the International Classification of Primary Care (ICPC), but with no request to use specific criteria for their diagnoses.⁸

In each practice, a nurse or a secretary was responsible for ensuring that all contacts, irrespective of prescribing or not, were recorded. The 12 pharmacies in the county kept a record every time a GP used his or her private prescription form instead of that designed for the study. This showed that private prescription forms were used in less than 0.5% of the cases.⁶

On January 1st 1989 the population of the county was 238 287 inhabitants of which 1514 were living in nursing homes.⁶ There were 156 GPs in the county and their age- and sex-distribution did not differ from the national averages.⁶ It has previously been shown that the proportion of patients consulting GPs outside the county is less than 3%.⁶

In November 1988, 149 (96%) of the GPs participated in the survey, and in November 1989, 153 (98%) GPs in the county participated. During the survey, drugs were altogether issued during 58% of the 90 458

recorded contacts.⁶ All contacts (n = 8610; 9.5% of all) for the following six diagnoses were included for analysis in the present study: upper respiratory tract infection (URTI), tonsillitis, sinusitis, acute bronchitis, pneumonia, and otitis media. Altogether, 4909 AB prescriptions (48.3% of all ABs issued) were for these infection diagnoses.

The data recorded during the two one month periods were pooled together and analysed as a cross sectional study.

RESULTS

All over, systemic antibiotics were prescribed during 57% of all contacts for the included diagnoses, ranging from 22% (URTI) to 91% (tonsillitis), *Table 1*. However, when first time office consultations for the diagnoses were analysed separately, this revealed that antibiotics in fact were prescribed during 68% of all consultations, ranging from 26 (URTI) to 100% (tonsillitis, acute bronchitis, and pneumonia), *Table 1*.

Antibiotics were also frequently issued during house calls for these diagnoses, – but, except for URTI and otitis media, less frequently than during first time office consultations for corresponding diagnoses, *Table 1*. Some of the house calls were, however, follow up visits. Patients with pneumonia and who did not receive antibiotics during a house call, had already started an antibiotic course in 28% of the cases, while another 28% of them were admitted to hospital for treatment there. For tonsillitis and acute bronchitis, the corresponding figures were 32 and 3, and 13 and 4 percents, respectively.

Telephone consultations made up 12% of all the contacts for the included diagnoses, and an AB prescription was issued during one third of the telephone consultations, *Table 1*.

Table 1. General practitioners' (GPs') antibiotic prescribing patterns for otitis media and the most common respiratory tract infections, by the numbers of different GP-patient contacts and the proportion of which antibiotics were issued (AB%) for the various diagnoses.

DIAGNOSES	Office consultations				House calls		Phone GP ^a		3rd person ^b		ALL CONTACTS	
	First time		Follow up		n=	AB%	n=	AB%	n=	AB%	n= ^c	AB% ^d
Otitis media	477	78	139	30	163	80	61	46	22	68	899	69
Sinusitis	470	94	120	68	71	80	180	59	92	66	959	81
Tonsillitis	489	100	96	55	177	93	72	67	41	90	922	91
Upper resp. tract infection	1 636	26	348	24	310	33	556	12	599	14	3 552	22
Acute bronchitis	827	100	285	60	193	92	133	53	111	63	1 615	86
Pneumonia	225	100	162	39	166	89	60	48	29	83	663	78
Total	4 124	68	1 150	43	1 080	72	1 062	33	894	32	8 610 ^c	57
Number of contacts with AB	2 795		493		778		350		290		4 909 ^d	

Percentages are rounded

^aTelephone consultation with the GP

^bIndirect contact via a third person, e.g. the practice nurse or the receptionist

^cIncluded here are 300 cases with incomplete data regarding kind of contact

^dIncluded here are 203 cases with incomplete data regarding kind of contact

Females made up 55% of all patients who received antibiotic treatment, but for otitis media 55% of the patients who got ABs were males, *Table 2*. Half of all AB prescriptions for otitis media were for children aged five years or less. Altogether, patients aged 0-9 years, and those aged forty years or more, each received about 30% of all AB prescriptions for the included diagnoses, *Table 2*.

DISCUSSION

The strength of this study is the high participation rate among the GPs in the county, and their high compliance in using the prescription forms. We do not have exact data on the GPs' compliance in recording contacts when drug treatment was *not* issued, which may represent a limitation of the validity. However, that drugs were prescribed during 58% of all contacts corresponds well with other studies and suggest that most contacts were actually recorded.⁶

The total AB sales (for human use) in Norway have increased by about 18% during the last twelve years, from 13.8 (1988) to 16.3 (2000) defined daily doses per 1000 inhabitants per day (the corresponding increase from 1976 to 1988 was 24%).⁹⁻¹⁰ These figures suggest that AB prescriptions probably are not issued less frequently in general practice today than, say, twelve years ago. Our data regarding AB prescribing are therefore probably still relevant for clinical practice today even if they were recorded about twelve years ago.

The GPs' decisions whether or not to prescribe an antibiotic is usually based on a quite low predictive value of the symptom-sign complex.^{4,12,14,19} The validity of the various diagnoses included in this survey may therefore be questioned because the diagnoses were not based on explicit diagnostic criteria. Furthermore, it may be tempting for a doctor to record a diagnosis that justifies the treatment given, e.g. tonsillitis instead of sore throat or pharyngitis. The tendency to choose a

particular treatment, and then a diagnosis that fits with the treatment given, instead of vice versa, has been documented by others.¹¹ Nevertheless, we believe that the diagnoses recorded during this survey are representative for diagnoses used by GPs during everyday practice.

The age- and sex distribution of the patients contacting GPs for the common respiratory tract infection included here, fits quite well with other Norwegian data from 1994/95.¹² The relatively small proportion made up by elderly patients consulting for respiratory tract infections (except for pneumonia), may partly be explained by the fact that frail and old people residing in long term care facilities (e.g. nursing homes) were not included in this survey.

This study confirms that AB treatment is the rule, not the exception, for the treatment of all respiratory tract infections. The only exception to this rule is the not very well defined diagnostic entity of URTI. This all over pattern correspond well with results from other surveys in Scandinavia^{1,13} and in the US.¹⁴

Even if a "wait and see" strategy is recommended for uncomplicated acute otitis media, AB treatment still seem to be the most common outcome. A quite recent Norwegian survey from an out-patient clinic (staffed by GPs) in Northern Norway revealed that ABs were given to more than nine of ten children who encountered for acute otitis media.¹⁵

It is indeed remarkable that practically all patients who went to a GP's surgery for the first time during an episode with acute bronchitis left the GP with an AB prescription. Corresponding, but less pronounced, patterns have also been reported in previous studies both from Norway¹⁶⁻¹⁷ and elsewhere.¹⁴ Our finding that "only" 94% of the patients consulting a GP for the first time for the diagnosis of sinusitis were given an AB, may to some extent be because we did not differentiate between acute and chronic sinusitis in this survey. Some of the encounters for "sinusitis" may therefore have been more long term symptoms related to the sinuses without acute infection.

Table 2. General practitioners' (GPs') antibiotic prescriptions (Rx AB) for otitis media and the most common respiratory tract infections, by patients' gender and age groups.

DIAGNOSES	Rx AB ^a n=	% Fe- males	Patients' age groups (years) %										Patients' age (years)		
			0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80+	Mean	SD ^b	Median	
Otitis media	618	45	68	16	5	5	3	2	1	1	<1	12	18.5	5	
Sinusitis	773	65	5	11	21	23	16	10	8	5	1	38	19.9	35	
Tonsillitis	839	54	37	28	15	11	3	2	2	1	<1	20	20.5	15	
URTI ^c	782	55	26	15	15	16	10	5	6	6	1	31	25.0	27	
Acute bronchitis	1381	55	28	12	8	12	10	8	11	8	3	34	26.9	32	
Pneumonia	516	58	23	12	6	11	8	8	10	13	9	41	29.6	39	
Total	4909	55	30	16	12	13	9	6	7	6	2	30	25.6	24	

^aAntibiotic prescriptions
^bStandard deviation
^cUpper Respiratory Tract Infection

This study was conducted before the rapid, diagnostic tests ("strep" and C-Reactive Protein tests) were commonly available in general practice. Steffensen *et al.*¹⁸ have shown that a high use of throat swabs (i.e. group A streptococci rapid test) was a strong negative predictor of high prescribing of ABs. On the other hand, Melbye *et al.*¹³ could not demonstrate significantly less AB use for lower respiratory tract infections in adults even if the rapid C-Reactive Protein test was *routinely* used. The uses of such rapid diagnostic tests may be performed by some other practice staff (e.g. practice nurse) than the GP and therefore without direct patient-doctor contact. However, AB prescriptions should not be based on the results from rapid diagnostic tests alone.⁴

That about one in eight AB prescriptions were issued during telephone consultations is about half of the figures reported by Mabeck in 1986, but in his study telephone consultations also made up a larger proportion of the encounters for these diagnoses.⁵ Nevertheless, the appropriateness of an AB prescription made based on only telephone consultation with the patient (or a parent) should indeed be questioned. However, we do not have access to the more detailed data needed to explore this prescribing practice further.

Due to the increased focus on antibiotic resistance one might hope that GPs of today prescribe ABs more appropriately for respiratory tract infections than they did, say, – twelve years ago. However, a recent US study has revealed that clinicians still prescribe ABs for almost all (98%) patients encountering for acute sinusitis, and for 80% of patients with acute bronchitis.¹⁴ Similar figures have also recently been reported from Norway.^{15,17} This practice contrasts with messages from many studies and from the Norwegian national therapeutic guidelines⁴ that ABs in most cases should be avoided for otitis media, sore throats, and acute bronchitis because of the viral etiology of a large majority of the cases with these diagnoses.

Unnecessary AB prescriptions create patient expectation and demand for AB during forthcoming illnesses.¹⁹ On the other hand, it has been shown that doctors often falsely exaggerate the significance of the patients' expectations for ABs even if the patients' expectations seldom are made explicit during the consultation.²⁰

Even if the national AB consumption in Norway is relatively low compared to elsewhere, this study substantiate that we probably still have a large potential for lowering the total human AB consumption in our population.

Methods to promote a more rational use of ABs based on evidence, could include among others: First, improved consulting strategies, e.g. the patient centred

clinical method²¹ that make patient expectations more explicit without damaging relationships may contribute to less AB use when combined with treatment guidelines based on scientific evidence. Second, prescribing feedback combined with educational input in groups of peers represent a particular fruitful continuing medical education which has been shown to improve the all over prescribing behaviour of the participants.²²⁻²³ In a recent Norwegian study, GPs on duty in an out of hours clinic in a town south of Norway, received an educational intervention targeted to reduce their AB treatment rate for acute bronchitis.¹⁷ The AB-prescription rate dropped from 86 to 71% of all contacts due to the modest intervention.¹⁷ A third option may be more use of "delayed" AB-prescriptions. That is, in cases of doubt where GPs nowadays probably prescribe AB to play safe, the patient may instead receive an AB prescription combined with an instruction to "wait and see". The prescription should only be redeemed if the condition deteriorates or does not improve within a given time. This prescribing strategy has recently been documented to reduce the antibiotic consumption significantly for otitis media.²⁴ Fourth, it is still a challenge to make doctors better able to establish the diagnosis of acute *viral* respiratory tract infection, which is an indication for *not* to prescribe an AB.²⁵

The favourable Norwegian situation regarding AB resistance has previously been ascribed to the sound prescribing habits of Norwegian GPs.²⁶ However, based on the prescribing patterns reported here, this may be questioned. Perhaps self care patterns and attitudes in the general population are underestimated in this context. A relatively high threshold for seeing a GP for minor respiratory tract infections and a widespread scepticism towards the uses of drugs in general, and ABs in particular, would both contribute to lower the AB consumption in the population. Among the Nordic countries, Norway and Denmark have the lowest human consumption of AB,²⁷ and the human AB use in Scandinavia is less than half of the use in southern Europe (Italy, Spain, Portugal).²⁸ The significance of patient related factors for seeing a GP (or not) and for (not) expecting antibiotics for otitis media and the common respiratory tract infections should be addressed in future research.

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CORRECTION

Straand J, Sandvik H. Home visits in general practice – most often for elderly patients: A report from the Møre & Romsdal Prescription Study. *Norwegian Journal of Epidemiology* 1998; **8** (2): 127-132.

Unfortunately, there is an error in Table 1 of this paper (page 129). In the headline for the columns showing patients' sex, the letters F (for females) and M (for males) have been displaced during the printing.

To put it right, the left column should be entitled "M" showing the distribution of diagnoses for males, whereas the next column should be entitled "F" and shows corresponding figures for female patients.