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SUPPORTING INFORMATION

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Inadequate knowledge of allergen immunotherapy among athletes with allergic rhinitis: A post hoc analysis

To the Editor:

In our recent paper-based questionnaire survey of 636 German professional and hobby athletes, we observed a high prevalence of allergic rhinitis ($n = 269$; 42.6% in total, 36.1% confirmed by a physician, 6.5% self-diagnosed).¹ We presented evidence suggesting that this condition substantially impairs athletes' physical fitness. The negative impacts of allergic rhinitis on sport performance can be lessened by allergen immunotherapy (AIT), whereas symptomatic medications elicit only modest effects on sport performance and physical fitness in this particular group of allergic rhinitis sufferers.¹

This post hoc analysis was conducted in the above-mentioned 269 athletes to better understand (a) athletes' knowledge of AIT, (b) the reasons why most athletes had not been treated with AIT, and (c) the demographic and diagnostic factors influencing the athletes' decision to undergo AIT.

Methods of the study and questionnaire are presented in Online Repository.

Although the majority of athletes (230 out of 265 athletes who responded to this question; 86.8%) had "heard" about AIT, most (213; 80.4%) were familiar with the conventional subcutaneous

immunotherapy. The noninvasive route of administration with its better safety and tolerability profile was largely unknown to them: 57 out of 265 (21.5%) of athletes were aware of sublingual immunotherapy with drops and 37 (14.0%) with tablets. About half of the athletes (110 out of 265, 41.5%) knew about short-term subcutaneous immunotherapy comprising 4-7 injections per year. Even fewer athletes were familiar with pre-co-seasonal sublingual immunotherapy administered before and during the pollen season: 27 out of 265 (10.2%) were aware of drops and 19 (7.2%) of tablets.

The athletes' knowledge about AIT came mostly from physicians (69.7%). Hardly any athletes obtained information from public channels (academic literature: 6.1%; the Internet: 5.3%; newspaper: 4.8%; television/radio: 3.1%; pharmacy: 3.1%; German Allergy and Asthma Association: 1.8%). Only 15.4% of athletes evaluated their physician's consultation regarding AIT as being "good" (score 6-7), whereas 50.4% gave a "moderate" (score 3-5) and 34.2% "poor" rating (score 1-2). These results mirrored the athletes' knowledge of AIT; only 8.3% of athletes rated their knowledge as being "good" (score 6-7), 56.4% as "moderate" (score 3-5), and 35.3% as "poor" (score 1-2).

The score for self-assessed knowledge of AIT was significantly higher for athletes who had undergone AIT than for those who did not (4.2 ± 1.2 vs 2.8 ± 1.4 ; $P < 0.001$). Interestingly, the score for physicians' consultations was also significantly higher for athletes who had received AIT than for those who did not (4.5 ± 1.7 vs 2.8 ± 1.6 ; $P < 0.001$).

Among 269 athletes with allergic rhinitis, 98 had undergone AIT. Ten participants did not indicate whether they had undergone AIT or not. Out of 161 athletes who were asked whether they had any reasons against AIT, 104 athletes responded. The responses from them are categorized and summarized in Table 1 and Figure 1. In 29.8% of athletes, AIT appeared unnecessary. Some athletes (6.7%) had already planned to begin AIT. Some (4.8%) had started AIT but later discontinued it. Objective reasons for not undergoing AIT (eg, cost, concomitant autoimmune disorders) were reported by only 16.3% of athletes. The rest of the athletes (42.3%) drew our attention to the issue of inadequate information about AIT. While some athletes did not know about AIT at all, others stated that they had decided not to undergo AIT because it was too time-consuming or they doubted its efficacy. These reasons seem to be unjustified, since there are AIT products available on the market that have proven efficacy, cause only transient local irritations, and have convenient treatment schedules.² Furthermore, we show that athletes who had received AIT were significantly more satisfied with their treatment than those who used symptomatic medications (mean score = 4.8 ± 1.5 vs 4.1 ± 1.6 on a scale from 0 [not at all satisfied] to 7 [totally satisfied], $P < 0.001$).

Table 2 and Figure S1 present demographic and diagnostic factors of athletes who were treated with AIT and of those who were not. The two groups did not differ significantly regarding sex. Athletes with concomitant asthma were 1.5 times more likely to undergo AIT than were those without asthma (95% CI [1.17, 2.62], $P = 0.130$). The two athlete groups differed significantly with regard to age ($P = 0.001$), the duration of allergies ($P < 0.001$), and the number of allergies ($P < 0.05$). The likelihood of undergoing AIT correlated proportionally with older age, a longer duration of allergies, and a greater number of allergic sensitizations.

Table S1 presents athletes' evaluation about severity of their symptoms during trainings. There was no statistically significant difference in the level of restriction between the groups with and without AIT treatment ($P > 0.05$).

Table S2 presents the athletes' desires and expectations regarding AIT. In general, athletes who had undergone AIT showed greater expectations about the treatment than those who had not received AIT, but most variables did not differ significantly between the two groups. The greatest expectation about AIT in both groups was long-term symptom improvement. Other aspects that were equally crucial to both groups included few side effects, physicians' preparedness to treat rare serious reactions, information about available treatment options, ability to integrate therapy into one's daily routine/training, and the absence of negative impact on sport performance.

TABLE 1 Athletes' reasons for not undergoing AIT

Reasons	N	%
AIT is not necessary	31	29.8
Postponed momentarily or already planned	7	6.7
Previous AIT discontinued	5	4.8
Objective reasons for not undergoing AIT	17	16.3
Cost	6	5.8
Not interested	4	3.8
Autoimmune disorders	2	1.9
Bad experience reported by acquaintances	2	1.9
Not sure if they had allergy	2	1.9
Cost, too time-consuming	1	1.0
Subjective reasons for not undergoing AIT	44	42.3
Too time-consuming	17	16.3
Unaware of AIT	12	11.5
Doubts about AIT efficacy	6	5.8
Afraid of needles	2	1.9
Too many allergies	2	1.9
Doubts about AIT efficacy, too time-consuming	1	1.0
Fear of side effects	1	1.0
Fear of side effects, too time-consuming	1	1.0
Injections affect sport performance, too time-consuming	1	1.0
Concerned that the allergy type might change	1	1.0
Total number of responders	104	100

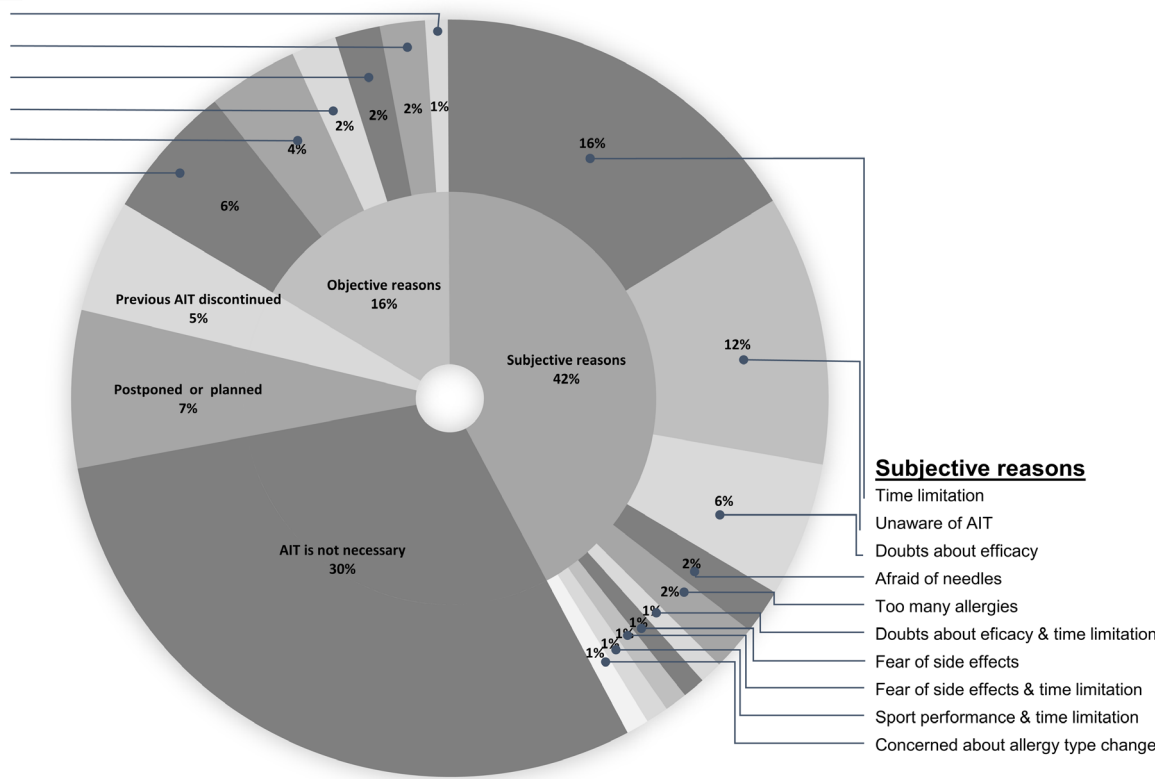
Abbreviations: AIT, allergen immunotherapy; N, number.

Compared to athletes who had not undergone AIT, those who had received AIT placed a significantly higher value on the improvement/prevention of allergic asthma (mean score = 5.7 ± 2.1 vs 5.1 ± 2.3 , $P = 0.017$) and the reduced need for symptomatic medication (mean score = 5.6 ± 2.1 vs 4.6 ± 2.6 , $P = 0.001$).

With these caveats, we wish to raise the awareness of all stakeholders that athletes with allergic rhinitis are often inadequately informed about AIT and its advantages. Public channels of information and physician-patient communications regarding AIT must be improved. Communications directed toward patients should clearly stress the long-term efficacy of AIT as well as emphasize the benefits of allergic asthma improvement/prevention and reduced need for symptomatic medication. The effect of AIT on lessening negative impacts of allergic rhinitis on sport performance should be mentioned. Patients should be assured that AIT is safe and be made aware of advantageous treatment regimens.³

Objective reasons

Cost & time limitation
Negative speculations
Autoimmune disorders
Not interested
Uncertain allergy
Cost

**FIGURE 1** Athletes' reasons for not undergoing AIT**TABLE 2** Effects of demographic and diagnostic parameters on AIT use

Variable		Athletes without AIT		Athletes with AIT		Total		P	OR	95% CI
		N	%	N	%	N	%			
Sex (n = 256)	Female	71	65.1	38	34.9	109	42.6	0.333	Reference	
	Male	87	59.2	60	40.8	147	57.4		1.3	0.77, 2.15
Age (y) (n = 256)	≤20	15	88.2	2	11.8	17	6.6	0.001	Reference	
	21-30	68	71.6	27	28.4	95	37.1		3.0	0.64, 6.34
	31-40	28	53.8	24	46.2	52	20.3		6.4	1.33, 13.89
	41-50	39	59.1	27	40.9	66	25.8		5.2	1.10, 11.12
	≥51	9	34.6	17	65.4	26	10.2		14.2	2.64, 32.29
Duration of allergies (y) (n = 256)	≤5	58	86.6	9	13.4	67	26.2	<0.001	Reference	
	6-10	28	62.2	17	37.8	45	17.6		3.9	1.55, 6.16
	≥11	73	50.7	71	49.3	144	56.3		6.3	2.89, 9.16
Number of allergies (n = 230)	1	32	59.3	22	40.7	54	23.5	0.029	Reference	
	2	47	65.3	25	34.7	72	31.3		0.8	0.37, 1.60
	3	33	61.1	21	38.9	54	23.5		0.9	0.43, 2.00
	4	17	56.7	13	43.3	30	13.0		1.1	0.45, 2.75
	5	5	25.0	15	75.0	20	8.7		4.4	1.38, 13.76
Concomitant asthma (n = 253)	No	114	65.1	61	34.9	175	69.2	0.130	Reference	
	Yes	43	55.1	35	44.9	78	30.8		1.5	1.17, 2.62

P values were obtained using the chi-square test. Odds ratios and confidence intervals were calculated using the univariate logistic regression.

Abbreviations: AIT, allergen immunotherapy; CI, confidence interval; OR, odds ratio.

In conclusion, given that allergic disorders are on the rise and athletes are at greater risk than the general population,⁴ we deem this issue worthy of more public and medical attention. Nevertheless, 29.0% of the study population comprised professional athletes, whereas 71.0% were hobby athletes,¹ who, in principle, can be considered representative of the general population. Therefore, we assume that the general population may have inadequate information about AIT and we wish to raise the awareness of all stakeholders by both public channels of information and physician-patient communications.

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CONFLICTS OF INTEREST

Cengizhan Acikel, Van-Anh Dao, Kija Shah-Hosseini, Julia Vent, and Esther Raskopf report no conflict of interest. Ralph Mösges reports personal fees from ALK, grants from ASIT biotech, personal fees from allergopharma, personal fees from Allergy Therapeutics, grants and personal fees from Bencard, grants from Leti, grants, personal fees, and nonfinancial support from Lofarma, nonfinancial support from Roxall, grants and personal fees from Stallergenes, grants from Optima, personal fees from Friulchem, personal fees from Hexal, personal fees from Servier, personal fees from Klosterfrau, nonfinancial support from Atmos, personal fees from Bayer, nonfinancial support from Bionorica, personal fees from FAES, personal fees from GSK, personal fees from MSD, personal fees from Johnson & Johnson, personal fees from Meda, personal fees and nonfinancial support from Novartis, nonfinancial support from Otonomy, personal fees from Stada, personal fees from UCB, nonfinancial support from Ferrero, grants from BitopAG, grants from Hulka, personal fees from Nuvo, grants from Ursapharm, outside the submitted work.

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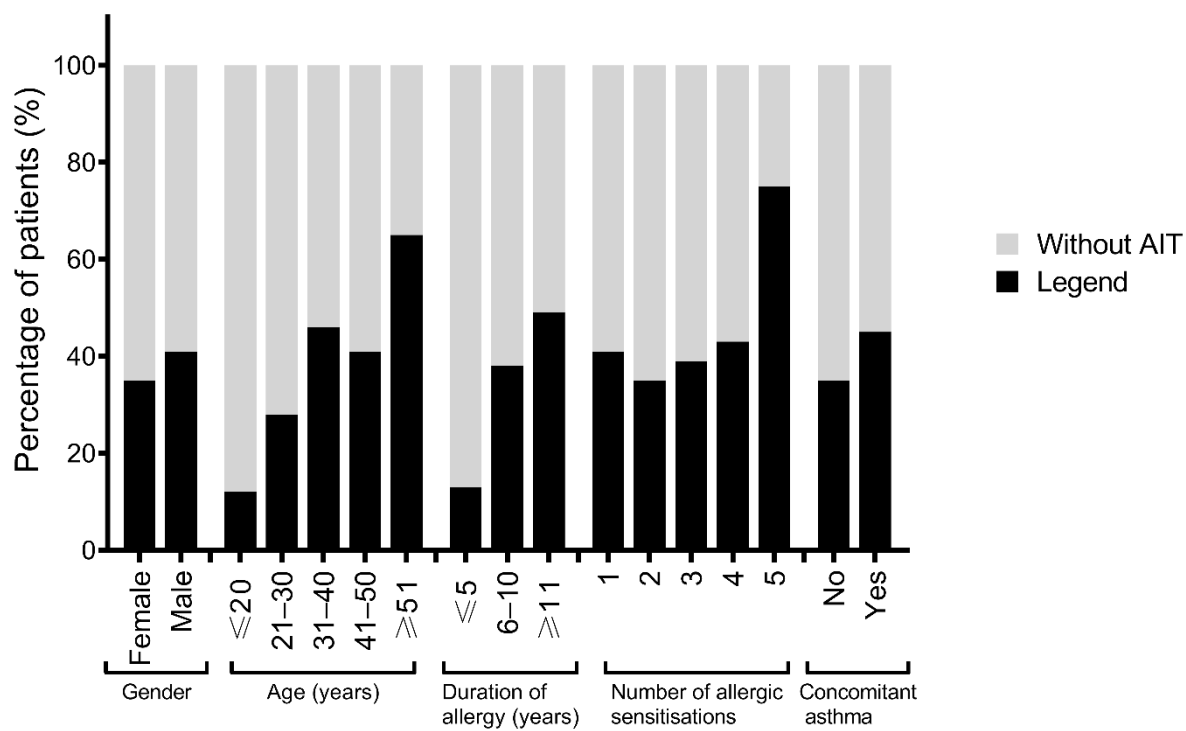


Figure S1. Effects of demographic and diagnostic parameters on AIT use

Table S1. Comparison of with and without AIT athletes' evaluation about severity of their symptoms

Restrictions on sports	Athletes without AIT (N=161)		Athletes with AIT (n=98)		<i>P</i>
	Mean	Std. Deviation	Mean	Std. Deviation	
Running eye	2.7	2.2	2.5	2.1	0.460
Itchy eye or redness	3.3	2.1	3.2	2.2	0.682
Nasal itching	3.2	2.2	3.3	2.2	0.850
Sniffing	3.8	1.9	3.9	2.2	0.483
Stuffy nose	3.5	2.3	3.6	2.5	0.612
Sneezing	3.4	2.2	3.3	2.2	0.736
Main reactions	1.0	1.8	1.4	2.0	0.127
Coughing	1.8	2.1	2.1	2.3	0.470
Dyspnea	2.2	2.3	2.5	2.3	0.379
Fatigue	2.7	2.5	2.3	2.2	0.356
General performance drop in during training or competitions	2.4	2.2	2.4	2.1	0.955
Restrictions on sports, after training or competition	2.1	2.0	1.9	2.1	0.387

Athletes rated the strength of their restrictions on a scale from 0 (= not at all) to 7 (= very strong).

P values were obtained using the Mann–Whitney U test.

Abbreviations: AIT, allergen immunotherapy; SD, standard deviation

Table S2. Comparison of with and without AIT athletes' evaluations about desires and expectations from AIT

	Athletes without AIT (N=161)		Athletes with AIT (n=98)		<i>P</i>
	Mean	SD	Mean	SD	
Long-term symptom improvement	6.0	1.9	6.2	1.7	0.374
Few side effects	5.8	2	6.0	1.6	0.892
Doctors' preparedness to treat rare serious reactions	5.7	2.1	6.0	2	0.422
Possibility of integrating therapy into one's daily routine/training	5.7	1.9	5.9	1.8	0.231
No negative impacts on sport performance	5.6	2.1	5.8	1.8	0.689
Improvement/prevention of allergic asthma	5.1	2.3	5.7	2.1	0.017
Comprehensive information about AIT	5.3	2.1	5.6	1.8	0.649
Information about available treatment options	5.5	2.0	5.6	1.8	1.000
Time-saving treatment schedule	5.3	2.1	5.6	1.8	0.262
Reduced need for symptomatic medication	4.6	2.6	5.6	2.1	0.001
Perceived rapid symptom improvement	5.3	2.1	5.5	1.9	0.303
Ability to train normally again	5.2	2.4	5.3	2.3	0.779
Doctors' confirmation of treatment success	4.7	2.2	5.1	2.2	0.178
Doctors' recommendation	4.3	2.4	4.7	2.4	0.178
Ability to participate in sport competitions again	4.3	2.7	4.6	2.7	0.430
Positive experience of friends/acquaintances	3.9	2.3	4.0	2.4	0.451
Therapy pursuant to WADA/NADA doping regulations	4.2	3.0	3.8	3.1	0.209

Athletes rated the strength of their desires and expectations from AIT on a scale from 0 (= not at all) to 7 (= very strong).

P values were obtained using the Mann–Whitney *U* test.

Abbreviations: AIT, allergen immunotherapy; SD, standard deviation; WADA/NADA, World Anti-Doping Agency / National Anti-Doping Agency

Methods

Paper-based questionnaires were specifically developed for this survey and distributed among the participants of the 2014 Cologne Marathon and the students of the German Sports University Cologne during the lecture periods.

Descriptions of the questions regarding athletes' demographic characteristics, allergy and asthma diagnosis, impacts of allergy on sport performance, and allergy treatment were described in our previous publication.¹ A full version of the six pages long questionnaire can be provided upon request.

This post hoc analysis was based on the athletes who suffered from allergic rhinitis. Athletes were asked if they knew about allergen immunotherapy (AIT) and, if yes, which forms of administration: subcutaneous immunotherapy with 4–7 injections per year or all-year-long treatment, sublingual immunotherapy with drops or with tablets.

Athletes provided the source of information for AIT they received: academic literature, the Internet, newspaper, television/radio, pharmacy, or the German Allergy and Asthma Association.

Assessments of physician's consultation regarding AIT, athletes' self-assessments of their knowledge of AIT, as well as their desires and expectations regarding AIT were rated by athletes on a numerical scale from 0 to 7.

Athletes' rated their symptoms during sport on a scale from 0 (not at all) to 7 (very severe).

Athletes suffering from allergic rhinitis who were not treated with AIT were to respond to an open-format question as to why not.

Statistical analysis was performed using the IBM SPSS Statistics for Windows, Version 25.0. (Armonk, NY: IBM Corp.). Continuous and categorical variables were displayed as means $\pm$ standard deviation and percentages. Comparisons of continuous variables between independent groups were performed by Mann Whitney U test. Chi square test was used to compare categorical variables. The univariate logistic regression analysis was used to compared between athletes who had undergone AIT and those who had not; odds ratios and confidence intervals were calculated. $P < 0.05$ was considered significant.

¹ Salem L, Dao VA, Shah-Hosseini K, de Marees M, Mester J, Mösges R, et al. Impaired sports performance of athletes suffering from pollen-induced allergic rhinitis: a cross-sectional, observational survey in German athletes. *J Sports Med Phys Fitness* 2019;59:686-92. DOI: 10.23736/S0022-4707.18.08556-0

This questionnaire was translated from the German original.

**German Sport University Cologne, Institute of Exercise Training and Sport Informatics
University of Cologne, Faculty of Medicine, Institute for Medical Informatics, Statistics
and Epidemiology**

Questionnaire endurance sport and pollen allergy

Dear participant,

With this survey we would like to find out to what extent different groups of athletes are affected by a pollen allergy and how effect the allergy has on their performance and their training behavior. At the same time, we would like to find out what claims an athlete undergone on allergy therapy.

Thanks for your participation.

1. General

1.1 Gender

☐ female ☐ male

1.2 Age: _____years

1.3 Highest level of education (optional)

☐ primary school ☐ secondary school ☐ high school
☐ college/university degree ☐ vocational school ☐ Other

1.4 Employment status

☐ employee/worker/civil servant ☐ self-employed ☐ currently unemployed
☐ student ☐ pensioner ☐ other

1.5 Familial Allergy Existence: Allergy, Asthma, Eczema (neurodermitis) also known

☐ father ☐ mother ☐ siblings ☐ other relatives ☐ absent

1.6 Which sport do you mainly practice?

☐ Running ☐ Cycling ☐ Triathlon ☐ Swimming ☐ Rowing ☐ _____ ☐ _____

1.7 Are you in your main sport:

☐ top international ☐ top national ☐ high performance class in Germany
☐ middle performance class in Germany ☐ lower performance class in Germany
☐ hobby/recreational athletes ☐ other

1.8 Which performance group do you belong to?

☐ A ☐ B ☐ C ☐ CD ☐ D ☐ none

1.9 How often do you train in your main sport?

☐ <2 hours/week ☐ 2-4 hours/week ☐ 4-6 hours/week ☐ 6-8 hours/week ☐ 8-10 hours/week
☐ 10> 10 hours/week?

This questionnaire was translated from the German original.

2. Allergy history/diagnostics/impact on performance

2.1 Do you suffer from a pollen allergy (hay fever)?

☐ Yes, diagnosed by the doctor ☐ I think so ☐ I do not think so

If you answer no, please only answer questions 3.1, 3.1.2 and 3.6. Thanks.

2.2 Do you suffer from (exercise-induced) asthma?

☐ Yes, diagnosed by the doctor ☐ I think so ☐ I do not think so

2.3 How long have you been suffering from pollen allergy (hay fever)?

☐ <1 year ☐ 1-5 years ☐ 6-10 years ☐ Longer than 10 years

2.4 To what extent do you feel restricted by the following symptoms during your sport activities?

Please rate to 0 = not at all to 7 = very strong

	0	1	2	3	4	5	6	7
running eye	☐	☐	☐	☐	☐	☐	☐	☐
itchy eye/redness	☐	☐	☐	☐	☐	☐	☐	☐
nasal itching	☐	☐	☐	☐	☐	☐	☐	☐
sniffing	☐	☐	☐	☐	☐	☐	☐	☐
stuffy nose	☐	☐	☐	☐	☐	☐	☐	☐
sneezing	☐	☐	☐	☐	☐	☐	☐	☐
skin reactions	☐	☐	☐	☐	☐	☐	☐	☐
coughing	☐	☐	☐	☐	☐	☐	☐	☐
breathing problems	☐	☐	☐	☐	☐	☐	☐	☐
fatigue	☐	☐	☐	☐	☐	☐	☐	☐
general performance dropping in training/competition	☐	☐	☐	☐	☐	☐	☐	☐
neck/throat complaints after the training/competition	☐	☐	☐	☐	☐	☐	☐	☐

2.5 When and where do the complaints occur preferentially?

☐ seasonal ☐ all year

☐ In the morning ☐ in the mornings and the evenings ☐ full-time ☐ at night (multiple answers possible)

☐ during the training / competition ☐ after training / competition (multiple answers possible)

☐ rather outdoor ☐ rather indoor

2.6 Are you presently receiving medical treatment?

☐ no ☐ yes

2.6.1 If yes, which doctor?

☐ GP/internist ☐ dermatologist ☐ otolaryngologist ☐ pulmonologist ☐ sports physicians

This questionnaire was translated from the German original.

2.7 Which allergies has the doctor clearly diagnosed with you? (Multiple answers possible)

☐ trees (such as hazel, alder, birch) ☐ grasses/rye ☐ herbs (such as mugwort, ragweed)
☐ house dust mites ☐ pet hair ☐ other (which)

2.8 How often did the pollination affect your training seasons (TS) as a pollen allergy sufferer, in the last pollen season (2014)?

☐ all TS ☐ more than every 2 TS ☐ almost every 2 TS ☐ 1 of 4 TS ☐ less than 1 in 4 TS
☐ never

2.9 How many times have you skipped training because of pollen allergy?

☐ all TS ☐ more than every 2 TS ☐ almost every 2 TS ☐ 1 of 4 TS ☐ less than 1 in 4 TS
☐ never

2.10 How often did you have to stop competitions (C) because of your allergy or could not compete?

☐ all C ☐ more than every 2 C ☐ almost every 2 C ☐ 1 of 4 C ☐ less than 1 in 4 C
☐ never

2.11 How often have you adjusted your training to the pollination?

☐ all TS ☐ more than every 2 TS ☐ almost every 2 TS ☐ 1 of 4 TS ☐ less than 1 in 4 TS
☐ never

2.12 Have you noticed a performance drop in your training/competition?

During the training ☐ not at all ☐ easy ☐ medium ☐ strong

During the competition ☐ not at all ☐ easy ☐ medium ☐ strong

2.13 Has the allergy deteriorated over the last years?

☐ not at all ☐ easy ☐ medium ☐ strong

3. Do you know the hyposensitization?

3.1 Have you ever heard about the hyposensitization?

☐ yes ☐ no

3.1.2 If so, how did you become aware of hyposensitivity?

☐ physician ☐ friends/relatives ☐ Newspaper ☐ TV/radio ☐ Internet ☐ German Allergy and Asthma Association (DAAB) ☐ scientific literature ☐ Pharmacy

3.2 Have you ever undergone hyposensitization?

☐ yes ☐ no

3.2.1 If not: why: _____

3.3 How would you rate your knowledge about hyposensitization?

1 = too bad

6 = very good

1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐
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3.4 What would you like to know about hyposensitization?

Please rate to 0 = not at all to 7 = very strong

	0	1	2	3	4	5	6	7
☐ comprehensive information about the treatment	☐	☐	☐	☐	☐	☐	☐	☐
☐ that I am informed about all possible treatment options	☐	☐	☐	☐	☐	☐	☐	☐
☐ that the therapy does not take too much time (waiting, drive durations)	☐	☐	☐	☐	☐	☐	☐	☐
☐ that few side effects occur	☐	☐	☐	☐	☐	☐	☐	☐
☐ that I quickly feel a relief of the symptoms	☐	☐	☐	☐	☐	☐	☐	☐
☐ a durable relief of the complaints	☐	☐	☐	☐	☐	☐	☐	☐
☐ that I can train normally again	☐	☐	☐	☐	☐	☐	☐	☐
☐ that I can participate in competitions again	☐	☐	☐	☐	☐	☐	☐	☐
☐ that the doctor checks the success in the meantime	☐	☐	☐	☐	☐	☐	☐	☐
☐ that the doctor recommends hyposensitization to me	☐	☐	☐	☐	☐	☐	☐	☐
☐ that the doctor is well prepared in case of a rare severe reaction	☐	☐	☐	☐	☐	☐	☐	☐
☐ that acquaintances have had good experience with the treatment	☐	☐	☐	☐	☐	☐	☐	☐
☐ that allergic bronchial asthma is prevented/improved	☐	☐	☐	☐	☐	☐	☐	☐
☐ that I can reduce my need for medication	☐	☐	☐	☐	☐	☐	☐	☐
☐ that the therapy can be well integrated into my daily routine/training (Regular medical appointments, or regular use of the drug)	☐	☐	☐	☐	☐	☐	☐	☐
☐ that the therapy has no effect on my performance	☐	☐	☐	☐	☐	☐	☐	☐
☐ that the therapy complies with the WADA/NADA Doping Regulations	☐	☐	☐	☐	☐	☐	☐	☐

3.5 What affects your opinion about hyposensitization?

	I agree	I do not agree
☐ the patient should be accustomed to his allergen	☐	☐
☐ the patient should be more sensitive to his allergen	☐	☐
☐ there are always side effects	☐	☐
☐ an allergic bronchial asthma should be prevented	☐	☐
☐ new allergies arise	☐	☐
☐ free of symptoms/reduction of symptoms	☐	☐

This questionnaire was translated from the German original.

3.6 What form of hyposensitization do you know? (multiple answers are possible)

- ☐ Classic treatment with injection
 - ☐ year-round treatment
 - ☐ short-term hyposensitization with 4-7 injections per year
- ☐ Sublingual hyposensitization with drops
 - ☐ year-round treatment
 - ☐ treatment before and during the season
- ☐ Sublingual hyposensitization with tablets
 - ☐ year-round treatment
 - ☐ treatment before and during the season

3.7 How do you feel well informed by a doctor about hyposensitization?

1 = too bad

7 = very good

1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
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3.8 Where do you get additional information: _____

4. Experience with allergy therapies

4.1 With which treatment options have you already experienced and how satisfied were you with it?

1 = very dissatisfied 6 = completely satisfied 1 2 3 4 5 6

- | | |
|--|--------|
| ☐ avoid allergens (eg stay indoors for pollen allergy) | □□□□□□ |
| ☐ drug treatment to relieve the symptoms
(eg antihistamines, nasal spray, eye drops) | □□□□□□ |
| ☐ alternative medicine (eg homeopathy, acupuncture, bioresonance therapy) | □□□□□□ |
| ☐ hyposensitization: ☐ with injection | □□□□□□ |
| ☐ with drops | □□□□□□ |
| ☐ with tablets | □□□□□□ |
| ☐ no experiences | □□□□□□ |

4.2 How do you currently alleviate your symptoms? (multiple answers are possible)

- ☐ avoid allergens (eg stay indoors for pollen allergy)
- ☐ drug treatment on demand (seasonal) to relieve the symptoms
- ☐ drug treatment all year round to relieve the symptoms
- ☐ hyposensitization:
 - ☐ with injection
 - ☐ with drops
 - ☐ with tablets
 - ☐ no experiences
- ☐ alternative medicine (eg homeopathy, acupuncture, bioresonance therapy)
- ☐ none of above

4.2.1 If you have medications to relieve your symptoms, which are they?

- | | |
|---|--|
| ☐ antiallergic tablet | ☐ anti-allergic nasal spray / eye drops |
| ☐ cortisone (spray, tablet, syringe) | ☐ bronchodilator medication |
| ☐ none | |

This questionnaire was translated from the German original.

4.3 How satisfied are you with your current treatment method?

1 = very
dissatisfied

7 = very
satisfied

1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
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4.4 Which fears do you have in your present therapy in particular as an athlete?

Please name the therapy option that is relevant for you: _____

	not at all	slightly	moderately	strongly
fear of side effects	☐	☐	☐	☐
fear of negative impact on the training	☐	☐	☐	☐
fear that the therapy will not comply with WADA/NADA's doping regulations	☐	☐	☐	☐
does not work in the long term	☐	☐	☐	☐

Thanks for your support