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ORIGINAL RESEARCH

The current burden of allergic rhinitis amongst primary care practitioners and its impact on patient management

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Abstract

Aims: To investigate the burden of allergic rhinitis (AR) amongst primary care practitioners (PCPs), the impact of AR on PCPs' professional lives, and the effect on their management of AR patients of PCPs' personal experience of AR.

Methods: An online questionnaire was completed by 1201 PCPs (50% AR sufferers) from eight countries.

Results: 21% of PCPs reported very well controlled symptoms and 66% quite good control. Six hours work per week, on average, was missed by PCPs whose AR symptoms resulted in absence. AR symptoms affected concentration, stress level, mood, time spent with patients, physical contact with patients, and patient throughput. PCPs with AR reported a significantly higher proportion of AR patients in their practice and gave a significantly higher ranking to specific treatment requests and emotional well-being, and gave a significantly lower ranking to preventing comorbidity development and providing a treatment most likely to result in high patient compliance.

Discussion: This is the first study demonstrating the impact of AR on PCPs showing association with lost productivity, absenteeism and reduction in professional performance. Personal experience of AR significantly influences PCPs' management of AR and may improve their AR diagnostic ability.

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The full version of this paper, with online Appendices A and B, is available online at www.thepcrj.org

Introduction

Allergic rhinitis (AR) is a common, symptomatic disorder induced by allergen exposure and subsequent IgE-mediated inflammation of the membranes lining the nose.[1] In 2001, the Allergic Rhinitis and its Impact on Asthma (ARIA) Workshop Group, in collaboration with the World Health Organisation (WHO), introduced a new classification which subdivided AR as either intermittent or persistent, and either mild or moderate-severe, depending on the duration, severity, and impact of symptoms on quality of life (see Table 1).[1]

Although many sufferers self-treat and seek medical help only when their symptoms become intolerable,[2] AR remains amongst the top ten reasons for visits to primary care clinics.[3] Updated management guidelines have recently been published by the International Primary Care Respiratory Group (IPCRG).[4] Several studies have examined the detrimental effects of AR on the working lives of sufferers amongst the general population,[5-9] but to date there has been no published research investigating the effects of AR symptoms on the professional lives of primary care physicians (PCPs) themselves.

Therefore, the aim of this study was to investigate whether suffering from AR has a negative impact on the professional lives and performance of PCPs, and to assess whether or not personal experience of AR influences their management of patients with the disease.

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Table 1. ARIA classification of allergic rhinitis[1]

Intermittent	Symptoms are present: • Less than 4 days a week • Or for less than 4 weeks
Persistent	Symptoms are present: • More than 4 days a week • And for more than 4 weeks
Mild	None of the following items are present • Sleep disturbance • Impairment of daily activities, leisure and/or sport • Impairment of school or work • Troublesome symptoms
Moderate-severe	One or more of the following items are present: • Sleep disturbance • Impairment of daily activities, leisure and/or sport • Impairment of school or work • Troublesome symptoms

Materials and methods

Design of the study

The questionnaire, which was quantitative and devised for online completion, was derived from existing and validated questionnaires,[10] with the addition of a number of novel questions covering demographic details, PCPs' personal experience of AR, self-treatment, impact of AR on their working lives, and their management of patients with AR. In order to test the viability and technical functionality of the electronic questionnaire, 10 pilot online interviews were conducted amongst PCPs who qualified according to the eligibility criteria for the main study as described below. Amendment of the initial questionnaire resulted in a final version (see Appendix A at www.thepcrj.org) which consisted of 21 closed questions. PCPs were advised that the questionnaire would take approximately 15 minutes to complete, that it would be available for completion for a period of four weeks, and that those who participated would receive a small cash payment for completing the questionnaire. The questionnaire was translated from English into five other languages (French, German, Italian, Portuguese and Spanish) but there was no allowance made for regional variations in English or French.

Recruitment and eligibility of PCPs

In order to ensure sufficiently high numbers of participants from eight countries, PCPs were recruited from a panel of healthcare professionals, of all specialties, who were prepared to take part in such studies. However, they were not pre-selected for health-related or other reasons. The panel was managed by an independent group specialising in healthcare recruitment. All PCPs on the panel received a personal invitation and were eligible for inclusion if at the time of participation they were aged 25-65 years, were qualified and currently practising, had been in practice for 2-30 years, and had not participated in research on allergies of any kind in the previous three months.

In order to be able to compare PCPs with and without AR, 50% of the total sample from each country had to be AR sufferers and 50% AR non-sufferers. AR status was self-diagnosed by the PCPs as part of the screening criteria according to a simplification of the ARIA guidelines, outlined in the questionnaire as:

- Intermittent AR: the presence of symptoms for ≤4 weeks per year
- Persistent AR: the presence of symptoms for ≥4 weeks per year.

Self diagnosis by PCPs of AR for the purposes of this study reflects normal clinical practice for such conditions.

The total sample was designed to include approximately 1200 PCPs recruited from eight countries (Australia, Brazil, Canada, France, Germany, Italy, Spain and the UK), which were chosen to enable trends to be identified and explored from a global representation of markets.

Statistical analysis

Data were entered into QPSMR software (Wallingford, UK) and tabulated for analysis. Statistical differences were assessed for means using t-testing of two independent sample means. This method was selected since use of the t-test is standard practice in market research when analysing rating scales. Although the data are not strictly of interval form and often not normally distributed, the t-test was considered robust enough to allow for this. For proportions, z-testing of two independent sample proportions was used. Statistical significance was recognised at the 5% level in all cases. For Question 11 of the questionnaire (impact of AR symptoms on ability to perform daily tasks), the following statistical method was used: PCPs rated only the symptoms they personally experienced for their impact on ability to perform daily tasks; as the number of symptoms varied for each individual, each symptom was allocated a new rank value on a comparable scale ranging from 1 to 3; finally, the impact of each symptom was determined from its prevalence in the top, middle or bottom third of individual rankings, with symptoms appearing more frequently in the top third than bottom third considered as being more impactful on the population as a whole.

Results

Demographics of the study population

Of the 2817 PCPs assessed for eligibility, 894 were unable or unwilling to complete the study. A further 343 PCPs did not meet the eligibility criteria. A final 379 PCPs were excluded

Table 2. Symptoms reported by PCPs with AR (when not taking medication)

Symptoms suffered	Percentage of PCP AR sufferers (n=600)
Sneezing	72%
Runny nose	66%
Blocked nose	59%
Itchy nose	58%
Itchy/red eyes	45%
Watery eyes	39%
Post nasal drip	33%
Itchy palate	29%
Cough	26%
Headache	23%
Snoring	22%
Sinus pressure	21%
Waking at night	19%
Sore throat	17%
Wheezing	15%

because the pre-specified populations with or without AR had been achieved by the time of their recruitment.

The total study population therefore consisted of 1201 PCPs from eight countries – Australia, Brazil, Canada, France, Germany, Italy, Spain and the UK – with 150 PCPs from each with the exception of Brazil where the online program closed when one extra PCP above the required 150 had completed the questionnaire. The mean age of the PCPs was 47 years, with 7% falling in the 25 to 34 years age range, 29% aged 35 to 44 years , 46% aged 45 to 54 years and 18% aged 55 to 65 years. Seventy-three per cent were male and 27% female. Of the 600 PCPs self-diagnosed with AR, 71% had intermittent AR and 25% had persistent AR. A total of 28 PCPs (16%) reported having both intermittent AR and persistent AR.

Perceived symptom control amongst PCPs with AR

Nasal symptoms such as sneezing and runny, blocked or itchy nose, were the most commonly reported by PCPs (see Table 2). Both nasal and ocular symptoms were reported by 55% (n=326) of the PCPs, 41% (n=248) had nasal symptoms only, and 1% (n=5) ocular symptoms only.

Oral antihistamines were the most frequently used treatment (66%), followed by intranasal glucocorticoids (44%), environmental control measures (29%) and intranasal decongestants (26%) (see Table 3). PCPs using oral antihistamines were significantly more likely to report that their AR symptoms were quite or very well controlled than quite or very poorly controlled (p=0.037). PCPs using environmental control measures or intranasal decongestants were significantly less likely to report that their symptoms were quite or very well controlled than quite or very poorly controlled (p=0.013 for environment control measures; p<0.0001 for intranasal decongestants). Overall, 21% of PCPs considered their symptoms to be very well controlled and 66% reported quite good control. No significant difference was demonstrated between PCPs with nasal and PCPs with ocular symptoms in the perceptions of the level of their symptom control. The results obtained for symptom control were very similar between countries.

Effects of AR symptoms on PCPs' professional lives

An average of six hours work missed per week was reported by the 27% of PCPs who said that their AR symptoms resulted in absence from work, late arrival or early departure. PCPs reporting very good symptom control were significantly more likely to report no time lost from work compared with those reporting very poor control (85% versus 50%; p=0.010). The results indicated that, compared to those who were not self-employed, self-employed PCPs were significantly less likely to miss work (p=0.022) and also missed significantly fewer hours of work a week (0.8 hours versus 1.8 hours; p=0.001) due to AR symptoms, although this was independent of the level of symptom control. Compared with

Table 3. Treatment use and symptom control reported by PCPs with AR

		Symptom control reported by PCPs			
Treatment type	All PCPs (n=600)	Very poorly controlled (n=8)	Quite poorly controlled (n=69)	Quite well controlled (n=371)	Very well controlled (n=116)
Oral antihistamines	66%	63%	59%	72%	69%
Intranasal glucocorticosteroids	44%	75%	43%	46%	49%
Environmental control	29%	63%	41%	32%	20%
Intranasal decongenstants	26%	63%	45%	27%	16%
Oral decongestants	19%	63%	25%	21%	12%
Intranasal H1-antihistamines	14%	25%	14%	16%	9%
Asthma treatments	13%	25%	19%	13%	13%
Intraocular antihistamine	12%	13%	13%	14%	9%
Oral glucocorticosteroids	8%	13%	6%	9%	8%
Intraocular chromone	6%	13%	9%	6%	4%
Immunotherapy (referral)	5%	25%	4%	4%	6%
None of the above	6%	N/A	N/A	N/A	N/A

Table 4. Effect of AR symptoms on the ability of PCPs to perform daily tasks)

	Percentage of PCPs reporting effect of AR on ability to perform daily tasks (n=600)			
Task	No effect	Limited effect	Moderate effect	Considerable effect
Concentration	32%	37%	23%	8%
Number of patients seen	59%	26%	12%	4%
Time with patient	50%	33%	14%	4%
Level of physical contact with patient	42%	36%	16%	6%
Stress	39%	31%	22%	9%
Mood	33%	39%	21%	7%

nasal symptoms alone, the presence of both ocular and nasal symptoms was also significantly associated with time missed from work (23% versus 31%; p=0.031).

Ability to perform daily tasks was affected most by runny or blocked nose and itchy red eyes. PCPs reported that their AR symptoms moderately or considerably affected their concentration (31%), stress level (31%), general mood when dealing with patients (28%), level of physical contact with patients (22%), time spent with each patient (18%), and the number of patients that they saw (16%) (see Table 4).

Influence of personal experience of AR on PCPs' management of patients with AR

The mean prevalence of AR patients in the PCPs' practice populations was 16.5% (two-thirds (64%) with intermittent AR and 34% with persistent AR), though there was a wide variation in the reported prevalence. PCPs with AR reported a slightly (but significantly) higher mean proportion of AR patients in their practice compared with those PCPs not suffering from AR (17.7% and 15.3% respectively; p=0.015). Results were broadly similar between countries although PCPs from Brazil did report a higher proportion of patients suffering from persistent AR (40%) compared to the other countries (30-35%).

Awareness of the full ARIA guidelines was not significantly affected by the PCPs' AR status or symptom type, with 41% being unaware of the guidelines and 29% stating that they preferred to treat patients' individual needs irrespective of the guidelines. PCPs from Australia (46.9%), Canada (44.7%), France (40.7%) and the UK (49.3%) were significantly more likely to be unaware of the ARIA guidelines when compared with the other countries. Only 3% of all PCPs followed the guidelines for all AR patients, with a further 27% basing their management on the ARIA guidelines but adapting them according to the individual patient. Younger PCPs were significantly more likely to be unaware of the guidelines (48% aged 25-44 years versus 37% aged 45-65 years; p=0.0002).

Table 5a. Importance to PCPs (with and without AR) of patient-relevant factors of AR treatment (a lower score indicates a higher level of importance). See Table 5b (Appendix B, available at www.thepcrj.org) for a detailed breakdown of the PCP responses to each of the eight patient-relevant factors.

	Importance to PCPs of patient-relevant factors		
Patient-relevant factors of treatment	Total (n=1201)	AR sufferer (n=600)	Non AR sufferer (n=601)
1. Improving patient quality of life	2.1	2.2	2.0
2. Providing a treatment most likely to result in high patient compliance	3.5	3.6	3.3
3. Preventing the onset of or development of comorbidities of AR	3.5	3.8	3.3
4. Patient emotional well-being	5.0	4.8	5.1
5. Providing affordable treatment for patients	5.2	5.2	5.1
6. Demands on patients from their professional lives	5.3	5.2	5.4
7. Demands on patients from their personal lives	5.5	5.5	5.6
8. Patient requests for specific treatment	5.9	5.8	6.1

The results of the questionnaire indicated that the relative importance given by PCPs to patient-relevant factors of AR treatment was similar between PCPs with and without AR; for example, improvement in their AR patients' overall quality of life was the most important patient-relevant factor to all physicians (see Table 5a). However, some significant differences were highlighted; compared to PCPs without AR, those with the disease gave a significantly higher ranking to patients' requests for a specific treatment (p=0.011) and emotional well-being (p=0.008), and gave a significantly lower ranking to preventing the onset or development of comorbidities (p<0.0001) and providing a treatment most likely to result in high patient compliance (p=0.005). Further data is given in Table 5b, available as Appendix B at www.thepcrj.org, which gives a detailed breakdown of the

Table 6. Importance to PCPs (with and without AR) of AR treatment attributes (the lower score indicates the higher level of importance).

	Importance to PCPs of treatment attributes		
Treatment attributes	Total (n=1201)	AR sufferer (n=600)	Non AR sufferer (n=601)
Reduction of symptom severity	2.6	2.7	2.6
Safety /side effects	3.5	3.6	3.5
Speed of onset of action	4.0	4.1	4.0
Experience of PCP with the treatment	4.7	4.6	4.7
Ease of administration	4.8	4.8	4.9
Duration of action	5.0	4.9	5.0
Guideline recommendation	6.0	6.0	6.0
Treatment cost to practice or state health service	7.0	6.8	7.1
Formulary recommendation	7.3	7.4	7.3

PCP responses to each of the eight patient-relevant factors assessed.

When considering treatment attributes the two groups were also similar. Safety and effectiveness were the most important treatment attributes for all PCPs. Specific differences were again identified. For example, PCPs with AR ranked treatment costs to their practice slightly (but significantly) higher than PCPs without AR (p=0.012) (see Table 6) although the cost of treatment did not rank highly when compared to some other treatment attributes for both PCPs suffering with AR and those without the disease.

When using monotherapy to treat mild AR, all PCPs were most likely to recommend or prescribe oral antihistamines as their first-choice treatment. PCPs without AR, however, were significantly more likely to recommend environmental control measures (53% versus 38% of PCPs with AR; p<0.0001), an intranasal antihistamine (29% versus 19%; p=0.0001), and an intranasal decongestant (28% versus 22%; p=0.010). There was no difference between PCPs with and without AR in their first choice monotherapy for severe AR, which was equally likely to be an oral antihistamine (54%) or an intranasal glucocorticoid (52%). Compared to PCPs with AR, PCPs without the disease were significantly more likely to recommend an intranasal glucocorticoid (55% versus 48%; p=0.009), an intranasal decongestant (23% versus 17%; p=0.003) and environmental control measures (33% versus 27%; p=0.001).

There was no difference between PCPs with and without AR in their choice of combination therapy for either mild or severe AR. Significantly fewer PCPs would prescribe or recommend combination therapy for mild AR than for moderate-severe AR (93% versus 99%; p<0.0001). PCPs using combination therapy for mild AR suggested over 300 different combinations, but the most frequent choice (by 15% of PCPs; n=177) was an oral antihistamine plus an intranasal glucocorticoid. PCPs chose over 450 different combinations for severe AR, but again the most frequent combination (recommended or prescribed by 9% of PCPs; n=112) was an oral antihistamine plus an intranasal glucocorticoid.

Discussion

Effects of AR on PCPs' working lives

This is the first study to examine the impact of AR on the lives of PCPs. It shows that AR is associated with lost productivity, work absenteeism and 'presenteeism' (being present at work, but not fully functioning), similar to AR sufferers in the general population.[5-9] Over one-quarter of PCPs with AR reported losing an average of six hours of work a week during a typical week of AR symptoms. Yet those who did not miss work also reported detrimental effects on their professional effectiveness during their contact with patients. The study indicates an association between AR symptoms, symptom control and lost productivity, and that effective control of AR symptoms significantly reduced the likelihood of absence from work. There was a significant association between self-employment status for PCPs and continuing presence at work, although this was not influenced by AR symptom severity. This reflects research in the general European population demonstrating relatively low rates of absenteeism among self-employed sole traders and small employers despite their higher rates of stress and fatigue compared to employed individuals.[11] Self-employment status was, however, less influential than AR symptom control, and so the burden of AR symptoms appears to be a more important contributor to absenteeism among PCPs in our study.

Influence of PCPs' personal experience of AR on their management of AR patients

This is the first study to show that personal experience of AR influences PCPs' management of patients with the disease. All PCPs aim to provide the most effective treatment for their patients, but those with AR assigned a higher ranking to patients' requests for a specific treatment and their emotional well-being. It was therefore surprising that, when choosing a specific treatment, PCPs with AR appeared to be more influenced than their colleagues without AR by costs to the practice or state health service. Although significant, the difference between the two groups was, however, small, and cost was a relatively minor consideration compared to the main influences of effectiveness and safety.

The results also suggest that personal experience of AR

may improve a PCP's ability to recognise the disease amongst their patients, since the AR patient population was slightly, but significantly, higher for PCPs with AR compared to those without AR. It remains unclear whether this was due to PCPs' greater awareness of the disease and superior diagnostic abilities, or because AR patients were more likely to consult them because they could provide better treatment. PCPs with AR were significantly less likely than PCPs without the disease to recommend an intranasal antihistamine, an intranasal decongestant or environmental control measures, possibly because of their personal experience of the lower effectiveness of these two classes of drug. Further explanations could be the cost implications of these therapies or that environment control measures can be complicated, time-consuming, costly, and not always practical to incorporate into everyday life.

In contrast, personal experience of AR did not influence PCPs' most frequent first choice of monotherapy or combination therapy in either mild or moderate-severe AR. Similarly, there is no indication that PCPs with AR are more likely to incorporate current evidence-based guidelines into their clinical practice when treating either themselves or their AR patients, with younger physicians being the least likely. Indeed, it is remarkable that PCPs with AR were less likely than PCPs without AR to recommend an intranasal glucocorticoid, the most effective treatment for moderate-severe AR.

Some PCPs may have been following the ARIA guidelines without being aware of the fact, since the guidelines' provisions have been included in national AR guidelines in some of the countries included in the study (UK, Canada, Italy, France and Germany). Furthermore, since the new ARIA classification is based on suspected pathophysiology rather than on clinical presentation (i.e. seasonal or perennial AR), PCPs may have difficulty in implementing the guidelines in their everyday practice in primary care. Previous studies have also demonstrated suboptimal management of AR patients in primary care[12,13] and PCPs' lack of awareness of, or adherence to, ARIA guidelines is confirmed in our study by their low ranking of guideline recommendations, their first line choice of treatment, and the hundreds of reported therapy combinations.

Limitations of the study

The mean AR prevalence of 16.5% reported in our study reflects findings in other primary care populations,[14] but our findings have limitations since our definitions of persistent AR and intermittent AR did not precisely reflect those of the ARIA guidelines.

The study population was drawn from a panel of healthcare professionals, with no special interest in AR, who were willing to be involved in research. This method (rather than approaching the general population of healthcare professionals) was employed in order to obtain the large study population required by the study and to provide the wide geographical spread of countries.

The balance between persistent AR and intermittent AR in our study is equivalent to that in the general population,[1,15] but the preponderance of male PCPs (73% versus 27% female) does not reflect the epidemiology of AR, and is greater than the mean of 62% amongst PCPs in the countries included in the study (data unavailable in Brazil).[16] In the general population, women are absent from work more often than men in similar employment,[17] but since gender was not included in the eligibility criteria for our study it is not possible to conclude that gender imbalance led us to underestimate AR-related absenteeism among the PCPs in our study.

Furthermore, some subsets of the total large study population – for example AR sufferers whose symptoms were poorly controlled – were very small, resulting in a low sample base for that group of PCPs.

Recommendations

By selecting eight countries, the current study has been able to focus on global findings. Future analysis of our study data will focus on a comparison of the influence of persistent AR and intermittent AR, and, whilst the majority of data are consistent between countries, we plan to undertake a detailed analysis of international differences, including the influence of healthcare systems, reimbursement arrangements, and referral practices. In order to enable more detailed investigation of the influence of AR on PCPs' professional lives and their management of AR patients, other investigators should ensure that definitions of persistent AR and intermittent AR precisely reflect ARIA criteria

Discussion summary

This is the first study demonstrating the impact of AR on PCPs showing association with lost productivity, absenteeism and reduction in professional performance. Personal experience of AR significantly influences PCPs' management of AR and may improve their AR diagnostic ability. All PCPs aim to provide the most effective treatment, but those with AR assigned a higher ranking to patients' requests for a specific treatment and their emotional well-being. Personal experience of AR did not influence PCPs' most frequent first choice of monotherapy or combination therapy. Possible limitations of this study were that the definitions of persistent and intermittent AR did not precisely reflect those of the ARIA guidelines, and also that the study population was drawn from a panel of health care professionals willing to be involved in research rather than from the general population of PCPs.

and that their study design enables measurement of the severity of AR symptoms. Qualitative research is also needed to resolve important questions highlighted by our study, including the reasons for PCPs' choice of treatment, the influence of personal experience of AR symptoms on their management of their patients with AR, and their attitudes to the use of evidence-based guidelines when managing their own and their patients' AR.

Our study confirms that suboptimal treatment remains common in primary care, whether PCPs are managing their own or their patients' symptoms. Moreover, an unknown proportion of intermittent and persistent AR patients treat themselves with OTC medications. Management of AR by PCPs can be improved in clinical trials by adoption of the structured approach inherent in guidelines,[18] but studies are needed to assess the long-term outcome and feasibility of these interventions in everyday clinical practice.

Conflicts of interest

None.

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Appendix A. Primary Care Physicians' Study Online Questionnaire

All PCPs answered questions 1-8 and 16-21, while questions 10-15 were answered only by PCPs with AR.

Section 1: Respondent profile (all respondents)

1. Which, if any, of the following areas have you participated in any market research on within the past 3 months?

☐ Asthma ☐ Acid-peptic disorders and treatments ☐ Diabetes
☐ Allergies ☐ Emollients and antipruritics ☐ Oncology

2. Are you male / female? _____

3. What is your age? _____

4. How many years have you been practising as a primary care practitioner? _____

5. What is your current working status? Please check as many boxes as are applicable to you

☐ Full-time ☐ Part-time ☐ Retired ☐ Self-employed ☐ Other

6. How many hours do you normally work in a week? _____

7. How many other primary care practitioners are there in the practice in which you work? _____

8. Approximately, how many patients do you have on your personal list? _____

Section 2: PCP AR sufferers (all respondents)

9. We would now like to ask you about your own experience of any of the following symptoms.
☐ Which, if any, of the following do you suffer from?
☐ Intermittent allergic rhinitis (IAR)
☐ Persistent allergic rhinitis (PAR)
☐ Both IAR and PAR
☐ None of the above

10. Thinking about allergic rhinitis (AR), which, if any, of the following do you suffer from when not taking AR medication?

☐ Cough ☐ Sore throat ☐ Headach ☐ Sinus pressure ☐ Itchy / red eyes
☐ Watery eyes ☐ Itchy palate ☐ Blocked nose ☐ Itchy nose ☐ Wheezing
☐ Post nasal drip ☐ Runny nose ☐ Sneezing ☐ Snoring as a result of any of the above ☐ Waking up in the night as a result of any of the above

11. For each of the symptoms you've mentioned, please rank this in order of the degree of impact they have on your ability to perform your daily tasks, where 1 means this symptom has the most impact.

☐ Cough ☐ Sore throat ☐ Headach ☐ Sinus pressure ☐ Itchy / red eyes
☐ Watery eyes ☐ Itchy palate ☐ Blocked nose ☐ Itchy nose ☐ Wheezing
☐ Post nasal drip ☐ Runny nose ☐ Sneezing ☐ Snoring ☐ Waking up in the night

12. Which, if any, of the following do you use to treat these symptoms that you experience?

☐ Oral antihistamine ☐ Oral decongestant ☐ Oral glucocorticosteroid
☐ Intranasal H1-antihistamine ☐ Intranasal decongestant ☐ Intranasal glucocorticosteroid
☐ Intraocular antihistamine ☐ Intraocular chromone ☐ Treatment for asthma
☐ Referral for diagnostics/ possible immunotherapy
☐ Environmental control measures e.g. lifestyle changes

Continued ...

Appendix A. Primary Care Physicians' Study Online Questionnaire

13. How well do you feel your symptoms are controlled with this medication?

- ☐ Not at all well controlled
- ☐ Not very well controlled
- ☐ Quite well controlled
- ☐ Very well controlled

Section 3: Impact on work for PCP AR sufferers (AR sufferers only)

14. For this next question, please think about a week when you typically encounter the symptoms you have described experiencing yourself.
During this week, how many hours did you miss from work because of these problems typically associated with these symptoms? Please include hours you missed on sick days, times you went in late, left early etc. because of these symptoms.

Hours missed in a week because of these typical symptoms _____

15.a-f To what extent do these symptoms affect you in the following ways?

	My symptoms affect me considerably	My symptoms affect me moderately	My symptoms affect me to a limited extent	My symptoms do not affect me at all
15a My concentration at work				
15b The number of patients I see				
15c The time I spend with each patient				
15d My level of physical patient contact (e.g. touching, handling)				
15e My stress level at work				
15f My general mood when dealing with patients				

Section 4: Impact on patient management (all respondents)

16a. Of all your patients, approximately what percentage has any form of allergic rhinitis?

16b. And of all your patients with allergic rhinitis, what percentage has intermittent allergic rhinitis (IAR) and what percentage of patients have persistent allergic rhinitis (PAR)?
Percentage of patients with intermittent allergic rhinitis (IAR) _____
Percentage of patients with persistent allergic rhinitis (PAR) _____

17. To what extent do you follow the ARIA-guidelines in the treatment of allergic rhinitis?

- ☐ I follow them for all AR patients
- ☐ I base the management my AR patients on these guidelines and I adapt according to the individual situation
- ☐ I prefer not to treat patients' individual needs irrespective of the ARIA-guidelines
- ☐ I am not aware of the ARIA-guidelines

Continued ...

Appendix A. Primary Care Physicians' Study Online Questionnaire

18. Please rank the following factors in order of importance to you, where 1 is the most important to you and 8 is the least important to you

- ☐ Improving patients' overall quality of life
- ☐ Preventing the onset or development of comorbidities of allergic rhinitis (AR) e.g. asthma
- ☐ Providing a treatment that is most l likely to result in high patient compliance
- ☐ Patient requests for specific treatment
- ☐ Providing affordable treatments for patients
- ☐ Demand on patients' personal lives e.g. family commitments
- ☐ Demands on patients' professional lives
- ☐ Patients' emotional well-being

19a. Which of the following treatments, if any, would you prescribe or recommend as a monotherapy for a patient with mild AR?
Please indicate any treatments you would prescribe or recommend as stand alone treatment for mild AR.

- ☐ Environmental control measures e.g. lifestyle changes
- ☐ Oral decongestant
- ☐ Intranasal H1-antihistamine
- ☐ Intranasal glucocorticosteroid
- ☐ Intraocular chromone
- ☐ Intramuscular corticosteroid treatment
- ☐ Intraocular steroid
- ☐ Oral antihistamine
- ☐ Oral glucocorticosteroid
- ☐ Intranasal decongestant
- ☐ Intraocular antihistamine
- ☐ (Referral for) immunotherapy
- ☐ Intraocular decongestant
- ☐ I would not recommend any stand-alone treatment for a patient with mild AR
- ☐ I would not recommend any treatment for a patient with mild AR

19b. Which of the following treatments, if any, would you prescribe or recommend as a combination therapy for a patient with mild AR?
Please indicate which 2 or more treatments that you would typically prescribe or recommend in combination for a patient with mild AR.

- ☐ Environmental control measures e.g. lifestyle changes
- ☐ Oral decongestant
- ☐ Intranasal H1-antihistamine
- ☐ Intranasal glucocorticosteroid
- ☐ Intraocular chromone
- ☐ Intramuscular corticosteroid treatment
- ☐ Intraocular steroid
- ☐ Oral antihistamine
- ☐ Oral glucocorticosteroid
- ☐ Intranasal decongestant
- ☐ Intraocular antihistamine
- ☐ (Referral for) immunotherapy
- ☐ Intraocular decongestant
- ☐ I would not recommend any combination treatment for a patient with mild AR

20a. Which of the following treatments, if any, would you prescribe or recommend as a monotherapy for a patient with moderate to severe AR?
Please indicate any treatments you would prescribe or recommend as stand alone treatment for moderate to severe AR.

- ☐ Environmental control measures e.g. lifestyle changes
- ☐ Oral decongestant
- ☐ Intranasal H1-antihistamine
- ☐ Intranasal glucocorticosteroid
- ☐ Intraocular chromone
- ☐ Oral antihistamine
- ☐ Oral glucocorticosteroid
- ☐ Intranasal decongestant
- ☐ Intraocular antihistamine
- ☐ (Referral for) immunotherapy

Continued ...

Appendix A. Primary Care Physicians' Study Online Questionnaire

- ☐ Intramuscular corticosteroid treatment
- ☐ Intraocular decongestant
- ☐ Intraocular steroid
- ☐ I would not recommend any stand-alone treatment for a patient with moderate to severe AR
- ☐ I would not recommend any treatment for a patient with moderate to severe AR

20b Which of the following treatments, if any, would you prescribe or recommend as a combination therapy for a patient moderate to severe AR?
Please indicate which 2 or more treatments that you would typically prescribe or recommend in combination for a patient with moderate to severe AR.

- ☐ Environmental control measures e.g. lifestyle changes
- ☐ Oral decongestant
- ☐ Intranasal H1-antihistamine
- ☐ Intranasal glucocorticosteroid
- ☐ Intraocular chromone
- ☐ Intramuscular corticosteroid treatment
- ☐ Intraocular steroid
- ☐ Oral antihistamine
- ☐ Oral glucocorticosteroid
- ☐ Intranasal decongestant
- ☐ Intraocular antihistamine
- ☐ (Referral for) immunotherapy
- ☐ Intraocular decongestant
- ☐ I would not recommend any combination treatment for a patient with moderate to severe AR

21. Please rank the following treatment attributes in order of importance to you when considering treatment options for patients suffering from allergic rhinitis.
1 means this treatment attribute is most important to you and 9 means this treatment attribute is least important to you.

- ☐ Reduction of symptom severity
- ☐ Duration of action
- ☐ Speed of onset of action
- ☐ Safety / side effects
- ☐ Ease of administration
- ☐ Treatment cost to your practice or state health service
- ☐ Your experience with the treatment
- ☐ Guideline recommendation
- ☐ Formulary recommendation

Appendix B Figure 5b. Detailed PCP responses to the eight patient-relevant factors shown in Table 5a.

All PCPs answered questions 1-8 and 16-21, while questions 10-15 were answered only by PCPs with AR.

1. Improving patient quality of life	
Most important to you (1.0)	18%
2 (2.0)	23%
3 (3.0)	17%
4 (4.0)	12%
5 (5.0)	10%
6 (6.0)	9%
7 (7.0)	6%
Least important to you (8.0)	6%

2. Providing a treatment most likely to result in high patient compliance	
Most important to you (1.0)	11%
2 (2.0)	24%
3 (3.0)	25%
4 (4.0)	14%
5 (5.0)	8%
6 (6.0)	7%
7 (7.0)	6%
Least important to you (8.0)	3%

3. Preventing the onset of or development of comorbidities of AR	
Most important to you (1.0)	18%
2 (2.0)	23%
3 (3.0)	17%
4 (4.0)	12%
5 (5.0)	10%
6 (6.0)	9%
7 (7.0)	6%
Least important to you (8.0)	6%

4. Patient emotional well-being	
Most important to you (1.0)	3%
2 (2.0)	11%
3 (3.0)	12%
4 (4.0)	14%
5 (5.0)	18%
6 (6.0)	17%
7 (7.0)	14%
Least important to you (8.0)	11%

5. Providing affordable treatment for patients	
Most important to you (1.0)	4%
2 (2.0)	9%
3 (3.0)	12%
4 (4.0)	15%
5 (5.0)	14%
6 (6.0)	11%
7 (7.0)	15%
Least important to you (8.0)	19%

6. Demands on patients from their professional lives	
Most important to you (1.0)	2%
2 (2.0)	5%
3 (3.0)	11%
4 (4.0)	16%
5 (5.0)	16%
6 (6.0)	20%
7 (7.0)	18%
Least important to you (8.0)	12%

7. Demands on patients from their personal lives	
Most important to you (1.0)	2%
2 (2.0)	5%
3 (3.0)	7%
4 (4.0)	13%
5 (5.0)	17%
6 (6.0)	21%
7 (7.0)	21%
Least important to you (8.0)	13%

8. Patient requests for specific treatment	
Most important to you (1.0)	3%
2 (2.0)	5%
3 (3.0)	7%
4 (4.0)	9%
5 (5.0)	13%
6 (6.0)	12%
7 (7.0)	18%
Least important to you (8.0)	33%
Mean score :	5.9