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A study to assess current approaches of allergists in European countries diagnosing and managing children and adolescents with peanut allergy

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Abstract

Rationale

Food allergy is documented to result in considerable morbidity, negative impact on quality of life, and substantial medical care costs. Although anecdotal data suggest widely varying practices in the diagnosis and management of food allergies, the diversity and relative frequency of these practices have not been documented.

Methods

A questionnaire was developed evaluating allergists' management approaches of individuals with peanut allergy (PA) in Germany (DE), France (FR), and the United Kingdom (UK).

Results

Here, we report the survey results from a total of 109 allergists from DE, FR and the UK. They reported to confirm PA at initial diagnosis using skin prick test (≥60%), while allergists from DE and FR reported using allergen-specific IgE testing more (>86%) compared to the UK (<50%). At initial diagnosis, oral food challenge was used less in DE (13%) and FR (14%) and very rarely in the UK (3%) to confirm diagnosis. Recognition of acute reactions, use of adrenaline auto-injectors and allergen avoidance were reported to be discussed with the patient/caregiver at the initial office visit by most allergists (>75%). Half of the responders reported assessing the patient's quality of life. 63% allergists reported retesting for PA resolution at a later date, with 45% allergists indicated to recommend ingestion of a normal serving of peanut regularly upon resolution. Lack of effective PA treatment was reported to be a 'very significant' barrier for optimal PA treatment, with allergists being less than 'moderately familiar' with data from clinical trials testing new treatments options for PA. Lastly,

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allergists stated that the severity of patient's PA ranked as the most important factor in their decision to recommend oral immunotherapy for PA treatment.

Conclusions

This survey provides essential insights into the practice of allergists and highlights some areas that would inform strategies for education and improving PA healthcare.

Introduction

The prevalence of food allergy (FA), and especially an allergy to peanuts, has increased in developed countries in recent years [1]. In European countries, the prevalence of FA among children aged 6 to 10 years is estimated to be between 1.4% to 3.8% [2].

Unlike other IgE-mediated FAs (allergy to cow's milk or egg) that are often outgrown, peanut allergy (PA) [3] is usually persistent and continues into adulthood in ~80% of affected individuals [4–6]. Peanuts are the most common cause of fatal food-induced anaphylaxis in many European countries [7]. Point prevalence analyses in multiple European countries estimate that 1.6% of European children live with PA, with estimations ranging from 0.24% to 2% depending on the diagnostic methods used [3].

Globally, PA is associated with a considerable disease burden due to multiple psychological, social, and economic factors [8]. A recent Europe-wide study shows that PA has a day-to-day impact on more than 80% of affected children and their parents/caregivers. In comparison, nearly 40% live with a high or extremely high level of stress, and a similar proportion of PA patients reported feeling frequently or very frequently frustrated due to their PA [9].

According to current European guidelines, the standard of care for PA is based on early symptom recognition, short-term symptomatic relief with H1/2 antihistamine blockers, management of acute anaphylactic reactions via intramuscular administration of adrenaline/epinephrine, and long-term strategies to reduce the risk of future reactions by strict avoidance of peanut [10, 11]. At the time of this publication, standardised oral biologic drug–PTAH (Peanut [*Arachis hypogaea*] allergen powder-dnfp) formally called AR101 (brand name PALFORZIA™), was approved by the US Food and Drug Administration (January 2020) as the first oral immunotherapy (OIT) indicated to mitigate allergic reactions following accidental exposure to peanuts in individuals aged 4–17 years with a confirmed diagnosis of PA [12], and was not approved by any other regulatory authorities.

Despite their high awareness about the Learning Early About Peanut Allergy (LEAP) study for the early introduction of dietary peanut for high-risk allergic infants [13], and accordingly modified National Institute of Allergy and Infectious Diseases guidelines, a survey reported that many paediatricians continue to have guideline implementation barriers [14].

While attempts are made to improve FA management broadly, to our knowledge, there are no robust analyses that compare the diagnostic and management decisions of allergists in different European countries, specifically in the field of PA. Given the substantial burden on PA patients, caregivers, families and society, the present survey was undertaken to assess existing practices and awareness of allergists caring for young children and teenagers with PA in Germany (DE), France, (FR), the United Kingdom (UK). The data presented in this publication show the survey results from the three European countries only. The ultimate goal of the survey was to document and compare the relative practices of allergists treating PA patients to highlight areas that could be supported by medical education and training in order to improve PA healthcare.

Methods

Survey design

A 25-item questionnaire was developed to investigate current allergist approaches to the diagnosis and management of paediatric patients with PA. The survey included two patient case vignettes with associated questions to assess management choices, knowledge, attitudes and perceived barriers to optimal care for patients with PA. The survey was translated for FR and DE allergists, and distributed via email to allergists in FR, DE, UK and the United States of America during July 2019. The responses were collected anonymously, and data from FR, DE and UK are presented in the current manuscript. Detailed descriptions of case vignettes and questions used in the survey are available in the Supplementary Information.

Participant recruitment

The survey was distributed to 6450 allergists in three European countries (1185 in FR, 3350 in DE, 1915 in the UK). The inclusion criterion was physicians actively managing patients younger than 18 years of age with PA. A monetary incentive (equivalent to 50 USD) was offered to allergists for their participation, which was expected to take about 25 minutes to complete.

Statistical analysis

Survey responses were collected via an online platform. Survey data were compiled from each country, and open-ended responses from FR and DE were translated to English. The data were analysed with IBM SPSS Statistics 25. Descriptive statistics (frequencies and means) were calculated to examine overall responses and related trends among survey items. Inferential statistics (analysis of variance (ANOVA) for the Likert scale questions, and Chi-square distribution test for select one or select all questions) were performed to interpret differences between allergists responses, practising in different countries. Differences between groups were considered statistically significant at $p \leq 0.05$.

Results

Study participants

A total of 109 allergists (38 from DE, 36 from FR and 35 from the UK) completed the survey, with a response rate of 1.69% for all countries (1.13% for DE, 3.04% for FR and 1.83% for the UK). The allergists enrolled in this survey reported seeing a similar number of patients with PA per month, with an average of 14 patients per month (Table 1). Most patients who attended

Table 1. Demographics of physicians who participated in the survey.

	Average* (n = 109)	DE (n = 38)	FR (n = 36)	UK (n = 35)
Mean number of patients with PA seen per month	14	15	12	16
Mean number of PA patients <18 years seen per month	10	9	9	13
Primary practice setting (%)				
Private/Community	65	71	89	34
Academic/University	35	29	11	66
Practice location (%)				
Urban	77	74	78	80
Suburban	13	16	8	14
Rural	10	11	14	6

Data regarding the practice characteristics were collected on each respondent as a part of the survey. PA, peanut allergy.

*Represents the average value of France (FR), Germany (DE) and the United Kingdom (UK).

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were less than 18 years of age in all countries, with an average of 10 patients per month. In DE and FR, the majority of allergists' primary practice was private or community-based, while in the UK, most allergists practised in an academic or university setting.

Primary assessment approaches for diagnosis and management of PA diagnosing and verifying PA. At initial diagnosis, 71% of allergists (61% DE, 86% FR, 66% UK) reported performing a skin prick test (SPT) and 77% (95% DE, 86% FR, 49% UK) reported performing an allergen-specific IgE (sIgE) test for a 2-year old child's first PA evaluation (Fig 1A).

In an adolescent patient with long-standing PA and difficulty adhering to peanut avoidance, 64% of allergists (61% DE, 72% FR, 60% UK) reported performing a SPT, and 63% (66% DE, 78% FR, 46% UK) reported performing a sIgE test to reconfirm a PA diagnosis (Fig 1A). At that same point, 32% of allergists (37% DE, 42% FR, 17% UK) would choose to perform an oral food challenge (OFC) to reconfirm the PA diagnosis for the adolescent patient (S1 Table Q6). In a scenario where the patient's sIgE and SPT results were indeterminate at retesting, almost half of all respondents in each country (45% DE, 47% FR, 43% UK) would perform an OFC (S1 Fig in S1 File). In contrast, 39% of allergists (39% DE, 29% FR, 49% UK) would recommend their patient to continue peanut avoidance without further testing. At this stage, 13% of allergists (13% DE, 22% FR, 3% UK) would recommend OIT to the patient (S1 Table Q8). 14% of allergists (21% DE, 19% FR, 3% UK) reported never conducting OFCs in their patients (S1 Table Q9).

Initial management. At the initial office visit of a child with a potential PA diagnosis, 92% of allergists (92% DE, 97% FR, 86% UK) reported discussing recognition of acute reactions personally with the patient's caregiver (Fig 1B). At this stage, 79% of allergists (79% DE, 81% FR, 77% UK) stated discussing the usage of epinephrine/adrenaline auto-injector, whereas 91% (92% DE, 94% FR, 86% UK) reported discussing allergen avoidance personally with their patient's caregiver (Fig 1B).

In a patient with long-standing PA returning with difficulty avoiding peanuts, 65% of allergists (66% DE, 58% FR, 71% UK) reported to renew or revise the emergency action plan of the patient (Fig 1B). Additionally, 64% of allergists (58% DE, 50% FR, 83% UK) would reinforce previous education about PA management, and 34% (42% DE, 33% FR, 26% UK) would assess patient's nutritional status (Fig 1B).

At the initial office visit of a child with potential PA, 62% of allergists (61% DE, 61% FR, 63% UK) reported discussing the impact of PA on Quality of Life (QoL) personally with the child's caregiver (Fig 1C). As part of the initial management of a long-standing PA patient returning with avoidance difficulties, 50% of allergists (42% DE, 47% FR, 60% UK) reported performing QoL assessment (Fig 1C) wherein the majority (81% DE, 82% FR, 81% UK) opted for subjective QoL assessment, rather than using a standardised assessment tool (S2 Fig in S1 File). For the same patient, on a scale from 'not at all' (1) to 'extremely significant' (5), allergists responded that maximising patient's QoL, preventing serious reactions and relieving parent anxiety were between 'very' and 'extremely significant' goals in managing that patient (S3 Fig in S1 File).

In general, when asked to rate on the level of significance, how does PA negatively affect QoL of their patients, from 'not at all' (1) to 'extremely significant' (5), respondents from all countries stated 'moderately significant' (3.66 DE, 3.56 FR, 3.54 UK, S3 Fig in S1 File).

Retesting and follow-up management. After initial management of a child with newly diagnosed PA, 63% of allergists (58% DE, 61% FR, 69% UK) reported retesting the resolution of PA at a later date (Fig 1D). With regards to retesting frequency for the same patient, 29% of allergists (18% DE, 56% FR, 14% UK) stated to follow patients up bi-annually, whereas 24% (5% DE, 22% FR, 46% UK) would see the patient yearly (S4 Fig in S1 File). A majority of DE allergists (53%) would follow-up with the patient every three months (S1 Table Q3). In

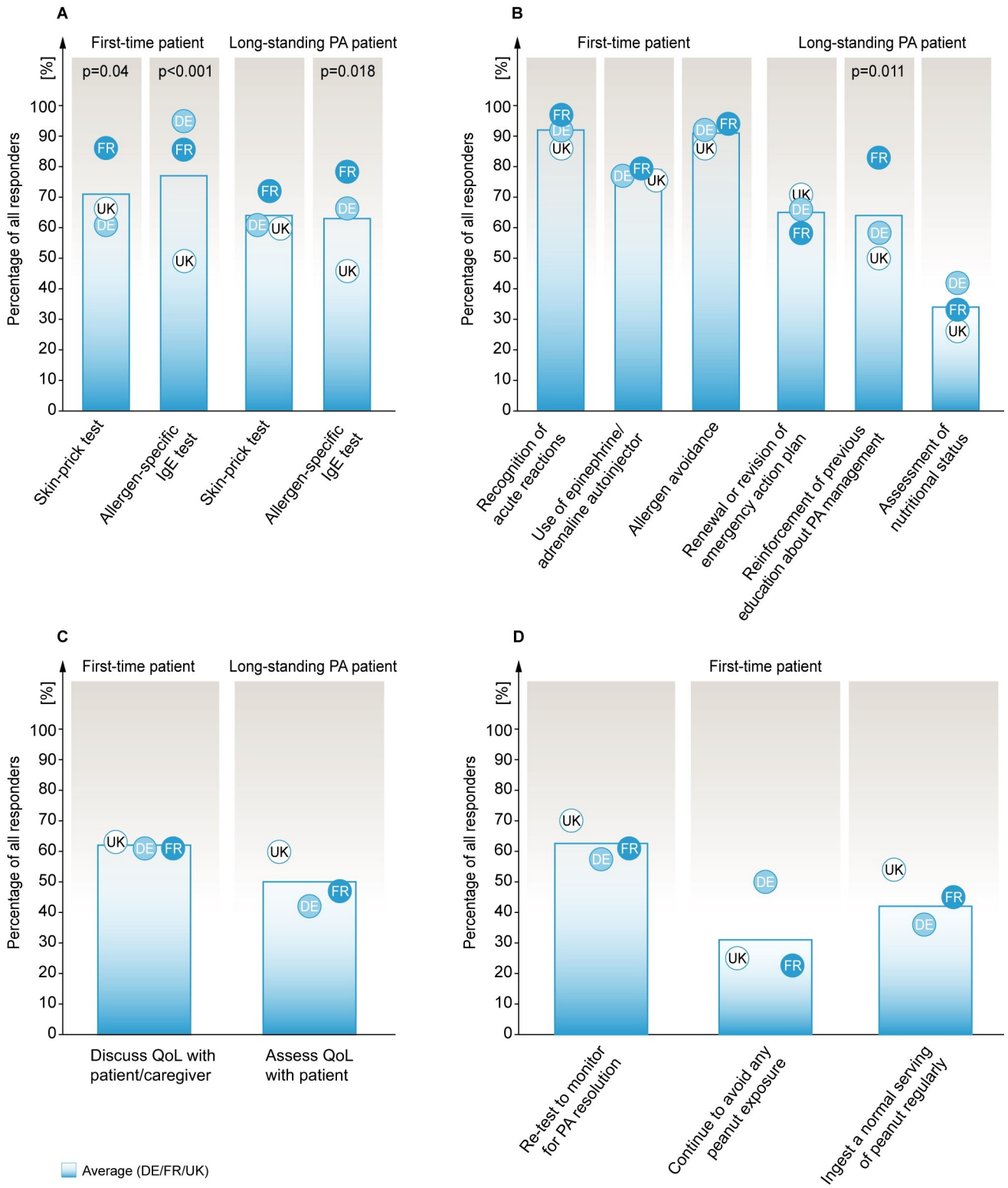

Fig 1. Primary assessment approaches towards PA diagnosis and management. Panels A-D: Percentage of all responses are shown. **A.** Choices of diagnostic tests performed to confirm PA for the first-time patient with potential PA and a long-standing patient for re-confirming PA. **B.** Topics discussed by allergists at the initial office visit with a first-time or long-standing patient with PA and their caregivers. **C.** Discussions about QoL with patients/caregivers. **D.** Monitoring for resolution of PA after confirming the diagnosis in a first-time PA patient. Blue gradient bar shows average results for responses from France (FR), Germany (DE) and the United Kingdom (UK) (n = 109; FR (36), DE (38), UK (35)), and circles represent individual

countries with the respective two-letter acronym. Only statistically significant p values from Chi-Square distribution analyses comparing differences among the three individual countries. ($p \leq 0.05$). IgE, Immunoglobulin E; PA, peanut allergy; OIT, oral immunotherapy; OFC, oral food challenge.

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addition, 10% of allergists (13% DE, 3% FR, 14% UK) stated to follow-up only as needed (S4 Fig in S1 File).

Upon the patient's PA resolution at a later date, 45% of allergists (36% DE, 45% FR, 54% UK) stated to recommend the patient ingest a normal serving of peanut regularly (Fig 1D). In comparison, 33% of allergists (50% DE, 23% FR, 25% UK) would recommend the patient to continue complete avoidance of peanut exposure (Fig 1D).

Factors influencing decision making regarding PA treatment

Out of five presented issues, allergists rated lack of effective PA treatments other than avoidance, the ubiquity of peanut in the patients' environment, and misconceptions or myths about PA as 'moderate' (≥ 3) to 'very significant' (≥ 4) barriers affecting optimal management of their PA patients (Fig 2A, S1 Table Q13).

In response to rating their familiarity of four emerging therapies for PA (PTAH/AR101 OIT, peanut subcutaneous immunotherapy (SCIT), peanut sublingual immunotherapy (SLIT) and peanut epicutaneous immunotherapy (EPIT)), allergists from all countries responded to be between 'slightly' (≥ 2) and 'moderately familiar' (≥ 3) for all four emerging therapies, except DE and UK allergists being less than 'slightly familiar' with EPIT (1.97) and SCIT (1.91) respectively (Fig 2B, S1 Table Q19).

Around half of all allergists (37% DE, 42% FR, 54% UK) responded correctly to which among the three routes of immunotherapies (SLIT, EPIT or OIT) demonstrated a 100-fold increase from baseline in the median tolerated dose after 12 months of treatment in a well-controlled clinical trial setting, with OIT being the correct option (S1 Table Q17). Around half of all allergists were 'unaware/unsure' about the safety data from different clinical trials comparing OIT with two routes of immunotherapies (SLIT or EPIT) as treatments for PA (S1 Table, Q18). Also, around 34% of allergists (34% DE, 39% FR, 29% UK) were aware that EPIT as PA treatment was not associated with similar rates of adverse reactions from different clinical trials compared to OIT (S1 Table Q18).

Allergists from all countries stated being between 'moderately' (≥ 3) and 'very concerned' (≥ 4) about the following aspects related to use of investigational OIT for PA treatment: risk of adverse effects, the need for maintenance dosing, lack of efficacy, patient's reluctance to undergo immunotherapy, patient's lack of adherence to immunotherapy treatment, lack of data supporting long-term outcomes and logistics of therapy administration (Fig 2C and S1 Table Q23).

Allergists were also in agreement that data supporting efficacy and safety profiles were between 'very' (≥ 4) and 'extremely significant' (5) factors in selecting between treatments, if multiple immunotherapies became available for PA treatment (Fig 2D, S1 Table Q21). Also, other factors such as the potential for loss of desensitisation when therapy is discontinued, the burden of scheduling and time required for treatments, cost or insurance coverage, convenience, and ability to assess patient response were between 'moderate' (≥ 3) and 'very significant' decision elements when choosing between multiple immunotherapies (Fig 2D and S1 Table Q21). Allergists also stated that efficacy and safety data from clinical trials, real-world data, approval by The Food and Drug Administration and inclusion of treatment in nationally recognised treatment guidelines were between 'very' (≥ 4) and 'extremely important' (5) factors in improving their comfort level in considering implementation of a new drug or treatment (S1 Table Q22).

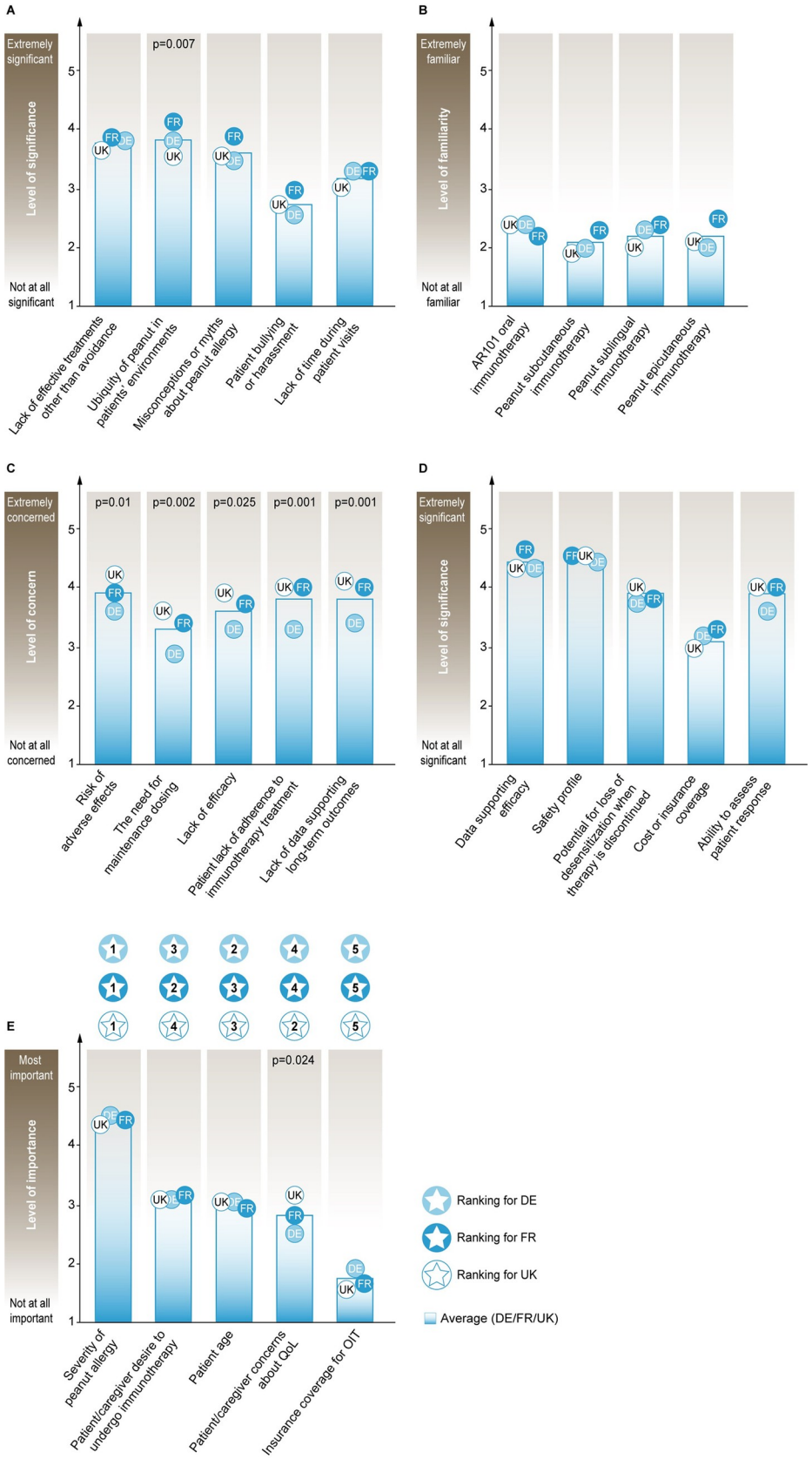
A
Extremely significant
Level of significance
Not at all significant
p=0.007
Lack of effective treatments other than avoidance
Ubiquity of peanut in patients' environments
Misconceptions or myths about peanut allergy
Patient bullying or harassment
Lack of time during patient visits
B
Extremely familiar
Level of familiarity
Not at all familiar
AR101 oral immunotherapy
Peanut subcutaneous immunotherapy
Peanut sublingual immunotherapy
Peanut epicutaneous immunotherapy
C
Extremely concerned
Level of concern
Not at all concerned
p=0.01
p=0.002
p=0.025
p=0.001
p=0.001
Risk of adverse effects
The need for maintenance dosing
Lack of efficacy
Patient lack of adherence to immunotherapy treatment
Lack of data supporting long-term outcomes
D
Extremely significant
Level of significance
Not at all significant
Data supporting efficacy
Safety profile
Potential for loss of desensitization when therapy is discontinued
Cost or insurance coverage
Ability to assess patient response
E
Most important
Level of importance
Not at all important
p=0.024
Severity of peanut allergy
Patient/caregiver desire to undergo immunotherapy
Patient age
Patient/caregiver concerns about QoL
Insurance coverage for OIT
Ranking for DE
Ranking for FR
Ranking for UK
Average (DE/FR/UK)

Fig 2. Factors influencing decision-making regarding PA treatment. Panels A-E: Mean scores of allergists' responses are shown. **A.** Significant barriers to the optimal management of patients with PA. **B.** Familiarity with clinical trials regarding emerging therapies for PA. **C.** Concerns with aspects related to investigational OIT for PA. **D.** Significance of factors in selecting between treatments, if multiple immunotherapies for PA become available. **E.** Factors important in the decision to recommend OIT for PA treatment ranked with the highest score at 1st Rank and lowest at 5th Rank; Blue gradient bar shows average results for responses from France (FR), Germany (DE) and the United Kingdom (UK) (n = 109; FR (36), DE (38), UK (35)), and circles represent individual countries with the respective two-letter acronym. Only statistically significant p-values from ANOVA tests comparing differences among the three individual countries ($p \leq 0.05$) are shown in figures. PA, peanut allergy; OIT, oral immunotherapy.

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When considering OIT for a patient with PA, allergists were asked to rank five presented factors on a scale of importance (1 = most important and 5 = least important). The severity of PA of the given patient was ranked as the most important factor by allergists from all countries. Factors such as patient' s/caregiver's desire to undergo OIT, patient's/caregiver's concerns about QoL and patient's age were ranked second, third and fourth important factors. However, their order was different for the three surveyed countries (Fig 2E, S1 Table Q20). Insurance coverage for OIT ranked as the least important factor for all allergists while considering OIT for their PA patient (Fig 2E, S1 Table Q20).

Multidisciplinary care and shared decision-making for PA management

With regards to questions involving multidisciplinary care, two-thirds of all allergists (63% DE, 61% FR, 77% UK) reported typically including other HCPs in the management of their PA patients, with a dietician or a nutritionist as the preferred choice by allergists (92% DE, 82% FR, 96% UK) to refer their patients for PA management (S1 Table Q10 and Q10a).

In response to questions involving patient/caregiver in the final decision-making for their PA management, almost half of all allergists (29% DE, 58% FR, 46% UK) opted to involve the patient/parent in the final treatment decision-making (S1 Table Q16). Besides, one in three DE allergists (32%) would instead decide the treatment for their PA patients on their own, compared to around one in five in FR (19%) and one in ten in the UK (11%) (S1 Table Q16).

Discussion

Given the significant burden associated with PA, improving care for PA patients (especially children and adolescents) and caregivers remains a challenge for allergists globally. Identifying areas of support around allergists' education and training is critical for improved patient care and management of PA. This international survey provides essential insights regarding practising allergists' awareness and knowledge related to PA treatment in developed countries.

As PA is an IgE-mediated type I hypersensitivity reaction of the immune system to the consumption of or exposure to peanuts [15, 16], current European guidelines (EACCI) state that clinical diagnosis of PA can be made by the combination of a clinical presentation and evidence of peanut-specific IgE detected either by a positive SPT or sIgE test [17]. Results from the current study show that allergists commonly used diagnostic tests to confirm PA were SPT and sIgE test from all surveyed countries. Still, some reported performing either of them in the absence of a clear clinical presentation (S1 Table Q1). Of note, more than one-third of all respondents stated they would choose not to do a SPT in a returning patient with a history of PA. SPT and sIgE are sensitive methods to confirm the diagnosis of most FAs with positive predictive values generated based on the probability of allergic reaction during an OFC [18].

OFC may occasionally be required to make a definitive diagnosis of a FA. Still, with the advent of more specific diagnostic methods (such as allergen component testing and basophil activation test), the level of risk involved and the resource-intensive nature of conducting an

OFC calls for its use only for equivocal cases [19]. In consensus with the FA practice parameter update [20], if the patient has a convincing clinical history of an allergic response to the allergen, then performing OFC is deemed as high-risk and should ideally not be performed [21]. However, in case initial or follow-up diagnostic tests are negative or inconclusive (as presented in the survey, S1 Table Q8), then conducting an OFC is deemed low-risk and crucial, as a negative OFC result would contribute to a significant improvement in patient's QoL [21].

The survey results also show that most allergists across all surveyed countries reported they would discuss how to recognise acute reactions and avoid allergens at the initial visit with their patient/caregiver (Fig 1B). The British Society for Allergy and Clinical Immunology (BSACI) guidelines state that the safe management of anaphylaxis depends on early recognition and rapid intervention with epinephrine/adrenaline [22]. Renewal/revision of an emergency action plan, reinforcement of previous education about PA management, and discussing effects of PA on the QoL of patient/caregiver were other initial management steps reported to be performed by >40% allergists. An earlier study demonstrated that even though 95% of allergists (n = 500) adhered to the use of practice recommendations for the treatment and management of anaphylaxis, opportunities for improvement of patient education and information sharing were found, including providing of emergency plans and revising pre-existing plans [23], which is in line with this survey's findings.

Considering that the natural course of PA is different from other FAs, and does not resolve during early childhood [24], the current survey also provided insights on allergists' decisions regarding the frequency of follow-up evaluations to check for patient's PA resolution. Almost half of all allergists would not or were unsure of retesting their patients for resolution of PA at a later date (Fig 1D), a result that in light of other publications signifies potential impact on the QoL of the patient/caregiver due to psychological, social and economic burden on the affected family and society, caused by fear of accidental peanut exposure, bullying or feeling of being left out from social groups and events and maintenance of a peanut avoidance diet [9, 25]. In patients with resolved PA, half of the surveyed allergists indicated they would suggest the patient to consume a normal peanut intake regularly, while the other half would recommend continuing strict avoidance of peanut for their patients despite resolved PA (Fig 1D).

Allergists in the survey rated lack of effective treatments other than avoidance as a 'moderate' to 'very significant' barrier to PA management (Fig 2A), which was expected considering this survey was carried out before the first US approval of PTAH/AR101/ [26] and the lack of an approved PA treatment in Europe at present. The current investigational treatment landscape for PA includes immunotherapy administered via oral, sublingual, subcutaneous or epicutaneous routes [27]. A series of questions posed to the allergists in the survey showed that almost half of allergists were unsure/unaware of efficacy and safety data from different clinical trials regarding emerging therapies for PA (S1 Table Q17 & Q18). Allergists indicated that efficacy and safety data from clinical trials were between 'very' to 'extremely important' factors when recommending a new drug or treatment to their patients (S1 Table Q22). Currently, OIT efficacy is the highest compared to other routes for PA treatment, with data from large phase 3 trials concluding that treatment with PTAH AR101/OIT resulted in desensitisation in children (4–17 years) who were highly allergic to peanut [28]. Despite its clear efficacy profiles in terms of desensitisation, OIT is also associated with higher rates of systemic adverse events [27] which have recently been analysed in detail by two large meta-analyses [29, 30]. These observations are consistent with the proposal that physicians, prospective patients and their caregivers should approach OIT as a nuanced and shared decision. Potential patients and caregivers should weigh the risks of treatment-related side-effects of OIT against the uncertainty and risk of allergic reactions due to accidental exposure inherent with strict avoidance only [31].

The current survey also highlights some of the ambiguity regarding OIT among the allergist community. Allergists were generally 'very concerned' about the safety and long-term OIT as PA treatment (Fig 2C, S1 Table Q23). With regards to choosing the appropriate treatment for their PA patient, in a scenario where multiple therapies would be approved, allergists were in unison that data supporting treatment efficacy, safety and post-treatment loss of desensitisation were between 'moderate' to 'very significant' factors (Fig 2D). These results indicate the need for better communication of ongoing and future studies with promising efficacy and safety profiles that could improve PA management.

Data from the current survey show most allergists would typically include other HCPs in the multidisciplinary management of their PA patients (S1 Table Q10). These findings are in line with the previous results from US allergists, who reported that 20% of patients with anaphylaxis referred to primary care and emergency department physicians are misdiagnosed [32]. Also, when considering shared decision-making regarding PA treatment with their patients/caregivers, most allergists stated their preference to share or partially share the responsibility for deciding the optimal treatment (S1 Table Q16). To highlight the importance of multidisciplinary management of PA, recent reports highlight the continuous efforts made to help PA caregivers navigate through emerging therapies and decide on the best treatment choice for their patients [33, 34].

Some limitations should be considered when interpreting the results of this study. Heterogeneity among groups concerning allergists' qualifications, practice settings and locations leading to possible variations in levels of experience, knowledge and awareness compared to the norm. Selected countries were targeted to represent practices in PA management in developed countries. Although the survey was distributed to a large number of allergists in all countries, the sample size of 109 allergists who completed the survey suggests that the results should be interpreted with care, as the number of respondents may not be fully representative. One could speculate that the complexity of the questions and the amount of time taken to complete the survey (around 25 minutes) could be a reason for the low response rate. Additionally, the focus of the questions and the choice of the two case vignettes could have led to answer bias and does not represent the complete spectrum of PA cases that exist.

Conclusion

This study revealed essential insights into the current allergists' approaches to the diagnosis and management of their PA patients. Allergists from surveyed countries reported the use of different diagnosis and management methods in treating PA patients, including confirmation of PA diagnosis, performing OFCs, discussions of initial management issues or follow-ups to check for PA resolution. Further, it also demonstrates the allergists' self-reported levels of awareness of and concerns around the data from emerging PA therapies and the use of multidisciplinary collaboration and shared decision making with the patient/caregivers.

Supporting information

S1 File.
(TIF)

S1 Table. Supplementary results.
(DOCX)

S2 Table. A list of all survey questions.
(DOCX)

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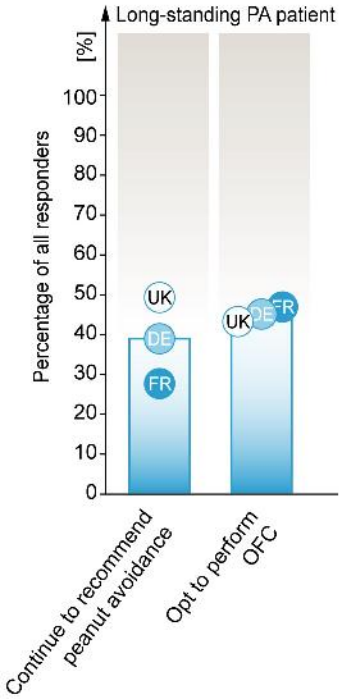
S1 Fig



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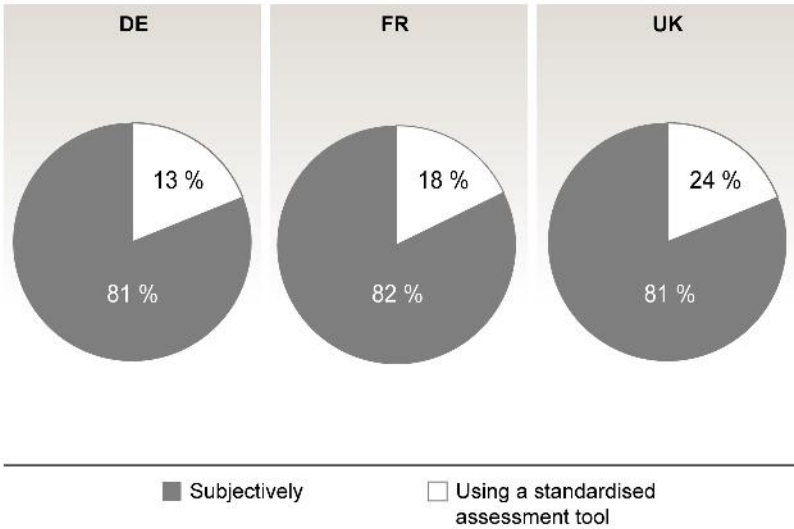

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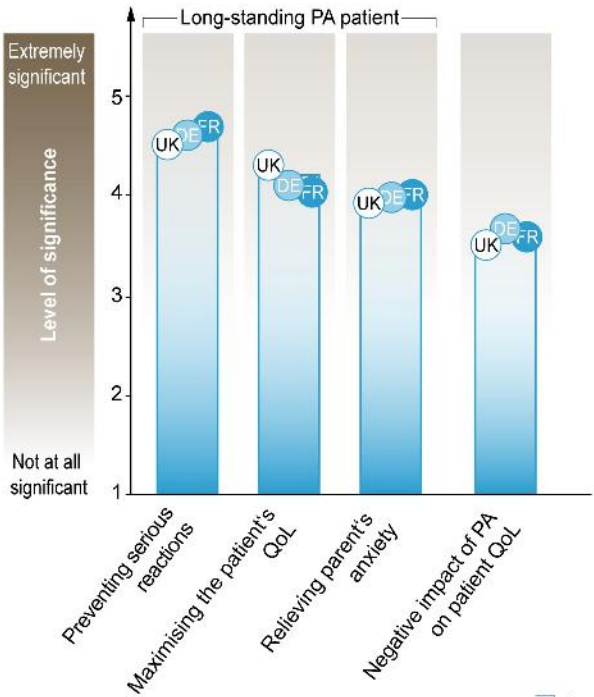

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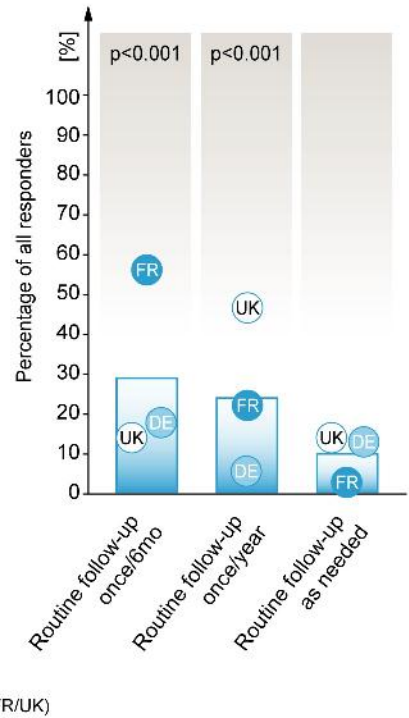

S1 Table. Supplementary results.

	DE (N=38)	FR (N=36)	UK (N=35)	EUR (N=109)	p-value (3-way comparison)
Screening Questions					
Approximately how many patients do you manage for peanut allergy each month?	15	12	16	14	0.295
Approximately how many patients <18 years old do you manage for peanut allergy each month?	9	9	12	10	0.25
What is your primary practice setting?					
Community-based (most patients are seen in a private practice/community hospital)	71%	89%	34%	65%	<0.001
Academic-based (most patients are seen in a university/academic hospital)	29%	11%	66%	35%	<0.001
Case #1					
1. What testing would you perform to confirm a diagnosis at this time? (select all that apply)					
Allergen-specific IgE	95%	86%	49%	77%	<0.001
Allergen-specific IgG4	16%	6%	6%	9%	0.216
Intradermal test	13%	19%	6%	13%	0.224
Oral food challenge	13%	14%	3%	10%	0.225
Peanut component testing (eg, IgE to Ara h 1, 2, 3)	71%	50%	31%	51%	0.003
Skin prick test	61%	86%	66%	71%	0.04
Total serum IgE	63%	31%	34%	43%	0.008
Other	3%	0%	0%	1%	0.390
I would not perform any testing in this patient	0%	6%	14%	7%	0.044
2. Which of these (with or without the help of your staff) would you discuss with the patient and his mother at this visit or a follow-up visit? (select one for each item)					
Recognition of acute reactions					0.487
Refer to a dietician or other healthcare provider to discuss	5%	3%	11%	6%	0.310
I would discuss at this visit	92%	97%	86%	92%	0.211
I would discuss at a later visit	3%	0%	3%	2%	0.604
I would not routinely discuss	0%	0%	0%	0%	-
Use of adrenaline auto-injector					0.086
Refer to a dietician or other healthcare provider to discuss	0%	0%	6%	2%	0.116
I would discuss at this visit	79%	81%	77%	79%	0.94
I would discuss at a later visit	16%	19%	6%	14%	0.221
I would not routinely discuss	5%	0%	11%	5%	0.107
Allergen avoidance					0.676
Refer to a dietician or other healthcare provider to discuss	5%	6%	11%	7%	0.530

	DE (N=38)	FR (N=36)	UK (N=35)	EUR (N=109)	p-value (3-way comparison)
I would discuss at this visit	92%	94%	86%	91%	0.419
I would discuss at a later visit	3%	0%	3%	2%	0.604
I would not routinely discuss	0%	0%	0%	0%	-
Interpreting ingredient lists and food labels					0.358
Refer to a dietician or other healthcare provider to discuss	29%	14%	34%	26%	0.123
I would discuss at this visit	66%	78%	60%	68%	0.26
I would discuss at a later visit	3%	8%	3%	5%	0.422
I would not routinely discuss	3%	0%	3%	2%	0.604
Investigational therapies					0.025
Refer to a dietician or other healthcare provider to discuss	0%	0%	6%	2%	0.116
I would discuss at this visit	26%	8%	34%	23%	0.028
I would discuss at a later visit	37%	44%	17%	33%	0.042
I would not routinely discuss	37%	47%	43%	42%	0.662
Peanut allergy impact on quality of life					0.267
Refer to a dietician or other healthcare provider to discuss	5%	0%	6%	4%	0.357
I would discuss at this visit	61%	61%	63%	62%	0.978
I would discuss at a later visit	24%	39%	23%	29%	0.236
I would not routinely discuss	11%	0%	9%	7%	0.149
Prognosis					0.116
Refer to a dietician or other healthcare provider to discuss	0%	0%	0%	0%	-
I would discuss at this visit	76%	56%	83%	72%	0.028
I would discuss at a later visit	21%	36%	14%	24%	0.086
I would not routinely discuss	3%	8%	3%	5%	0.422
3. After his family becomes comfortable with food allergy management, approximately how frequently would you routinely see this patient back for follow-up? (select only one)					<0.001
Monthly	11%	0%	6%	6%	0.139
Every 3 months	53%	19%	17%	30%	0.001
Every 6 months	18%	56%	14%	29%	<0.001
Yearly	5%	22%	46%	24%	<0.001
Follow-up only as needed	13%	3%	14%	10%	0.202
Other	0%	0%	3%	1%	0.344
4. Would you re-test this patient for peanut allergy at a later date to monitor for peanut allergy resolution? (select only one)					0.251
Yes	58%	61%	69%	63%	0.631
No	16%	28%	11%	18%	0.181
Unsure	26%	11%	20%	19%	0.251
4a. If this patient's peanut allergy resolved, which recommendation would you make regarding peanut consumption and exposure? (select only one)					0.459
Continue to avoid any peanut exposure to the extent possible	50%	23%	25%	33%	0.098
Eat only small servings of peanut on rare occasion	9%	18%	13%	13%	0.667

	DE (N=38)	FR (N=36)	UK (N=35)	EUR (N=109)	p-value (3-way comparison)
Ingest a normal serving of peanut regularly	36%	45%	54%	45%	0.48
Other	5%	14%	8%	9%	0.565

5. When would you re-evaluate this patient for peanut allergy? (select only one)					0.623
Every six months	8%	6%	9%	8%	0.865
Yearly	33%	50%	26%	36%	0.093
Every 2-3 years	31%	25%	34%	30%	0.690
Other (please specify)	6%	3%	0%	3%	0.366
I would not re-test this patient for peanut allergy	14%	14%	23%	17%	0.508
Unsure	8%	3%	9%	7%	0.533
Case #2					
6. Which of the following would you perform at this time? (select all that apply)					
Assessment of nutritional status	42%	33%	26%	34%	0.334
Skin prick test	61%	72%	60%	64%	0.472
Total serum IgE	39%	22%	23%	28%	0.174
Other (please specify)	0%	0%	3%	1%	0.344
Assessment of quality of life	42%	47%	60%	50%	0.294
Renewal or revision of emergency action plan	66%	58%	71%	65%	0.509
Reinforcement of previous education about peanut allergy management	58%	50%	83%	64%	0.011
Allergen-specific IgE	66%	78%	46%	63%	0.018
Allergen-specific IgG4	13%	11%	11%	12%	0.958
Intradermal test	13%	17%	9%	13%	0.593
Oral food challenge	37%	42%	17%	32%	0.064
Peanut component testing (eg, IgE to Ara h 1, 2, 3)	53%	58%	34%	48%	0.106
6a. If "Assessment of quality of life" is selected above> How would you assess this patient's quality of life? (select all that apply)					
Subjectively	81%	82%	81%	81%	>0.99
Using a standardized assessment tool (please specify which tool)	13%	18%	24%	18%	0.676
Other (please describe)	0%	0%	0%	0%	-
7. How significant are each of the following goals in managing this patient? (select one for each item)					
Prevent serious reactions	4.55	4.67	4.51	4.58	0.674
Maximizing the patient's quality of life	4.11	4.08	4.29	4.16	0.542
Relieving the parent's anxiety	3.95	4.03	3.94	3.97	0.89
Case #2 continued: You decide to repeat peanut allergy testing. The patient has specific IgE 1.5 kU/L and peanut skin prick test wheal 5 mm.					
8. How would you manage the patient now? (select only one)					0.132
Continue to recommend avoidance without further testing at this time	39%	28%	49%	39%	0.196

	DE (N=38)	FR (N=36)	UK (N=35)	EUR (N=109)	p-value (3-way comparison)
Oral food challenge	45%	47%	43%	45%	0.933
Oral immunotherapy	13%	22%	3%	13%	0.051
Try small amount of peanut at home	3%	3%	0%	2%	0.617
Other	0%	0%	6%	2%	0.116
9. When considering conducting an oral peanut challenge, which factors do you use in determining whether to conduct an oral food challenge? (select all that apply)					
Patient age	63%	69%	69%	67%	0.823
History of acute reactions	84%	67%	83%	78%	0.133
Allergen-specific IgE	68%	69%	63%	67%	0.817
Skin prick results	66%	58%	83%	69%	0.074
Patient or parent desire for oral food challenge	26%	58%	77%	54%	<0.001
I do not conduct oral food challenges in my patients	21%	19%	3%	14%	0.055
Other	0%	0%	0%	0%	-
10. Do you typically include other healthcare professionals (eg, dietitians, social workers) in your management of patients with peanut allergy? (select only one)					0.294
Yes	63%	61%	77%	67%	
No	37%	39%	23%	33%	
10a. Which clinicians or specialists do you typically refer patients to for peanut allergy management? (select all that apply)					
Dietitian or nutritionist	92%	82%	96%	90%	0.103
Social worker	8%	5%	7%	7%	0.814
Nurse educator	17%	14%	74%	35%	<0.001
Psychologist or therapist	8%	27%	11%	15%	0.249
Other	4%	18%	4%	9%	0.197
11. Proprietary information					
12. Proprietary information					
13. Please indicate the significance of each of the following barriers to the optimal management of patients with peanut allergy: (select one for each item)					
Lack of effective treatments other than avoidance	3.84	3.89	3.63	3.79	0.308
Ubiquity of peanut in patients' environments	3.82	4.17	3.54	3.84	0.007
Misconceptions or myths about peanut allergy	3.42	3.89	3.54	3.62	0.069
Patient bullying or harassment	2.53	3	2.71	2.75	0.139
Lack of time during patient visits	3.29	3.33	2.97	3.20	0.224
14. In general, how challenging is allergen avoidance for your patients with peanut allergy? (select one)	3.58	3.11	3.46	3.38	0.041
15. To what extent does the peanut allergy negatively impact quality of life in your patients? (select one)	3.66	3.56	3.54	3.59	0.75
16. How do you prefer to make a final treatment decision for patients with peanut allergy? (select only one)					0.082
I prefer to make the final decision about which treatment my patients receive	32%	19%	11%	21%	0.104

	DE (N=38)	FR (N=36)	UK (N=35)	EUR (N=109)	p-value (3-way comparison)
I prefer to make the final decision after seriously considering the patient's/parent's opinion	34%	14%	34%	27%	0.082
I prefer that the patient/parent and I share responsibility for deciding which treatment is best	29%	58%	46%	44%	0.038
I prefer that the patient/parent make the final decision, but after seriously considering my opinion	5%	8%	9%	7%	0.831
I prefer to leave all decisions regarding treatment to the patient/parent	0%	0%	0%	0%	-
17. In well-controlled clinical trials, the following treatments demonstrated a 100-fold increase from baseline in the median tolerated dose after 12 months of treatment: (select one)					
Sublingual peanut immunotherapy					0.52
TRUE	37%	28%	20%	28%	0.279
FALSE	16%	14%	23%	18%	0.577
Unsure	47%	58%	57%	54%	0.582
Epicutaneous peanut immunotherapy					0.248
TRUE	16%	25%	17%	19%	0.561
FALSE	45%	31%	23%	33%	0.129
Unsure	39%	44%	60%	48%	0.191
Oral peanut immunotherapy					0.315
TRUE	37%	42%	54%	44%	0.305
FALSE	18%	8%	6%	11%	0.183
Unsure	45%	50%	40%	45%	0.698
18. Data from different clinical trials suggest that the following treatments for peanut allergy are associated with similar rates of adverse reactions as oral immunotherapy: (select one)					
Sublingual immunotherapy					0.688
TRUE	42%	36%	31%	36%	0.637
FALSE	11%	17%	23%	17%	0.366
Unsure	47%	47%	46%	47%	0.988
Epicutaneous immunotherapy					0.723
TRUE	16%	11%	23%	17%	0.407
FALSE	34%	39%	29%	34%	0.656
Unsure	50%	50%	49%	50%	0.99
19. Please rate your familiarity with the following emerging therapies for peanut allergy: (select one for each item)					
AR101 oral immunotherapy	2.42	2.17	2.40	2.33	0.532
Peanut subcutaneous immunotherapy	2.00	2.25	1.91	2.05	0.396
Peanut sublingual immunotherapy	2.26	2.39	2.03	2.23	0.363
Peanut epicutaneous immunotherapy	1.97	2.50	2.09	2.19	0.09
20. If you were considering oral immunotherapy for a patient with peanut allergy, rank the following factors order of importance in your decision of whether to recommend oral immunotherapy? (Rank 1 to 5)					
Severity of peanut allergy	4.45	4.44	4.26	4.38	0.678
Patient/caregiver desire to undergo immunotherapy	3.03	3.19	2.97	3.06	0.701

	DE (N=38)	FR (N=36)	UK (N=35)	EUR (N=109)	p-value (3-way comparison)
Patient/caregiver concerns about quality of life	2.50	2.83	3.20	2.84	0.024
Patient age	3.13	2.92	3.06	3.04	0.727
Insurance coverage for oral immunotherapy	1.89	1.61	1.51	1.67	0.357
21. If multiple immunotherapies for peanut allergy become available, how significant will the following factors be in selecting between treatments? (select one for each item)					
Data supporting efficacy	4.29	4.64	4.31	4.41	0.07
Safety profile	4.42	4.47	4.49	4.46	0.928
Potential for loss of desensitization when therapy is discontinued	3.76	3.92	4.03	3.90	0.38
Scheduling burden and time required for treatments	3.18	3.75	3.89	3.61	0.001
Cost or insurance coverage	3.21	3.28	2.94	3.14	0.405
Convenience	3.61	3.69	3.60	3.63	0.828
Ability to assess patient response	3.61	4.00	4.03	3.88	0.051
22. How important are the following factors in improving your comfort level if you are considering implementing a new drug or treatment? (select one for each item)					
Efficacy data from clinical trials	4.24	4.47	4.37	4.36	0.439
Safety data from clinical trials	4.42	4.42	4.57	4.47	0.562
Real world data	3.74	4.28	4.20	4.07	0.014
FDA approval	4.11	4.08	4.03	4.07	0.935
Inclusion of treatment in nationally recognized treatment guideline	3.97	3.97	4.34	4.09	0.078
23. How concerned are you about each of the following as it relates to investigational oral immunotherapies for peanut allergy? (select one for each item)					
Risk of adverse effects	3.61	3.94	4.20	3.92	0.01
The need for maintenance dosing	2.92	3.42	3.57	3.30	0.002
Lack of efficacy	3.26	3.72	3.89	3.62	0.025
Patient reluctance to undergo immunotherapy	2.76	3.58	3.66	3.33	<0.001
Patient lack of adherence to immunotherapy treatment	3.34	4.03	3.97	3.78	0.001
Lack of data supporting long-term outcomes	3.39	4.00	4.06	3.82	0.001
Logistics of administering therapy	2.84	3.47	3.57	3.29	<0.001
24. Do you administer unregulated (eg, "home brew") oral immunotherapies to your patients with peanut allergy? (select only one)					0.464
Yes	8%	14%	6%	9%	
No	92%	86%	94%	91%	
25. Practice location: (select only one)					0.705
Urban	74%	78%	80%	77%	0.808
Suburban	16%	8%	14%	13%	0.602
Rural	11%	14%	6%	10%	0.517

S2 Table. A list of all survey questions.

Screening Questions

Approximately how many patients do you manage for peanut allergy each month? <if 0, screen out>

Approximately how many patients <18 years old do you manage for peanut allergy each month? <if 0, screen out>

What is your primary practice setting? (select only one)

❑	Community-based (most patients are seen in a private practice/community hospital)
❑	Academic-based (most patients are seen in a university/academic hospital)

Case-vignette Questions

Case #1: A 2-year-old boy presents with his mother for a peanut allergy evaluation. Several weeks ago, he had eaten about 1 teaspoon (5 mL) of peanut butter. Within a few minutes, he developed several "hives" on his face and torso with pruritus without other concerning symptoms such as lip or tongue swelling, coughing, difficulty breathing, or vomiting. After calling his pediatrician's office, he was given diphenhydramine with resolution of symptoms. His family does not recall any prior peanut exposures. He does not have any significant allergy history as other food allergies, atopic dermatitis, or wheezing episodes.

1. **What testing would you perform to confirm a diagnosis at this time?** (select all that apply)

❑	Allergen-specific IgE
❑	Allergen-specific IgG4
❑	Intradermal test
❑	Oral food challenge
❑	Peanut component testing (eg, IgE to Ara h 1, 2, 3)
❑	Skin prick test
❑	Total serum IgE
❑	Other (please specify)
❑	I would not perform any testing in this patient <exclusive answer option>

Case #1 continued: The boy undergoes skin prick testing with appropriate positive and negative controls. His peanut skin test reveals a 7 mm wheal. Peanut specific IgE is 1.9 kU/L.

2. **Which of these (with or without the help of your staff) would you discuss with the patient and his mother at this visit or a follow-up visit?** (select one for each item)

	Refer to a dietician or other healthcare provider to discuss	**I would discuss at this visit**	**I would discuss at a later visit**	**I would not routinely discuss**
Recognition of acute reactions	❑	❑	❑	❑
Use of adrenaline auto-injector	❑	❑	❑	❑

Allergen avoidance	❑	❑	❑	❑
Interpreting ingredient lists and food labels	❑	❑	❑	❑
Investigational therapies	❑	❑	❑	❑
Peanut allergy impact on quality of life	❑	❑	❑	❑
Prognosis	❑	❑	❑	❑

3. **After his family becomes comfortable with food allergy management, approximately how frequently would you routinely see this patient back for follow-up?** (select only one)

❑	Monthly
❑	Every 3 months
❑	Every 6 months
❑	Yearly
❑	Follow-up only as needed
❑	Other (please specify)

4. **Would you re-test this patient for peanut allergy at a later date to monitor for peanut allergy resolution?** (select only one)

❑	Yes
❑	No
❑	Unsure

   a. <If "Yes" selected above> **If this patient's peanut allergy resolved, which recommendation would you make regarding peanut consumption and exposure?** (select only one)

❑	Continue to avoid any peanut exposure to the extent possible
❑	Eat only small servings of peanut on rare occasion
❑	Ingest a normal serving of peanut regularly
❑	Other (please specify)

5. **When would you re-evaluate this patient for peanut allergy?** (select only one)

❑	Every six months
❑	Yearly
❑	Every 2-3 years
❑	Other (please specify)
❑	I would not re-test this patient for peanut allergy <exclusive answer option>
❑	Unsure

Case #2: A 12-year old boy comes to your office with his parents. He has a long-standing peanut allergy diagnosis. His last allergy testing occurred several years ago with a peanut specific IgE 0.9 kU/L. At that time, he underwent a challenge and developed hives after consuming ~300 mg peanut protein (approximately 1 peanut). For the last year, he has become increasing frustrated in dealing with his allergy. He admits to being less careful about food allergy management. He often does not carry an adrenaline autoinjector or read labels before eating foods. He describes taking a small bite of a food to see if it is safe. He has not experienced any recent reactions so feels that his approach to his peanut allergy is "good enough," but his parents are concerned about his attitude toward his allergy.

His medical history is notable for tree nut allergy and moderate persistent asthma. He has poor adherence to his prescribed asthma medications and has had two exacerbations in the past year requiring systemic corticosteroids.

6. Which of the following would you perform at this time? (select all that apply)

❑	Assessment of nutritional status
❑	Assessment of quality of life
❑	Renewal or revision of emergency action plan
❑	Reinforcement of previous education about peanut allergy management
❑	Allergen-specific IgE
❑	Allergen-specific IgG4
❑	Intradermal test
❑	Oral food challenge
❑	Peanut component testing (eg, IgE to Ara h 1, 2, 3)
❑	Skin prick test
❑	Total serum IgE
❑	Other (please specify)

a. <If "Assessment of quality of life" is selected above> **How would you assess this patient's quality of life?** (select all that apply)

❑	Subjectively
❑	Using a standardized assessment tool (eg, Food Allergy Quality of Life Questionnaire, SF-36) (please specify which tool)
❑	Other (please describe)

7. How significant are each of the following goals in managing this patient? (select one for each item)

	Not at all significant	Slightly significant	Moderately significant	Very significant	Extremely significant
Prevent serious reactions	❑	❑	❑	❑	❑
Maximizing the patient's quality of life	❑	❑	❑	❑	❑
Relieving the parent's anxiety	❑	❑	❑	❑	❑

Case #2 continued: You decide to repeat peanut allergy testing. The patient has specific IgE 1.5 kU/L and peanut skin prick test wheal 5 mm.

8. How would you manage the patient now? (select only one)

❑	Continue to recommend avoidance without further testing at this time
❑	Oral food challenge
❑	Oral immunotherapy
❑	Try small amount of peanut at home
❑	Other (please specify)

<u>Non-case Questions</u>

9. When considering conducting an oral peanut challenge, which factors do you use in determining whether to conduct an oral food challenge? (select all that apply)

❑	Patient age
❑	History of acute reactions
❑	Allergen-specific IgE
❑	Skin prick results
❑	Patient or parent desire for oral food challenge
❑	I do not conduct oral food challenges in my patients
❑	Other (please specify)

10. Do you typically include other healthcare professionals (eg, dietitians, social workers) in your management of patients with peanut allergy? (select only one)

❑	Yes
❑	No

a. <If "Yes" is selected above> **Which clinicians or specialists do you typically refer patients to for peanut allergy management?** (select all that apply)

❑	Dietitian or nutritionist
❑	Social worker
❑	Nurse educator
❑	Psychologist or therapist
❑	Other (please specify)

11. Proprietary information

12. Proprietary information

13. Please indicate the significance of each of the following barriers to the optimal management of patients with peanut allergy: (select one for each item)

	Not applicable or not at all significant	Slightly significant	Moderately significant	Very significant	Extremely significant
Lack of effective treatments other than avoidance	❑	❑	❑	❑	❑
Ubiquity of peanut in patients' environments	❑	❑	❑	❑	❑
Misconceptions or myths about peanut allergy	❑	❑	❑	❑	❑
Patient bullying or harassment	❑	❑	❑	❑	❑
Lack of time during patient visits	❑	❑	❑	❑	❑

14. In general, how challenging is allergen avoidance for your patients with peanut allergy? (select one)

Not at all challenging	Slightly challenging	Moderately challenging	Very challenging	Extremely challenging
❑	❑	❑	❑	❑

15. To what extent does the peanut allergy negatively impact quality of life in your patients? (select one)

Not at all	Slightly	Moderately	Very	Extremely
❑	❑	❑	❑	❑

16. how do you prefer to make a final treatment decision for patients with peanut allergy? (select only one)

❑	I prefer to make the final decision about which treatment my patients receive
❑	I prefer to make the final decision after seriously considering the patient's/parent's opinion
❑	I prefer that the patient/parent and I share responsibility for deciding which treatment is best
❑	I prefer that the patient/parent make the final decision, but after seriously considering my opinion
❑	I prefer to leave all decisions regarding treatment to the patient/parent

17. In well-controlled clinical trials, the following treatments demonstrated a 100-fold increase from baseline in the median tolerated dose after 12 months of treatment: (select one for each item)

	True	False	Unsure
Sublingual peanut immunotherapy	❑	❑	❑
Epicutaneous peanut immunotherapy	❑	❑	❑
Oral peanut immunotherapy	❑	❑	❑

18. Data from different clinical trials suggest that the following treatments for peanut allergy are associated with similar rates of adverse reactions as oral immunotherapy: (select one for each item)

	True	False	Unsure
Sublingual immunotherapy	❑	❑	❑
Epicutaneous immunotherapy	❑	❑	❑

19. Please rate your familiarity with the following emerging therapies for peanut allergy: (select one for each item)

	Not at all familiar	Slightly familiar	Moderately familiar	Very familiar	Extremely familiar
AR101 oral immunotherapy	❑	❑	❑	❑	❑
Peanut subcutaneous immunotherapy	❑	❑	❑	❑	❑
Peanut sublingual immunotherapy	❑	❑	❑	❑	❑
Peanut epicutaneous immunotherapy	❑	❑	❑	❑	❑

20. If you were considering oral immunotherapy for a patient with peanut allergy, how would you rank the following factors in order of importance in your decision of whether to recommend oral immunotherapy? (Rank 1 to 5 with 1 being the most important and 5 being the least important factor)

	Severity of peanut allergy
	Patient/caregiver desire to undergo immunotherapy
	Patient/caregiver concerns about quality of life
	Patient age
	Insurance coverage for oral immunotherapy

21. If multiple immunotherapies for peanut allergy become available, how significant will the following factors be in selecting between treatments? (select one for each item)

	Not at all significant	Slightly significant	Moderately significant	Very significant	Extremely significant
Data supporting efficacy	❑	❑	❑	❑	❑
Safety profile	❑	❑	❑	❑	❑
Potential for loss of desensitization when therapy is discontinued	❑	❑	❑	❑	❑
Scheduling burden and time required for treatments	❑	❑	❑	❑	❑
Cost or insurance coverage	❑	❑	❑	❑	❑
Convenience	❑	❑	❑	❑	❑
Ability to assess patient response	❑	❑	❑	❑	❑

22. How important are the following factors in improving your comfort level if you are considering implementing a new drug or treatment? (select one for each item)

	Not at all important	Slightly important	Moderately important	Very important	Extremely important
Efficacy data from clinical trials	❑	❑	❑	❑	❑
Safety data from clinical trials	❑	❑	❑	❑	❑
Real world data	❑	❑	❑	❑	❑
FDA approval	❑	❑	❑	❑	❑
Inclusion of treatment in nationally recognized treatment guideline	❑	❑	❑	❑	❑

23. How concerned are you about each of the following as it relates to investigational oral immunotherapies for peanut allergy? (select one for each item)

	Not at all concerned	Slightly concerned	Moderately concerned	Very concerned	Extremely concerned
Risk of adverse effects	❑	❑	❑	❑	❑
The need for maintenance dosing	❑	❑	❑	❑	❑
Lack of efficacy	❑	❑	❑	❑	❑
Patient reluctance to undergo immunotherapy	❑	❑	❑	❑	❑
Patient lack of adherence to immunotherapy treatment	❑	❑	❑	❑	❑
Lack of data supporting long-term outcomes	❑	❑	❑	❑	❑
Logistics of administering therapy	❑	❑	❑	❑	❑

24. Do you administer <NOTE: "non-FDA approved" for US "unregulated" for EU> **unregulated (eg, "home brew") oral immunotherapies to your patients with peanut allergy?** (select only one)

❑	Yes
❑	No

25. Practice location: (select only one)

❑	Urban
❑	Suburban
❑	Rural