ORIGINAL CONTRIBUTION

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The ARIA guidelines in specialist practice: a nationwide survey*

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SUMMARY

Problem: *In 2001, the ARIA guidelines were published to assist healthcare practitioners in managing allergic rhinitis (AR) according to the best evidence. Very limited information, however, is available on the impact of these guidelines on clinical practice.*

Methods: *All Belgian Otorhinolaryngologists were invited to complete a questionnaire, covering demographic and professional characteristics, knowledge, use and perception of the ARIA guidelines and 4 clinical case scenarios of AR.*

Results: *Of the 258 (44%) Belgian Otorhinolaryngologists who participated, almost 90% had ever heard about ARIA and 64% had followed a lecture specifically dedicated to the ARIA guidelines. Furthermore, 62% stated to always or mostly follow the ARIA treatment algorithms in the daily management of AR patients. In the clinical case section, adherence to the ARIA guidelines raised with increased self-reported knowledge and use of the ARIA guidelines and among participants that considered the guidelines more userfriendly. Of the respondents, 51% were considered as good compliers. Younger age was a significant predictor for good compliance.*

Conclusion: *More efforts are required to improve the translation of scientific knowledge into clinical practice and to further identify which factors may influence guideline compliance.*

Key words: allergic, guidelines, guideline adherence, rhinitis

INTRODUCTION

Allergic rhinitis (AR) affects one into four people worldwide, causes significant impairment of the personal, social and professional life and has substantial economic consequences [1,2]. Despite the wealth of information available on the pathophysiology, diagnosis and treatment of AR, this disease remains too often unrecognized, underestimated and inadequately treated [3,4].

Over the last decades, clinical practice guidelines have gained a lot of interest as a support to synthesize clinical information, to assist health care providers in the management of their patients and to improve the quality of health care.

Several national and international guidelines, specifically dedicated to AR have been designed [5-8], but it wasn't until 2001 that the first evidence-based guidelines for AR, the ARIA guidelines (Allergic Rhinitis and its Impact on Asthma) guidelines, were published [9]. The ARIA guidelines were developed in collaboration with the World Health Organization (WHO) and provide general practitioners (GPs) and specialists dealing with AR patients with stepwise, evidence-based treatment algorithms, based on a new classification of AR in terms of the duration and severity of disease.

It has previously been demonstrated that following guidelines has favourable effects on health care and patient outcomes. Recently, implementation of the GINA guidelines in childhood asthma showed to reduce daytime and nighttime symptoms, activity limitations and drug use and to improve quality of life in patients and their families [10]. The only guidelines for AR that have been assessed for their effects on health outcomes are those from the International Rhinitis Management Group [5]. Application of these guidelines demonstrated to be significantly better than treatment according to the GPs' free choice, as reflected by reduced symptom scores and increased quality of life, patient compliance and satisfaction [11]. In these validation studies, however, health care providers were explicitly asked to follow the guideline recommendations, whereas, in real life, availability of guidelines does not ensure their use, and the impact of guidelines on daily practice patterns remains uncertain.

The translation of scientific knowledge into clinical practice and physician's adherence to guidelines is often complicated by structural, cultural, socio-economic and behavioural barriers [12-14]. Physicians' knowledge of, attitude towards and compliance with clinical guidelines should therefore be evaluated as an intermediate step, before measuring effectiveness of clinical practice guidelines, based on patient outcomes.

As specialists of the upper respiratory tract, Otorhinolaryngologists play a key role in the management of AR and its several associated conditions in the upper airways, including rhinosinusitis, nasal polyps, adenoid hypertrophy, tubal dysfunction,

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otitis media with effusion and laryngitis [15]. Furthermore, they are often considered as a point of referral when rhinitis management in primary care practice remains unsatisfactory.

We conducted a survey 1) to assess treatment practices of AR in specialist practice, 2) to assess the knowledge and use of the ARIA guidelines among Belgian Otorhinolaryngologists, and 3) to gain information on physicians' characteristics that may influence compliance with the guideline recommendations.

MATERIALS AND METHODS

Questionnaire development and data collection

We designed a questionnaire in multiple response format that covered following items:

- Demographic and professional details;
- Dissemination of the ARIA guidelines;
- User-friendliness of the ARIA guidelines;
- Self-reported knowledge of the ARIA classification and ARIA treatment recommendations, assessed with a four-point Likert scale (1: not at all familiar, 2: a little familiar, 3: somewhat familiar, 4: very familiar);
- Test question on the ARIA classification to detect potential bias in self-reported knowledge ('According to ARIA allergic rhinitis is classified into: 1: seasonal or perennial, 2: acute, chronic or recurrent 3: intermittent or persistent, 4: periodic or non-periodic);
- Self-reported use of the ARIA classification and ARIA treatment recommendations, assessed with a four-point Likert scale (1: never, 2: sometimes, 3: mostly, 4: always);
- Presentation of 4 clinical scenarios, representing different types of AR, where the respondents were asked to select the treatment or combination of treatments they would recommend (environmental control measures, oral antihistamine, oral decongestant, oral glucocorticosteroid, nasal antihistamine, nasal decongestant, nasal glucocorticosteroid, ocular antihistamine, ocular chromone, (referral) for immunotherapy or other, with free text space to specify).

The questionnaire was distributed in French and Flemish, the 2 major national languages. Initially, the questions were developed in English and translated into French and Flemish, followed by back-translation into English, with modifications if necessary. Additional minor amendments of the initial survey were made after the questionnaire was pilot tested among 15 Otorhinolaryngologists. In May 2005, the final questionnaire was sent to all fully-trained and practicing Belgian Otorhinolaryngologists (n = 598). A reminder was sent to the non-respondents 4 weeks after the initial mailing. The physicians had the possibility to respond by completing and sending back the anonymised postal questionnaire in an accompanying return-stamped envelope or by completing the questionnaire on a website for which they received a login.

The Ethics Committee of Ghent University Hospital approved the conditions and application of the survey.

Clinical case section

For the 4 clinical scenarios the treatment proposed by the respondents was strictly compared with the treatment recommendations of the ARIA guidelines, available at that time [9] (Appendix 1). A score of 0 (treatment not consistent with ARIA recommendations, resulting from over- or undertreatment) or 1 (treatment consistent with ARIA recommendations) was attributed per case, resulting in a total score ranging from 0 to 4 per respondent. Upon further analysis, compliance with the ARIA guidelines in the clinical scenarios was dichotomized into 'poor compliance' or 'good compliance'. Good compliance was set at a total score of >2.

Statistical analysis

The descriptive part of the study uses conventional parameters: means ± standard deviations for quantitative variables; qualitative variables are represented in terms of percentages. Statistical differences for means of quantitative values were analyzed using the independent samples t-test. To assess a lin-

Table 1. Demographic and professional details of the respondents.

		n	%	Mean (SD)	Range
Gender (male) (256 respondents)		166	64.8		
Age (years) (257 respondents)				47.9 (11.2)	31-77
Number of years in practice (years) (257 respondents)				17.8 (11)	1-48
Estimated proportion of AR patients among all patients treated (254 respondents)	<10%	57	22.4		
	10-20%	137	53.9		
	20-30%	49	19.3		
	>30%	11	4.3		
Practice type (258 respondents)					
	University hospital	58	22.5		
	Non-university, teaching hospital	46	17.8		
	Non-university, non-teaching hospital	123	47.7		
	Not hospital affiliated	31	12.0		

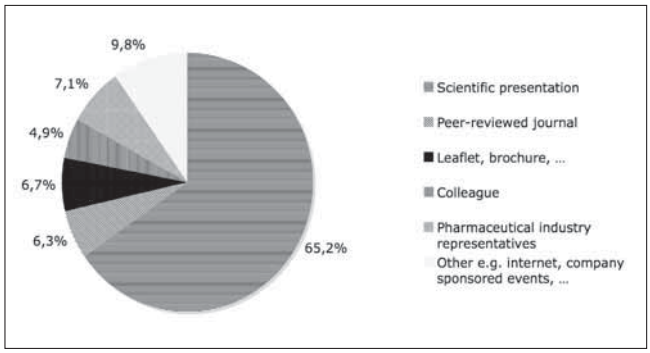

Figure 1. Sources of initial contact with the ARIA guidelines.
Among the respondents that had ever heard about the ARIA guidelines, sources of initial contact were scientific presentations (146/224), peer-reviewed journals (14/224), leaflets/brochures (15/224), colleagues (11/224), pharmaceutical industry representatives (16/224) and other sources including the internet and company sponsored events (22/224).

ear trend in proportions of nominal or ordinal values across subgroups Chi square test for trends was used.
The influence of demographic and professional variables on compliance with the ARIA guidelines in clinical case scenarios was assessed using multivariate logistic regression. The following demographic and professional characteristics were considered to potentially influence guideline compliance and were included in the regression analyses: gender, age, years of practice, specialty, proportion of AR patients in practice and type of practice. As age and years in practice were strongly correlated (Spearman correlation coefficient 0.98, $p < 0.001$), only age was entered into the regression model.
Significance level was set at $\alpha = 0.05$. Analyses were completed using SPSS Inc (Chicago, IL, USA; version 16.0, Nov 2007).

RESULTS

Baseline characteristics of the respondents

Of the 598 Otorhinolaryngologists that were contacted, 4 were ineligible because they were no longer practicing Otorhinolaryngology and 6 questionnaires were returned because of incorrect mail addresses. After 2 mailings, 258 questionnaires were returned, yielding an overall response rate of 43.9%. Demographic and professional details of the respondents are summarized in Table 1.

Dissemination of the ARIA guidelines

87.2% (224/257) of the respondents stated that they had ever heard about the ARIA guidelines and 64.2% (165/257) had ever followed a lecture specifically on this topic. For the group that had ever heard about ARIA, scientific presentations were the most frequently cited source to become aware of the guidelines, whereas the medical literature, representatives from the pharmaceutical industry, colleagues and the internet were less often mentioned (Figure 1).

42.6% (110/258) of the respondents considered the ARIA guidelines as very user-friendly, 26.7% (69/258) as moderately user-friendly and 15.9% (41/258) as not user friendly, with an additional 14.7% (38/258) claiming they were not familiar enough with guidelines to formulate an opinion.

Self-reported knowledge and use of the ARIA classification and ARIA treatment recommendations

26.4% (68/257) of the respondents reported to be very, 38.9% (100/257) somewhat, 18.7% (48/257) a little and 16.0% (41/257) not at all familiar with the ARIA classification. Similarly, 31.4% (81/258) responded to be very, 41.5% (107/258) somewhat, 12.4% (32/258) a little and 14.7% (38/258) not at all familiar with the ARIA treatment recommendations. To detect potential bias in self-reported knowledge, a test question on the ARIA classification was included. The correct response rate to this question significantly increased ($p < 0.001$) with increased self-reported knowledge of the ARIA classification, and among participants claiming to be very familiar with the ARIA classification only 7.4% gave an incorrect answer (Table 2).
10.5% (27/257) of the respondents reported to use the ARIA classification always, 20.2% (52/257) sometimes, 17.9% (46/257) mostly, but the majority of 51.4% (132/257), answered that they never used this classification. On the other hand, only 23.6% (61/258) of the respondents claimed they never followed the ARIA treatment recommendations, whereas 48.8% (126/258) reported to follow them mostly, 13.6% (35/258) always and 14.0% (36/258) sometimes.
Self-reported use of the ARIA classification and ARIA treatment recommendations significantly ($p < 0.001$) increased with increased level of self-reported knowledge of the classification (Table 2) and the recommendations (results not displayed, $p < 0.001$), respectively.

Table 2. Self-reported knowledge and use of the ARIA classification.

Self-reported knowledge of ARIA classification in % (n)	Self-reported use of ARIA classification classification (% using classification mostly or always)	ARIA classification test (% with correct response)
Not at all familiar 16.0 (n=41)	0.0	26.8
A little familiar 18.7 (n=48)	2.1	39.6
Somewhat familiar 38.9 (n=100)	27.0	70.0
Very familiar 26.5 (n=68)	75.0	92.6
Significance of linear trend (p)	<0.001	<0.001

Treatment practices of AR, compliance with the ARIA guidelines in clinical case scenarios

Appendix 2 represents the treatment modalities selected in the 4 clinical scenarios. A treatment consistent with the ARIA recommendations was proposed by 18.2% of the participants for scenario 1, 49.2% for scenario 2, 50.0% for scenario 3 and 38.1% for scenario 4. Upon calculation of the individual total scores obtained in the 4 clinical scenarios, 21.0% (53/252) of the participants obtained a score of 0, 27.8% (70/252) a score of 1, 29.0% (73/252) a score of 2, 18.3% (46/252) a score of 3 and 4.0% (10/252) a score of 4.

Significantly higher scores were obtained by respondents self-reporting to be very or somewhat familiar with the ARIA treatment recommendations compared to those that were a little or not at all familiar with the recommendations (mean score of 1.67 ± 1.12 versus 1.27 ± 1.10, t = -2.46, p = 0.015) and by Otorhinolaryngologists that considered the ARIA guidelines as very userfriendly compared to those that considered them as moderately or not userfriendly (1.82 ± 1.09 versus 1.40 ± 1.14, t = -2.71, p = 0.007). Specialists self-reporting to always or mostly follow the ARIA recommendations scored significantly higher than those reporting to follow them sometimes or never (mean score of 1.69 ± 1.10 versus 1.35 ± 1.14, t = -2.39, p = 0.018). Nevertheless, only 9% (3/33) of the respondents claiming to always follow the ARIA recommendations proposed a treatment that was fully consistent with the ARIA guidelines in all 4 clinical case scenarios and still 45% (15/33) obtained a score of only 0 or 1 (indicating that they proposed a treatment was not consistent with the ARIA recommendations in respectively 4 or 3 of the 4 presented clinical scenarios; Figure 2).

Determinants of guideline compliance

Good compliance with the ARIA guidelines was defined as obtaining a score of ⩾ 2 in the clinical scenario section, resulting in 48.8% (123/252) poor compliers and 51.2% (129/252) good compliers. Multivariate logistic regression analysis showed no influence at the 5% significance level of gender, practice type, (sub)specialty or proportion of AR patients on compliance with the ARIA recommendations. Age, on the other hand, was identified as a significant predictor of compliance. For an increase of age with one year the odds of guideline compliance decreased with a factor 0.92 (95% confidence interval = 0.89 to 0.95). This conclusion is corrected for all other factors in the model (Table 3).

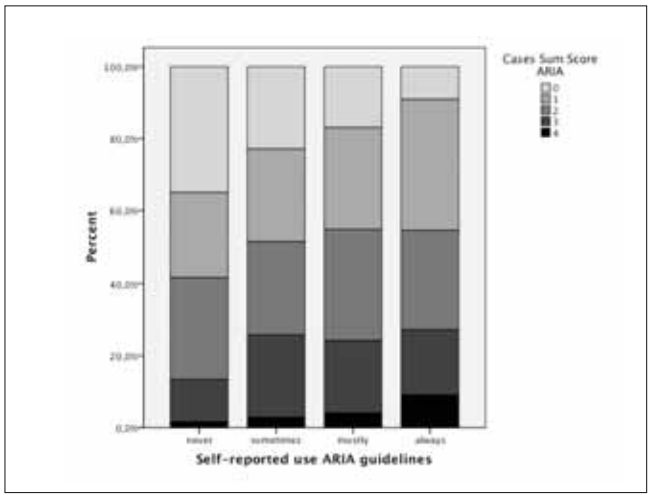

Figure 2. Distribution of the scores obtained in clinical scenarios (ranging from 0 to 4) in function of the self-reported use of the ARIA guidelines (never (n=60), sometimes (n=35), mostly (n=124) or always (n=33).

Table 3. Adjusted odds ratio and confidence interval for compliance with ARIA guidelines in clinical case scenarios (* p < 0.001).

	Odds ratio	95% confidence interval
Age	0.92	0.89 to 0.95 *
Gender		
Male	1.48	0.78 to 2.83
Female	1	
(Sub)specialisation		
General ENT specialist	0.61	0.25 to 1.46
Rhinologist/allergologist	0.96	0.4 to 2.3
Other subspecialist	1	
Proportion of AR patients		
<10%	0.85	0.19 to 3.80
10-20%	0.74	0.18 to 3.02
20-30%	0.74	0.17 to 3.18
>30%	1	
Practice type		
University hospital	0.63	0.19 to 2.06
Non university teaching hospital	0.44	0.14 to 1.39
Non university non teaching hospital	0.73	0.28 to 1.90
No hospital practice	1	

DISCUSSION

Four years after publication of the ARIA guidelines for AR, the dissemination and implementation of these guidelines among Otorhinolaryngologists were assessed for the first time. This study has some obvious limitations. First, results are based on the responses of Otorhinolaryngologists, who were willing to participate. Nothing can be said about the non-respondents, who made up 56% of the original sample, why they did not return the questionnaire and whether they differ from those who did return it. Second, the study population was limited to Belgian Otorhinolaryngologists, whose behaviour may vary from that of their colleagues in other parts of the world. Third, data are based on self-reports and responses to hypothetical case descriptions, which may be different from actual practice patterns. Well-constructed clinical case scenarios, however, have demonstrated to reflect the actual clinical behaviour of a group of physicians [16,17]. Fourth, in the case scenario section, for every treatment that was not entirely consistent with the ARIA recommendations a score of 0 was attributed and no distinction was made between treatments that deviated 'strongly' or 'slightly' from the ARIA recommendations.

Despite these limitations, our results clearly show that there remains an apparent lack of influence of guidelines on health professionals' behaviour. In this context, three broad areas of concern have to be considered: i) the methodology of guideline development, ii) the process of guideline dissemination and, finally, iii) the implementation of the guideline recommendations in daily medical practice [18,19]. For the ARIA guidelines, considerable attention has been paid to the development and dissemination processes. The ARIA guidelines are evidence-based, developed by a multidisciplinary, international panel and introduced a new classification for AR, whose benefits have already previously been validated [20,21]. The guidelines have been widely distributed to healthcare providers dealing with AR patients, through publication of a full workshop report [9], an executive summary [22] ample citations in other articles, pocket guides in more than 20 languages and an impressive amount of lectures in all corners of the world. The extensive promulgation efforts are reflected in our survey, with 87% of the respondents having ever heard about ARIA, 64% having ever followed a scientific lecture on the ARIA guidelines, and 73% reporting to be very or somewhat familiar with the ARIA recommendations.

Whereas the dissemination process is focused on educational interventions that aim at influencing clinicians' awareness and understanding of the guidelines, implementation is much more complex, and involves strategies to translate knowledge into changes in medical practice, with impact on patient care. Very few data are available on the implementation of the ARIA guidelines, which should be evaluated as a continuum from dissemination, to awareness, to attitude, and finally, to adherence [12]. In the present survey, specialist's adherence to the ARIA guidelines was assessed in 4 clinical case scenarios. Overall, only 51% of the respondents were considered as good compliers, but specialists, that were more familiar with the ARIA guidelines and that considered the ARIA guidelines as userfriendly, more often proposed a treatment consistent with the ARIA recommendations. However, we acknowledge that other factors than lack of awareness, lack of familiarity and lack of userfriendliness of guidelines can act as barriers to guideline implementation. In the future, the impact of agreement or disagreement with the specific guideline recommendations, outcome expectancy, self-efficacy, motivation, practice habits, time, resources, infrastructure, reimbursement strategies, organizational or regulatory framework and patient preferences on guideline compliance should also be evaluated [12].

As expected, a higher self-reported use of the ARIA guidelines was also reflected in increased adherence to the ARIA treatment recommendations in the clinical case section. But still, among the Otorhinolaryngologists, self-reporting to always practice in accordance with the ARIA guidelines, only 9% proposed a treatment that was fully consistent with the ARIA recommendations. These findings could demonstrate that self-reported adherence to guidelines is subject to social desirability bias and interviewer bias, and in general represents an overestimation of actual guideline adherence [23]. On the other hand, it could also indicate that application of the ARIA guidelines in a clinical setting is not straightforward or that the ARIA recommendations are sometimes misinterpreted.

Whereas gender, subspecialty in rhinology/allergology, working at a University or teaching hospital and a higher proportion of AR patients in practice did not seem to influence compliance with the ARIA guidelines, we found that younger age was a significant predictor for good compliance. Similar findings of declining adherence to clinical practice standards and evidence-based guidelines with increasing age and experience have also been reported in other areas of medicine [24,25]. A possible explanation is that the introduction of guidelines into clinical training and practice and the evolution of opinion-based to evidence-based medicine dates from the last 15 years. It is well known that physicians not easily change their long-standing prescribing patterns, and inertia of previous practice has been identified as a barrier to the incorporation of guidelines into practice [12]. On the other hand, we recognize that staying up-to-date can be difficult and even confusing when different guidelines, providing conflicting recommendations, are promoted within a short time interval. Less than 2 years before the publication of the ARIA guidelines, the 'Consensus statement on the treatment of allergic rhinitis' was developed by the European Academy of Allergology and Clinical Immunology (EAACI) [6]. Although not evidence-based, these guidelines also provide stepwise treatment algorithms for the management of AR. An important difference is that the EAACI guidelines recommend to combine an antihistamine and an intranasal corticosteroid as a first-line treatment in severe cases of AR, whereas the ARIA guidelines follow a more stepwise approach and only recommend this combination if treatment with an antihistamine or an intranasal corticosteroid alone fails [6,9]. In the clinical case scenarios we found that the combination of an antihistamine and an intranasal corticosteroid as a first-line treatment was recommended by many specialists, and that the prescription of this combination accounted for one of the most frequent reasons of inconsistence with the ARIA guidelines.

CONCLUSION

Despite the wide promulgation of the ARIA guidelines, many specialists dealing with AR patients remain only poorly influenced by these evidence-based recommendations. Translation of scientific knowledge into clinical practice is not straightforward and adherence to guidelines is undermined by several barriers at the level of physicians' knowledge, attitudes and practice behaviour.

We found that older, more experienced Otorhinolaryngologists were more unlikely to adhere to the guidelines than their younger colleagues. However, further research is needed to

determine the factors influencing poor compliance before selecting effective interventions to change physicians' practice behaviour.

Nevertheless, we recognize that a treatment remains a result of an agreement between doctor and patient and is always influenced by the individual context. The main goal of guidelines is to assist physicians and to improve patient care, which implies that they should be developed and considered as a support for practitioners with space for flexibility, rather than as a set of constrained rules.

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APPENDIX

Appendix 1. Treatment recommendations of the ARIA guidelines (9) for the different case scenarios. (Decongestant*: short course of oral or nasal decongestant.)

Case scenario	AR classification (according to ARIA)	Treatment recommended according to ARIA guidelines [9]
1. Currently untreated patient, allergic to house dust mite, who is suffering from rhinorrhea, sneezing and nasal congestion since 2 months. Symptoms interfere with the patient's quality of sleep.	Moderate-severe persistent AR	• Allergen avoidance • And intranasal glucocorticosteroid +/- decongestant*
2. Currently untreated patient who has experienced sneezing, rhinorrhea, nasal congestion and red and tearing eyes for the last month, especially when he's working in the garden. Besides these symptoms, the patient has no complaints.	Mild intermittent AR with conjunctivitis	• (Allergen avoidance) • (And) oral antihistamine +/- decongestant* Or intranasal antihistamine + topical eye treatment +/- decongestant*
3. Currently untreated patient, allergic to birch, who is especially suffering fom nasal congestion for the last 2 weeks. The patient is having exams and says that he's bothered during studying	Moderate-severe intermittent AR	• (Allergen avoidance) • (And) oral antihistamine +/- decongestant* Or intranasal anthistamine +/- decongestant* Or decongestant* Or intranasal glucocorticosteroid +/- decongestant*
4. Patient with manifest symptoms of allergic rhinitis due to house dust mite and currently treated with an oral antihistamine. This treatment provides insufficient symptom relief	Step up treatment oral antihistamine	• Allergen avoidance • And intranasal glucocorticosteroid +/- decongestant* Or oral antihistamine + intranasal glucocorticosteroid +/- decongestant*

Appendix 2. Treatment modalities selected in 4 case scenarios of allergic rhinitis. Treatments consistent with the ARIA guidelines are in bold.

Clinical scenario 1 Selected treatment or combination of treatments	% (n)
OAH/NAH + NGCS + AA	45.6 (115)
NGCS + AA	**18.2 (46)**
IT*	9.9 (25)
OGCS**	4.8 (12)
OAH/NAH + NGCS	5.6 (14)
OAH/NAH + NGCS + DC + AA	5.2 (13)
OAH/NAH + AA	4.0 (10)
OAH/NAH	2.0 (5)
OAH/NAH + NGCS + DC	1.6 (4)
NGCS	1.2 (3)
AA	1.2 (3)
Other	0.8 (2)

Clinical scenario 2 Selected treatment or combination of treatments	% (n)
OAH +/- TEM +/- AA	42.5 (107)
OAH + NGCS +/- TEM +/- AA	30.6 (77)
NGCS + TEM +/- AA	7.9 (20)
IT*	6.0 (15)
NAH + TEM +/- AA	**4.4 (11)**
OAH +/- TEM + DC +/- AA	**2.4 (6)**
NGCS +/- AA	2.4 (6)
OGCS**	1.6 (4)
Other	2.4 (6)

Clinical scenario 3 Selected treatment or combination of treatments	% (n)
OGCS**	17.1 (43)
NGCS +/-AA	**16.3 (41)**
OAH/NAH + NGCS +/- DC	14.7 (37)
NGCS + DC +/- AA	**13.1 (33)**
OAH/NAH + DC +/- AA	**10.7 (27)**
OAH/NAH + NGCS + DC +/- AA	10.7 (27)
OAH/NAH + DC +/- AA	**5.2 (13)**
IT*	5.2 (13)
DC +/- AA	**4.8 (12)**
IMGCS	2.4 (6)

Clinical scenario 4 Selected treatment or combination of treatments	% (n)
IT*	45.2 (114)
NGCS + AA	**21.4 (54)**
OAH/NAH + NGCS + AA	**15.1 (38)**
NGCS	6.0 (15)
OGCS**	5.2 (13)
OAH + NGCS	3.2 (8)
OAH + NGCS + DC + AA	**1.6 (4)**
AA	1.6 (4)
Other	0.8 (2)

OAH: oral antihistamine
NAH: nasal antihistamine
NGCS: nasal glucocorticosteroid
OGCS: oral glucocorticosteroid (short course), OGCS**: usually proposed in combination with or followed by diverse anti-allergic medications
DC: oral or nasal decongestant (short course)
TEM: topical eye medication (ocular antihistamine or cromone)
IMGCS: intramuscular glucocorticosteroid
IT: immunotherapy, IT*: usually proposed in initial combination with diverse anti-allergic medications
AA: allergen avoidance