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# Management of Upper Respiratory Tract Infections in Dutch Family Practice

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**Background.** Family physicians vary in their management of upper respiratory tract infections (URTIs), especially regarding prescription of antimicrobial drugs and patient referral. This study was designed to provide insight into this variation in the management of URTI.

**Methods.** A secondary data analysis of a nationwide study of morbidity and interventions regarding the management of cases of acute otitis media, otitis media with effusion, acute upper respiratory tract infections (acute URTIs), sinusitis, and acute tonsillitis was performed. One hundred sixty-one Dutch family physicians and 335,000 patients were included in the study.

**Results.** About 10% of all first contacts in this study were house calls, which are most often made to patients in the youngest and oldest age categories. In one third of all first contacts, an antimicrobial drug was

prescribed, most frequently for sinusitis (72%) and acute tonsillitis (74%), much less frequently for otitis media and acute URTI. Doxycycline and amoxicillin were prescribed most frequently; two thirds of all antimicrobial prescriptions for the first contact were for one of these two drugs. In 1% of all first contacts and 6% of repeat contacts, patients with URTI were referred to a specialist.

**Conclusions.** Compared with physicians in other countries, Dutch family physicians show a relatively restrictive and selective prescription behavior in dealing with URTI. This may be why the Netherlands has one of the lowest reported levels of antibiotic resistance. House calls are still important in Dutch family practice.

**Key words.** Respiratory tract infections; antibiotics; house calls; family practice; otitis media; sinusitis; tonsillitis. (*J Fam Pract* 1994; 38:353-357)

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Family physicians vary in their management of frequently occurring complaints and diseases, such as upper respiratory tract infections (URTIs).<sup>1,2</sup> The prescription of antimicrobial drugs and referral to medical specialists are especially significant in the efficacy and efficiency of care, and both seriously affect patient and health care.<sup>3-7</sup> Two thirds of all antimicrobial drugs prescribed in general practice in the Netherlands concern the management of URTI, and all antimicrobial drugs together account for 9% of the total medication costs.<sup>1</sup>

The aim of this study was to obtain insight into

some aspects of the management of URTIs that occur most frequently. The study focused primarily on the prescriptive and referral behavior of Dutch family physicians according to type of encounter (eg, office visit or house call). The most frequently occurring URTIs are acute otitis media (AOM), otitis media with effusion (OME), acute URTI, sinusitis, and acute tonsillitis.

Research questions addressed by this study include the following:

1. How often do family physicians deal with cases of URTI over the telephone, in office visits, or during house calls?
2. How often are antimicrobial drugs prescribed for URTIs, in total and per diagnosis? Does the frequency correlate with type of contact and age?
3. What is the nature of antimicrobial agents prescribed by family physicians in cases of URTIs?

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Table 1. Sex, Age, and Practice Type of Participating Family Physicians as Compared with All Dutch Family Physicians on January 1, 1985

Variables	This Study, %	The Netherlands, %
Female	15	8
Age		
<35 years	32	9
35-39 years	30	27
40-44 years	12	23
≥45 years	26	41
Solo practice	32	56

- How often are patients referred to medical specialists during first visits, repeat visits, and visits for recurrences?

## Methods

### Study Population

The population studied for this secondary analysis was derived from data of the National Study of Illness and Procedures of the Netherlands Institute of Primary Health Care,<sup>8</sup> and included 161 family physicians with a patient population of 334,449. The family physicians were selected from three independent stratified random samples from all Dutch family physicians. Four hundred eight family physicians were asked by letter to participate. Stratification variables included region, urbanization level, and distance from practice to hospital. There was an overrepresentation of younger family physicians and female family physicians, and an underrepresentation of solo practices<sup>8</sup> (Table 1).

The family physicians were divided into four groups of 40 physicians each. Each group was involved in the study for 3 consecutive months during the period between April 1, 1987, and March 31, 1988. Although the research population is a nonproportional selection, the study is believed to give a fairly reliable impression of Dutch family physicians' practice with regard to the study topic.<sup>8</sup>

All contacts with patients were recorded in terms of the main complaints, differential diagnosis, diagnostic procedures, medication prescribed, and other treatment measures. Standard encounter forms were filled in by the physicians immediately after each patient encounter by office visit, house call, or telephone. The medical secretary used a standard form to record all telephone calls received and medication prescribed. The family physicians and their secretaries were trained to use the forms, which were regularly gathered and checked. The physi-

cians received feedback about the completeness and quality of their records.<sup>8</sup> Morbidity data were centrally coded in the format of the International Classification of Primary Care.<sup>9</sup> Mean percentage of agreement between coders was 85%.<sup>8</sup>

### Contact Registration

Contacts included office visits, contacts with medical receptionists, consultations by telephone, and house calls. The following data were used:

- Patient characteristics: age, sex.
- Encounter characteristics: type of encounter (telephone, house call, office visit); and nature of contact (first contact, repeat contact, contacts regarding recurrent infections). The analysis was carried out in cases of URTIs that occurred most frequently: AOM; OME; acute URTI; sinusitis; and acute tonsillitis.<sup>9</sup> Otitis media with effusion was included in the analysis as a major determinant for recurrent AOM.<sup>9-11</sup>
- Prescriptions and referrals: the medication was coded in the format of the Anatomical Therapeutic Chemical Classification.<sup>12</sup> The frequency of antimicrobial agents was expressed as a percentage of the total number of first contacts in which an antimicrobial agent was prescribed. The frequency of referrals was expressed as a percentage of first and repeat contacts, and contacts for recurrences for which patients were referred to a specialist.

The data were computerized and analyzed with the SSPS-X program; 95% confidence intervals (95% CI) were used.

## Results

The 161 family doctors who participated in this study recorded 386,000 contacts, encompassing 320,000 episodes of illness. There were about 23,800 contacts for URTI, of which 14,500 were first encounters, 7800 repeat contacts, and 1500 contacts for recurrences.

### Type of First Contacts

Seventy-eight percent of all first contacts for URTI were office visits, and only 12% were house calls (Table 2). Contacts by telephone were a minority. In general, these numbers apply to the separate diagnostic groups. A house call was made in 22% of all first contacts for acute tonsillitis cases, however, whereas a house call was made

Table 2. Type of First Contact, by Diagnosis

Disease Categories	Telephone, %	House Call, %	Office Visit, %	Other,* %	Total, n
Acute otitis media	3	13	69	15	1782
Otitis media with effusion	1	6	87	6	307
Acute upper respiratory tract infection	5	11	79	5	8239
Sinusitis	3	6	87	4	2473
Acute tonsillitis	3	22	69	7	1696
All first contacts, % (n)	4 (609)	12 (1676)	78 (11,326)	6 (886)	100 (14,497)

\*"Other" includes contacts not categorized as telephone, house call, or office visit.

in only 6% of cases of OME and sinusitis (Table 2). House calls were made most often in the youngest and oldest age categories: one fourth of the first contacts for infants (0 to 1 year) and about one third for the elderly ( $\geq 65$  years) ( $\chi^2 = 826.5$ ;  $df = 5$ ;  $P < .01$ ).

### Prescriptive Behavior

In 34% of all first contacts, an antimicrobial drug was prescribed. Antimicrobial drugs were most frequently prescribed for sinusitis (72%) and acute tonsillitis (74%) and much less frequently for otitis media and acute URTI. In general, these percentages apply to several types of encounters with the exception of house calls and telephone calls for cases of otitis media. The percentages of first contacts in which antimicrobial drugs were prescribed were relatively higher for house calls for AOM and OME, and the percentages of first contacts by telephone in which antimicrobial drugs were prescribed for AOM were relatively lower (Table 3).

For cases of acute URTI, an antimicrobial drug was more frequently prescribed for patients more advanced in

age ( $\geq 45$  years) ( $\chi^2 = 119.99$ ;  $P < .01$ ). In the oldest age categories, the percentage was more than double that of the youngest category (Table 4) for house calls and office visits but not for telephone consultations. For the remaining diagnoses, there was no link between age and the prescriptive behavior where choice of antimicrobial drugs was concerned.

### Antimicrobial Drugs Preferred

Two thirds of all antimicrobial agents prescribed at first contact were either doxycycline or amoxicillin, and more than 90% were covered by four different antibiotics. Newer drugs, such as cefaclor, were seldom prescribed. For AOM and OME, amoxicillin was prescribed in the majority of cases. Doxycycline or amoxicillin was prescribed for 66% of the cases of acute URTI, and doxycycline was the preferred treatment for sinusitis (63%). Penicillin was preferred in 64% of acute tonsillitis cases and amoxicillin in 26% (Table 5). Doxycycline and tetracycline were not prescribed for younger children (0 to 4 years).

Table 3. First Contacts in Which Antimicrobial Agents Were Prescribed, According to Type of Contact and Diagnosis

Type of First Contact	Diagnosis				
	Acute Otitis Media, %	Otitis Media with Effusion, %	Acute Upper Respiratory Tract Infection, %	Sinusitis, %	Acute Tonsillitis, %
Telephone (n = 130)	13	—	12	60	73
House call (n = 732)	44	29	23	78	78
Office visit (n = 3840)	25	9	17	72	73
Other* (n = 266)	22	16	13	72	72
All first contacts	27	10	17	72	74

\*"Other" includes contacts not categorized as telephone, house call, or office visit.

Table 4. First Contacts in Which Antimicrobial Agents Were Prescribed For Acute Upper Respiratory Tract Infections, by Type of Contact and Age

Type of First Contact	Age (y)*					Total (n = 8066),* %
	0-5, %	6-14, %	15-44, %	45-64, %	≥65, %	
Telephone	7	11	13	17	6	12
House call	15	19	25	36	32	23
Office visit	11	12	19	23	24	17
Other†	7	16	17	19	8	13
All first contacts	11	13	19	24	25	18

\*Age unknown for 173 patients.

†"Other" includes contacts not categorized as telephone, house call, or office visit.

## Referrals

In 3% of all contacts, patients were referred to otolaryngologists, including 1% of all first contacts and 6% of repeat contacts or contacts for recurrences. The highest referral percentages were for repeat contacts and contacts for recurrences of OME cases (31% and 26%, respectively) and contacts for recurrent tonsillitis (14%).

## Discussion

This study shows that house calls are important in Dutch family practice. A house call was made in 1 of 10 first contacts for all URTIs. In 1 of 3 URTI cases, an antimicrobial agent was prescribed at first contact. That relatively more antimicrobial agents were prescribed during house calls may indicate a selection for this type of contact based on severity of infection or may be related to patient expectation for an antibiotic when a house call is made.

House calls are an especially important part of family practice in the youngest and oldest age categories. It gives the family physician insight into lifestyle and illness behavior, factors that are important in the presentation and management of cases of URTI.<sup>2,13-16</sup> In European

countries, such as the United Kingdom and the Netherlands, the number of house calls has declined over the last few decades. In the northern region of the United Kingdom, the average number of house calls decreased from nine to five a day between 1969 and 1980.<sup>17</sup> This decline has been attributed to people having cars, the possibility of making an appointment, and the feeling of family physicians that some house calls were unnecessary.<sup>16,17</sup> In the United States and Canada, the decline of house calls has been even greater than in European countries.<sup>14</sup>

Our finding that antimicrobial drugs are most frequently prescribed for sinusitis and acute tonsillitis in the Netherlands concurs with the results of another Dutch study.<sup>1</sup> The relatively low percentage of prescriptions for AOM and the limited spectrum of agents (in 79% of prescriptions, amoxicillin is prescribed) are in accordance with Dutch national guidelines and the results of several studies.<sup>18-20</sup> In the guidelines of the Dutch College of Family Doctors for AOM, antibiotics are prescribed in cases with an abnormal course (3 days of earache or fever) and in high-risk groups (eg, young children with recurrences).

An international study showed that Holland has a prescription rate of 30% for antibiotics in case of AOM, which is relatively low compared with the 85% to 97% in

Table 5. The Nature of Antimicrobial Agents Prescribed in First Contacts by Diagnosis Expressed in Percentages of the Number of First Contacts in Which Antimicrobial Agents Were Prescribed

Antimicrobial Agent	Diagnosis					Total, % (n)
	Acute Otitis Media, %	Otitis Media with Effusion, %	Upper Respiratory Tract Infection, %	Sinusitis, %	Acute Tonsillitis, %	
Doxycycline	5	16	35	63	5	34 (1709)
Amoxicillin	79	59	34	22	26	32 (1605)
Penicillin	5	6	13	1	64	21 (1018)
Tetracycline	1	3	11	7	1	6 (266)
Sulfonamides	4	13	2	3	2	2 (119)
Other	6	3	5	5	2	4 (219)

Israel, the United Kingdom, and Australia.<sup>19</sup> In the United States, the prescription rate was 98%,<sup>18</sup> whereas data from the National Ambulatory Medical Care Survey (NAMCS) visits show a prescription percentage of 83% in all otitis media cases (NAMCS, data set, 1985, unpublished data). The spectrum of antimicrobial agents used in other countries is also wider. Amoxicillin is estimated to be prescribed in about 38% of the visits, followed by trimethoprim/sulfamethoxazole (10%), erythromycin/sulfisoxazole (10%), and cefaclor (9%) and topical polymyxin B/neomycin/hydrocortisone (9%) (NAMCS, data set, 1985, unpublished data).

The prescription rate of 70% in cases of acute tonsillitis is also relatively low compared with that of other countries. From an international study in 17 European countries, it appears that antibiotics were prescribed in about 90% of the cases of acute tonsillitis.<sup>21</sup>

In the Netherlands, bacteriological tests are rarely used (2% of all cases).<sup>21</sup> Dutch guidelines are to prescribe penicillin if the chance for  $\beta$ -hemolytic streptococci is more than 50%.<sup>22</sup>

It appears that house calls are still important in Dutch family practice. In cases of URTI, Dutch family physicians conduct a comparatively restrictive prescription behavior of limited amounts of antimicrobial agents for selected cases. In a large majority of cases, they diagnose and treat these infections themselves with limited referral. This may be the result of the selective "gatekeeper" function of the Dutch family physician.<sup>23</sup> This behavior and the limited spectrum of antimicrobial agents might be the reason that the Dutch level of resistance to antibiotics is one of the lowest in Europe.<sup>24,25</sup>

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