



Original Article

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Conflict of interest

The present study is a scientific project which is being conducted without any sponsoring. The authors have no conflict of interest.

Prevalence and treatment profile of patients with grass pollen and house dust mite allergy

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Summary

Background: In Europe, grass pollen and house dust mites are the most common allergens responsible for IgE-mediated allergies. The aim of our study was to examine the data provided by various medical practices specialized in allergic diseases in Germany regarding patients with rhinoconjunctivitis in terms of demographic data and the prescribed treatment by different medical specialists.

Patients and methods: Data from patients who were diagnosed with allergic rhinoconjunctivitis were taken from the “disease-analyzer” database (IMS Health GmbH) and analyzed. The data assessment was anonymous in accordance with the guidelines for data protection. The information collected included specific data about diagnosis and treatment in private practices in Germany.

Results: The majority of patients with grass pollen allergy were treated by their general practitioners, while those with house dust mite allergy were treated by a specialist with a background in allergic diseases (pulmonologists, otorhinolaryngologists, and dermatologists). Treatment was primarily symptomatic, usually consisting of antihistamines. Allergen-specific immunotherapy, the only causal treatment for IgE-mediated allergies at present, was performed rarely.

Conclusions: The data suggest the need for interaction and knowledge transfer between various specialists in order to improve patient-centered care in regard to allergic diseases.

Introduction

Allergic rhinoconjunctivitis is one of the most common IgE-mediated diseases. The prevalence in the general population is estimated at 20–30%. In Europe, current data show that about 80 million people have allergic rhinoconjunctivitis; in Germany, up to 25 million people are affected [1].

The most common triggers of allergic rhinoconjunctivitis are pollen and house dust mites [2]. Among the various pollen types in Germany, the most common ones leading to allergic rhinoconjunctivitis are birch and grass pollen [3]. House dust mite allergens do not lead to hypersensitivity as often, yet they are clinically relevant because they are perennial allergens, causing symptoms year-round in affected patients. Allergic bronchial asthma is also more common among patients with house dust mite allergy [4].

The treatment of allergic rhinoconjunctivitis is based on the Allergic Rhinitis and its Impact on Asthma (ARIA) criteria; thus therapy varies based on the severity of the allergy and the duration of symptoms [4]. Initial symptomatic treatments include antihistamines, which may be given either orally or topically, followed by topical corticosteroids [5]. Numerous studies have investigated whether allergen avoidance is effective against house dust mite allergy and, if so, to what extent [6]. Despite mixed results, in Germany impermeable mattress cases are generally recommended as a primary measure for newly diagnosed patients with house dust mite allergy.

For allergic rhinoconjunctivitis and/or allergic asthma due to grass pollens or house dust mites, specific immunotherapy may be performed as a causal treatment. Specific immunotherapy produces immunological changes that modulate the aberrant allergic immune response [7].

Data from previous clinical studies have shown that subcutaneous immunotherapy is effective against grass pollen as well as house dust mite allergy [8, 9]. In addition, specific immunotherapy may prevent the onset of new sensitizations or the development of allergic asthma [10]. Comparative studies on the efficacy of specific immunotherapy against grass pollen versus house dust mite allergies suggest that patients with grass pollen allergies probably benefit more [11]. Sublingual immunotherapy is another treatment option for both allergens for the management of allergic rhinoconjunctivitis. Large placebo-controlled studies have been published on sublingual immunotherapy for treating grass pollen allergies [12–15]. For house dust mite allergens, preliminary clinical results on the effectiveness of sublingual therapy in tablet form appear promising [16], although earlier studies on sublingual preparations sometimes reported negative outcomes [17].

The present study used patient data from private practices to compare patients with grass and house dust mite allergies in terms of frequency, demographic characteristics and treatment by various specialists.

Materials and methods

To analyze the treatment profile, we analyzed data from patients who were diagnosed with allergic rhinoconjunctivitis. The data were entered by private practice physicians into the “Disease-Analyzer” database (IMS Health GmbH).

Data collection was performed in accordance with data protection guidelines. The complete, anonymous data on treatment received and disease course among patients at private practices in Germany were collected and listed by specialty. The data were collected using standardized interfaces from private practice computers and were tested for plausibility and linked with other relevant information such as the price of medication, coding based on the anatomic therapeutic chemical classification (ATC) and the international classification of diseases (ICD). The German database currently contains more than 3,000 private practices with about 20 million patients [18,19].

For the analysis of private practice physicians in Germany, we took as the basis all physicians in the annual listing published by the German Medical Association. Of these, selected practices were chosen based on the stratification criteria: specialty, federal German state, region size, and age. The post-stratification sample was divided into eight regions, which represent the 16 federal German states. Along with the data from general practitioners and internists, the data from various other specialties were also included. To obtain a regional-level projection according to specialty, at least 30 doctors must be identified at that specialty level. For each single region, there was a minimum of at least seven doctors per specialty. To use the “Disease-Analyzer” database as

a basis for pharmaco-epidemiological studies, the selection of practices was performed in such a manner that the patient data collected within one specialty was representative in terms of demographic characteristics, diagnoses, and treatments. The panel design is adapted to the annually updated information collected by the German Medical Association on physicians in Germany and thus takes into account natural fluctuations in private practices. If a practice ends its participation, it is replaced by a new one.

The physicians receive compensation for their participation. They also receive an analysis of their prescribing behavior compared to that of other physicians. In 2007 a total of 3,200 private practices were contacted; 321 agreed to participate. The participation rate among the various specialties and regions is similar. The present data are from 2010. The data were collected from a total of 1,472 private practices. 111 were dermatology practices, 1,043 were general practitioners' offices, 164 were pediatric practices, 128 were ENT practices, and 26 were pneumology practices.

The analysis included patients who were documented at least once in 2010 as having a grass pollen or house dust mite allergy. Only confirmed diagnoses were included – presumptive diagnoses and diagnoses by exclusion were not. Given that it is impossible to distinguish between grass and house dust mite allergies based on ICD10 codes, we referred to the physician's original text, in which all diagnoses are accurately recorded. There was no minimum number of physician contacts or length of treatment required. Nor was it necessary for inclusion to have the relevant diagnosis in more than one quarter, given that most patients do not visit a doctor every quarter.

For the analysis of drug treatments, all recorded prescriptions were included: statutory health insurance prescriptions, private insurance prescriptions, green prescriptions, and samples.

The analyses were performed with SAS (version 9.2).

Results

The results show that people with house dust mite allergies are primarily seen by specialists, while people with grass pollen allergies are usually seen by general practitioners and internists.

We first combined the data across specialties for physicians working in private practices. There was an emphasis on general practitioners and internists compared with specialists in allergic diseases such as dermatologists, pediatricians, ENT specialists, and pneumonologists.

In 2010, of the patients who visited the private practices listed with allergic rhinoconjunctivitis, 49,910 patients had a grass pollen allergy and 5,751 patients were coded as having a house dust mite allergy. The analysis of the percentage of these patients across all specialties showed that the majority

Table 1 Sample selection for analysis and projection of numbers of patients with grass pollen and house dust mite allergies.

	Dermatologists	General practitioners	Pediatricians	ENT specialists	Pneumologists
Practices	111	1043	164	128	26
Physicians	132	1300	200	153	31
Total patients in 2010	625,553	2,226,058	439,742	564,069	94,435
Patients diagnosed with grass pollen allergy (patients in the database)	8,245	22,562	7,857	8,005	3,241
Patients diagnosed with grass pollen allergy (projected number of patients)*	218,493	848,331	219,210	205,729	51,532
Specialist (%)	14.2%	55.0%	14.2%	13.3%	3.3%
Percentage of all patients in the practice (%)	1.3%	1.0%	1.8%	1.4%	3.4%
Patients diagnosed with house dust mite allergy (patients in the database)	1,461	675	1,776	1,224	615
Patients diagnosed with house dust mite allergy (projected number of patients)*	38,717	25,380	49,550	31,457	9,779
Specialists in %	25.0%	16.4%	32.0%	20.3%	6.3%
Percentage of all patients in the practice (%)	0.2%	0.0%	0.4%	0.2%	0.7%
*Given that each specialty covers a different number, the data must be projected to arrive at the percentages for all patients seen by different specialists.					

of patients with grass pollen allergies were treated by general practitioners/specialists in general internal medicine (45%), while fewer patients with house dust mite allergy consulted a general practitioner or internist (12%). By way of comparison, a significantly greater percentage of patients with a house dust mite allergy visited a dermatologist (25%) or pediatrician (31%) (Table 1).

The age and sex distribution of patients with grass pollen allergies shows that children and adolescents up to age 17 are mainly treated by pediatricians (Table 2). The data concur with previous observations in the literature, namely, that significantly more boys than girls are affected (4,931 vs. 2,926 patients) [20]. Among adult patients with grass pollen allergies, men and women are affected equally because the percentage of women increases, effectively erasing the difference. Comparable data are seen in regard to house dust mite allergies (Table 3). If one compares just the specialists who are certified in allergy, most patients with house dust mite allergies are treated by pediatricians and dermatologists. Based on the present data, the frequency of comorbidity of atopic eczema was the highest among patients seeing a dermatolo-

gist or pediatrician (grass pollen allergies – house dust mite allergy, 17.2% and 4% as well as 8.0% and 8.2%). For general practitioners, these figures were 5.3% and 1.8%. Among other specialists, the co-diagnoses were not coordinated.

Treatment profile of patients with allergic rhinoconjunctivitis

The analysis of the treatment profile for 21,580 patients with grass pollen allergies in 2010 showed that there were 40,376 prescriptions. That corresponds to about 1.9 prescriptions per treated patient. Most patients were treated symptomatically, usually with antihistamines and less often with topical steroids. Only among pneumology patients topical steroids were prescribed more often than antihistamines (47% vs. 18%). The percentage of prescriptions for specific immunotherapy as causal treatment among dermatologists, pediatricians, and ENT physicians was between 6% and 7%; the percentage among pneumologists was much lower at 3%. General practitioners had the lowest rate of prescriptions for specific immunotherapy at nearly 1%.

Table 2 Age and gender distribution of persons suffering from grass pollen allergy.

	Dermatologists	General practitioners	Pediatricians	ENT specialists	Pneumologists
Patients diagnosed with grass pollen allergy (patients in the database)	8,245	22,562	7,857	8,005	3,241
Up to 17 years	967	2,283	7,857	1,331	437
Male	528	1,330	4,931	765	251
Female	439	953	2,926	566	186
18+	7,278	20,279	0	6,674	2,804
Male	2,716	9,192	0	2,941	1,241
Female	4,562	11,087	0	3,733	1,563
Total male	3,244	10,522	4,931	3,706	1,492
Total female	5,001	12,040	2,926	4,299	1,749
Up to 17 years	11.7%	10.1%	100.0%	16.6%	13.5%
Male	54.6%	58.3%	62.8%	57.5%	57.4%
Female	45.4%	41.7%	37.2%	42.5%	42.6%
18+	88.3%	89.9%		83.4%	86.5%
Male	37.3%	45.3%		44.1%	44.3%
Female	62.7%	54.7%		55.9%	55.7%
Total male	39.3%	46.6%	62.8%	46.3%	46.0%
Total female	60.7%	53.4%	37.2%	53.7%	54.0%

Grass pollen allergy

1,844 patients with grass pollen allergies were treated with specific immunotherapy. For 2,813 prescriptions, this corresponds to about 1.5 prescriptions per treated patient (Figure 1). The analysis of specific immunotherapy by administration route shows that subcutaneous administration was chosen at least 50% of the time by all specialties. The highest rate of subcutaneous administration was reported by pediatricians (78%), followed by dermatologists (74%) and ENT specialists (70%). General practitioners used subcutaneous administration 62% of the time, while pneumologists were the least likely to choose this route; 50% of patients with grass pollen allergies were treated with subcutaneous/sublingual specific immunotherapy (Figure 3).

House dust mite allergy

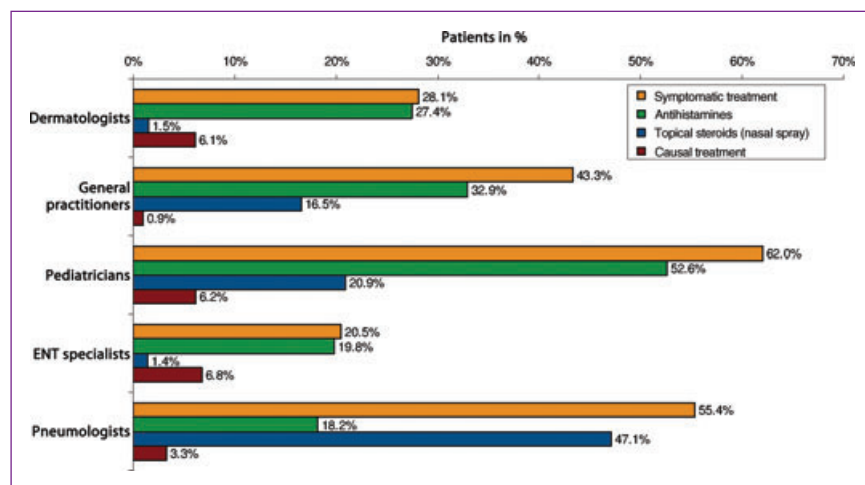
A total of 2,455 patients with house dust mite allergies were treated in 2010. 5,061 prescriptions were given, or about 2.1 prescriptions per patient. The treatment profile shows significant differences between these patients and those with grass

pollen allergies (Figure 2). Here, too, antihistamines were used for symptomatic treatment, although topical steroids were given significantly more often. This was especially evident among pediatricians who prescribed topical steroids much more often than antihistamines (33% vs. 29%). Comparable figures were found for general practitioners (23% vs. 18%). The situation is different for dermatologists and ENT specialists where antihistamines continue to be the most frequently prescribed drug for the treatment of house dust mite allergies (24% among dermatologists and 17% among ENT specialists).

Specific immunotherapy for the treatment of house dust mite allergy was prescribed in 541 patients. There were a total of 811 prescriptions, and as for people with grass pollen allergies, there were 1.5 prescriptions per treated patient. The data also show that, for these patients, specific immunotherapy was more often prescribed by all specialties, most often by ENT specialists (16%). Dermatologists administered specific immunotherapy in nearly 11% of patients with house dust mite allergies. Pneumologists also performed subcutaneous immunotherapy in patients with house dust mite allergies more often than in those with a grass pollen allergy (8%). The prescription rates for subcutaneous versus sublingual immunotherapy show that

Table 3 Age and gender distribution of persons with house dust mite allergies.

	Dermatologists	General practitioners	Pediatricians	ENT specialists	Pneumologists
Patients diagnosed with house dust mite allergy (patients in the database)	1,461	675	1,776	1,224	615
Up to 17 years	244	118	1,776	279	147
Male	123	63	1,099	169	85
Female	121	55	677	110	62
18+	1,217	557		945	468
Male	496	250		463	215
Female	721	307		482	253
Total male	619	313	1,099	632	300
Total female	842	362	677	592	315
Up to 17 years	16.7%	17.5%	100.0%	22.8%	23.9%
Male	50.4%	53.4%	61.9%	60.6%	57.8%
Female	49.6%	46.6%	38.1%	39.4%	42.2%
18+	83.3%	82.5%		77.2%	76.1%
Male	40.8%	44.9%		49.0%	45.9%
Female	59.2%	55.1%		51.0%	54.1%
Total male	42.4%	46.4%	61.9%	51.6%	48.8%
Total female	57.6%	53.6%	38.1%	48.4%	51.2%


Figure 1 Treatment profile of patients with grass pollen allergies in 2010.

a high rate of subcutaneous immunotherapy treatments across specialties. Pneumologists prescribed subcutaneous treatment to 67.4% of their patients. Among other specialists, the rate was significantly higher; among general practitioners it was around 84%, and among allergy specialists (dermatologists, pediatricians, and ENT specialist) it was more than 95% (Figure 3).

Discussion

The data in the present study underscore the differences between patients with grass pollen allergies and house dust mite allergies in terms of age and sex as well as the treatment profile according to medical specialty.

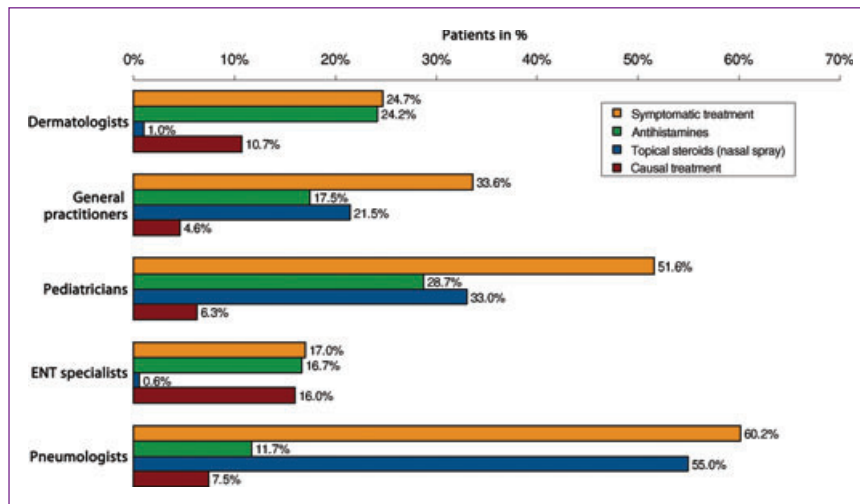


Figure 2 Treatment of persons with house dust mite allergies in 2010.

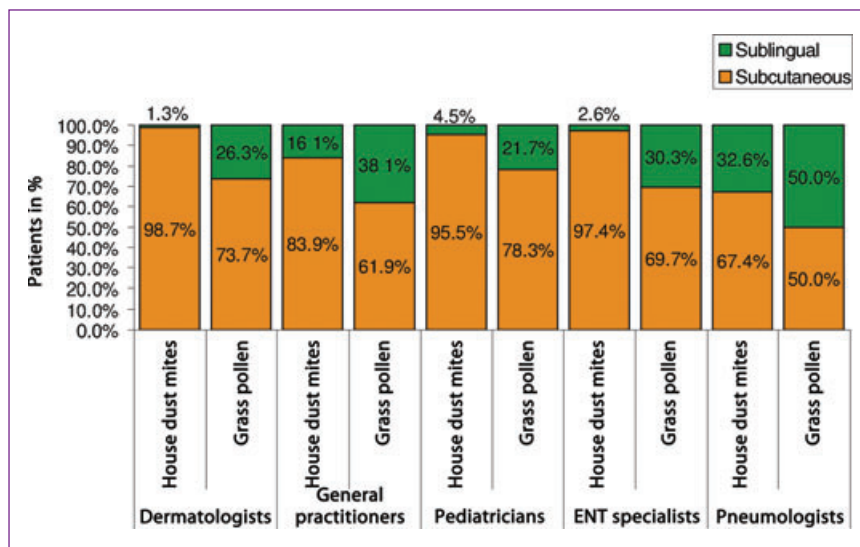


Figure 3 Subcutaneous versus sublingual allergen-specific immunotherapy (SIT) of patients suffering from grass pollen allergies in comparison to persons with house dust mite allergies in 2010.

Treatment of patients with grass pollen and house dust mite allergies

Grass pollen allergies are the most common form of pollen allergy among children and adults [21]. The present study shows that patients with grass pollen allergies primarily consult general practitioners and internists and less often see specialists whose training includes the treatment of allergic diseases. By way of contrast, patients with house dust mite allergies tended to be treated by doctors whose specialty includes the treatment of allergic diseases, while general practitioners and internists were less likely to report this diagnosis among their patients. There may be two reasons for this: first, allergic rhinoconjunctivitis due to grass pollen allergy is not especially difficult to diagnose or treat for the

non-specialist. The larger number of patients diagnosed with house dust mite allergies by specialists is due to more severe symptoms, given that this is a perennial allergen. In terms of percentages, pneumologists reported the highest number of patients with house dust mite allergies. This was followed by pediatricians, dermatologists, and ENT specialists. These results make sense, because people with house dust mite allergies very often have allergic bronchial asthma and therefore must consult a specialist for treatment.

Significance of age and sex

The data on age and sex distribution of patients with grass pollen and house dust mite allergies confirm the observations found in the literature. During childhood, boys are more

frequently affected by type I hypersensitivities [22]. This applies to grass pollen as well as house dust mite allergies, although the effect appears to be more marked among patients with house dust mite allergies (the ratio among patients with grass allergies: 1.54 [boys] to 1.48 [girls]). These differences between the sexes are not seen among adult patients. There is a tendency among female adults to be affected more often. Similar findings have been reported in the literature for other allergic diseases as well, such as allergic asthma, which also affects boys more often until after puberty when the situation is reversed. Similar results have been reported for food allergies [23].

On the whole, our own results, like those reported by other studies, indicate that sex hormones are an important part of sensitization and triggering of IgE-mediated allergies. Testosterone probably counteracts sensitization, while estrogen appears to promote clinically relevant allergies in particular [25]. Yet the effects of hormones on the various cells of the immune system are highly complex and also depend on the expression of their individual receptors to various cells (e.g., lymphocytes, antigen-presenting cells, mast cells). Another possible factor in the difference between the sexes is the discrepancy between men and women in regard to seeking treatment, which is similar for other diseases as well [24].

Analysis of Treatment Profile

The analysis of the treatment profile of patients with grass pollen allergy or house dust mite allergy shows that symptomatic treatment is very common. Specific immunotherapy, a causal treatment, is used only in a small percentage of patients. Symptomatic treatment is performed by private practice physicians across all fields. Therapy consists of antihistamines and only a smaller percentage of patients are treated with topical steroids. The higher rate of prescribing topical corticosteroids suggests that for house dust mite allergies, the allergic reaction is generally more severe and thus requires more intense treatment. In accordance with the ARIA recommendations, allergic rhinitis patients with year-round symptoms should be treated with topical steroids. Although this tendency was also evident in our sample, antihistamines were the most often prescribed treatment, as they were for patients with grass pollen allergies.

There was a very low prescription rate for specific immunotherapy treatments compared with prescriptions overall. As may be expected, specific immunotherapy treatments were mainly performed by specialists who were certified in allergy. Specific immunotherapy treatments were given more often for house dust mite allergies.

The analysis of the administration route shows that subcutaneous immunotherapy was the first choice across all

fields. Only pneumologists had a significantly higher rate of administering sublingual therapy: 50% for patients with grass pollen allergies. Among the other specializations, the results were comparable. A high percentage of subcutaneous immunotherapy is prescribed for house dust mite allergies by dermatologists, pediatricians, and ENT specialists. The rate of sublingual immunotherapy treatments among these specialties for grass pollen allergies is about 30%. One reason for the difference in administration route is that licensed sublingual preparations are currently available only for grass pollen allergies and should be preferably used [7].

Limitations

The present study is a retrospective analysis based on a large epidemiological database and thus has certain limitations. This includes the fact that the data represent individual private practices and therefore do not show entire treatment courses. The data presented here illustrate merely a portion of the treatment course (the same applies to the number of prescriptions per patient). In addition, it is impossible to draw any conclusions on the degree to which the various specializations are linked.

Further limitations include lacking information on the confirmation of the diagnoses and the severity of disease. Only the ICD diagnoses were coded. There are no data on the severity of symptoms or the duration of disease. Still, the data indicate that patients with grass pollen allergies are primarily seen and treated by general practitioners and internists, while patients with house dust mite allergies are mainly treated by specialists with certification in allergy. Hence there are differences in the administration of treatment. Specific immunotherapy is given more often to patients with house dust mite allergies who consult specialists with certification in allergy. This raises the question of whether specific immunotherapy treatment, which is supported by excellent data on efficacy and tolerability (for both subcutaneous and sublingual preparations), is not administered to many patients because they are underrepresented among specialists with certification in allergy. Increased communication between the various specialties is desirable in order to optimize patient care. The data on the percentages of sublingual and subcutaneous immunotherapy show that specific immunotherapy is given in accordance with the guidelines. These recommend subcutaneous immunotherapy primarily for grass pollen allergies, while sublingual immunotherapy is exclusively recommended for grass pollen allergies. Sublingual immunotherapy is only rarely administered for house dust mite allergies by any specialist. The percentage of sublingual treatments for grass pollen allergies, for which several preparations have been approved, is about one-third

of patients. The present data do not allow one to ascertain whether the specifics of administration, e.g., the treatment duration, are in accordance with the guidelines. This should be examined by further studies. Another aspect is the analysis of the onset of allergic diseases such as bronchial asthma. A comparative prospective study of patients who have been given symptomatic treatment and those who have received specific immunotherapy is needed.

In general, the data show the need for a better communication between general practitioners/internists and specialists in terms of allergy diagnosis and treatment options for patients with allergies. Specific immunotherapy, the only causal treatment, is performed in only a small number of patients with allergies in Germany. There is a need for action here, especially given that only specific immunotherapy can prevent the onset of new sensitizations and the development of allergic asthma.

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