

BRIEF COMMUNICATION

Results of an allergy educational needs questionnaire for primary care

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Abstract

It is well recognized that knowledge of allergic conditions is suboptimal in primary care. The Primary Care Interest Group of the European Academy of Allergy and Clinical Immunology undertook an educational needs survey to better understand what they were and how best to meet them, in the primary care environment. An electronic questionnaire was devised and distributed as widely as possible. A total of 2226 people from 63 countries opened the e-questionnaire of which 692 provided evaluable responses. In total, 81% were medical doctors with 299 possessing additional qualifications. Self-declared gaps in knowledge were expressed for most manifestations of allergy with a correspondingly high self-expressed educational need. The preferred learning modalities were online guidelines (69.6%) and courses (68.8%) followed closely by workshops (68%), structured online modules (63.9%) and small local working groups (59.75%). Podcasts and webinars scored poorly with only 25% expressing these as preferred learning modes although there was an age gradient. The preferred electronic platform was the personal computer (82.6%). A better understanding of the needs of primary care should help guide the design of educational initiatives to meet those needs.

The incidence and prevalence of allergy is increasing globally, due to a variety of factors (1, 2). The point of first contact for most patients in seeking remedy for their symptoms is the general practitioner, family practitioner, family physician or paediatrician (GP will be used as the abbreviation for all of these terms) (3).

The explosion of allergy-related disorders coupled with increased complexity of those disorders has left GPs feeling vulnerable, particularly as allergy appears to be virtually excluded

from both undergraduate and postgraduate GP training (4). A curriculum for undergraduate training has been proposed by the World Allergy Organisation (5), but to date, there is little evidence of an appetite to incorporate allergy in undergraduate curricula. In a variety of aspects of allergy, there are repeated calls for improved education to improve outcomes (6) with deficits being recognized across healthcare systems, (7) concerns shared with paediatricians, who are often the first port of call for children in many countries (8). Work has also been undertaken to describe the core competencies required by GPs to provide allergy care (9) and those which might be needed to provide a specialized level in primary care (general practitioner with a special interest, GPSI) (10, 11). GPSIs are generally GPs who work part-time in a defined clinical role, for example they see about 7% of allergy referrals in the UK (12). It is of note that one of the consequences of this skill and knowledge deficit is many unnecessary referrals to specialist clinics (13, 14) and recourse to complementary and alternative medicine (15).

Abbreviations

EAACI, European Academy of Allergy and Clinical Immunology; FeNO, fraction of exhaled nitric oxide; GPSI, general practitioner with a special interest; IPCRG, International Primary Care Respiratory Group; PCIG, Primary Care Interest Group; SCIT, subcutaneous immunotherapy; SIgE, specific IgE; SLIT, sublingual immunotherapy; WONCA, World Organisation of National Colleges and Associations.

This study seeks to inform the development of an educational and information programme by first ascertaining from GPs what they consider their areas of greatest educational need to be and then how they would like this need to be met. This is a fundamentally different approach to the current approach, of specialists determining the educational needs of primary care, undertaken for the first time in the field of allergy.

Methods

An electronic questionnaire was developed by the PCIG of EAACI (Primary Care Interest Group of European Academy of Allergy and Clinical Immunology). (A completed example attached as Annex S1). It underwent Beta testing by colleagues who were members of the PCIG, and the final questionnaire was developed. The questionnaire was framed to understand what GPs felt their educational needs were and allowed them to express how they would like to have these needs met. The questionnaire was made available online in English and translated into twelve other European languages by colleagues. The questionnaire was publicized through EAACI and the International Primary Care Respiratory Group websites with the aim of recruiting as many primary healthcare professionals as possible (including nurses and other allied professions). All national colleges and associations of primary care which appear on the WONCA (World Organization of National Colleges, Academies and Academic Associations of General Practitioners/Family Physicians, Europe) website were emailed in a bid to increase exposure. Participation in the survey was anonymized. We also wished to find out more about knowledge and learning needs with specific reference to immunotherapy, an area which is demonstrating considerable evolution (16, 17).

Responses were collected from June to September 2014. Respondents were asked to rate their perceived level of knowledge on a 1–5 scale, where 1 was no knowledge and 5 was detailed knowledge. The investigators arbitrarily assigned scores 5 and 4 to a relatively detailed or adequate knowledge and scores 3, 2 and 1 to inadequate knowledge, to facilitate interpretation.

Given that this was a noninterventional study to understand clinician's educational needs, ethics committee approval was not sought. Participant confidentiality has been maintained.

Statistical analysis

Exploratory analysis was carried out on 692 responders, and summary statistics were produced including mean, standard deviation (SD), median and interquartile range (IQR; 25th and 75th percentiles) for the continuous variables, and counts and percentages for the categorical variables, respectively. Correlations between continuous variables related to immunotherapy were assessed using Spearman's correlation coefficient.

Results

We report specifically on the questionnaire items pertaining to perceived educational need and priorities.

The majority of emails sent to national societies remained unanswered; a notable exception was the National Society of Family Medicine (SNMF), Romania.

The e-questionnaire link was opened by 2226 persons from 63 countries. Answers were received from 730 respondents of which 692 were evaluated having excluded grossly incomplete and duplicate items. Note: not all respondents completed every question so totals do not always tally.

The mean age of respondents was 46.8 years (SD 11.1); 64.4% were female, 58.4% were working within Europe. (A full demographic table appears in Annex S2).

Of the responses, 481 were in English and 211 in other languages (Annex S3: Language).

Of the total number of evaluable responders, 665 declared their occupation: 538 (81%) were medical doctors, of which 299 had additional specialist qualifications; 320 declared they had a special interest: 99 in allergy, 99 in respiratory medicine, 25 in dermatology, 10 in laryngology and 87 in other clinical areas. A total of 516 were employed as GPs of whom 114 were also employed as GPs with a special interest (GPSI): allergy, 56 (48.3%); respiratory, 42 (36.2%); dermatology, 6 (5.2%); other, 8 (including 2 missing values) (6.8%); ear–nose–throat, 2 (1.7%). A further 36 were GP trainees.

Self-perceived knowledge levels and educational needs

Table 1 demonstrates that the highest perceived knowledge was recorded for asthma and allergic rhinitis (81% and 71% of respondents, respectively, scoring in the range of detailed knowledge). In all areas, great educational need was >50% with the sole exception of asthma. It is clear that there is a greater level of confidence in those diseases most commonly seen.

Immunotherapy

A very low level of knowledge and confidence was demonstrated, with only 23% professing adequate knowledge (Fig. 1). More than half expressed a great educational need. Confidence levels in making a referral to specialist care were equally low (18.8% for SLIT and 28% for SCIT). Twenty-four per cent of the respondents stated that they perform immunotherapy in their clinical practice, which may represent those GPs who possess additional training or skills and who have considerable difference in their confidence and learning needs compared to GPs or GP trainees (Annex S4).

Learning: methods of learning

We sought to differentiate preferences between 'traditional' methods of learning and e-learning. The results (Fig. 2)

Table 1 Self-perceived knowledge levels and educational needs

Condition	Self-perceived knowledge level				Level of Educational/Learning need			
	<i>n</i>	Median (IQR)	Adequate%	Inadequate%	<i>n</i>	Median (IQR)	Great%	Not immediate%
Asthma	674	4 (4,5)	82.2	18.8	630	2 (2,3)	48.1	51.9
Allergic rhinitis	673	4 (3,4)	71.2	28.8	629	3 (2,3)	52.8	47.2
Eczema/atopic dermatitis	670	4 (3,4)	55.8	44.2	623	3 (2,4)	65.0	35.0
Anaphylaxis	668	4 (3,4)	50.7	49.3	630	3 (2,4)	62.4	37.6
Contact dermatitis	672	3 (3,4)	40.0	60.0	624	3 (2,4)	69.6	30.4
Drug reaction/allergy	672	3 (3,4)	38.5	61.5	623	3 (2,4)	74.0	26.0
Urticaria/Angioedema	674	3 (3,4)	35.2	64.8	626	3 (2,4)	74.9	25.1
Celiac Disease	669	3 (2,4)	32.6	67.4	631	3 (2,4)	70.7	29.3
Food allergy*	668	3 (2,4)	32.8	67.2	625	4 (3,4)	85.3	14.7
Oral Allergy syndrome	663	2 (1,3)	16.7	83.5	626	4 (3,5)	78.6	21.4
Latex allergy	668	3 (2,3)	15.9	84.1	627	3 (3,4)	75.8	24.2
EIA	669	2 (2,3)	15.2	84.8	632	3 (3,4)	78.3	21.7
Occupational allergy	670	3 (2,3)	14.3	85.7	628	4 (3,4)	80.7	19.3
Venom Allergy	669	2 (1,3)	14.1	85.9	626	3 (2,4)	72.8	27.2
Complex/Multi organ	668	2 (1,3)	7.6	85.7	628	4 (3,5)	80.7	19.3

CMP, cow's milk protein; EIA, exercise-induced anaphylaxis.

Self-perceived knowledge levels of 4 or 5 were considered adequate, 1, 2 or 3 inadequate. Levels of learning/education of 3, 4 or 5 were considered great, and levels of 1 and 2 indicate low or no immediate need.

*Food allergy was calculated as the average of food allergy and CMP allergy.

suggest that courses, workshops and educational modules were well favoured, with very few participants rating so-called traditional methods unacceptable. From the point of view of e-learning, online guidelines and structured online modules were highly rated with much lower rates of acceptability for modes such as Twitter links and podcasts: there was, however, an age gradient with a clear increase in preference for e-learning amongst the youngest age cohort (Annex S5).

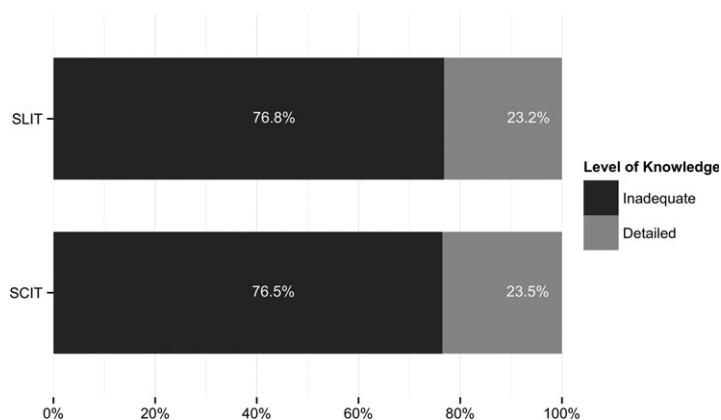
e-Learning platforms

Across all age cohorts, the personal computer was the most favoured and acceptable platform for learning although the youngest age cohort also found tablets and mobile phones acceptable (Annex S6).

Discussion

The strength of this study is the relatively large number of respondents and the diversity of those respondents encompassing GPs, GPs with a special interest, paediatricians and primary care nurses from a wide geographical area.

It is important to note that some primary care practitioners are otherwise specialized and provide primary care services alongside their specialty; furthermore, in many European countries, children are not seen by GPs but managed by paediatricians; thus, 618 noted their specialist qualifications: 278 (45%) were GPs, 45 as a primary Care clinician with an interest in allergy, 36 declared themselves to be allergists, 70 as general medical specialists: 37 as paediatricians and 16 as paediatric allergists. There were 136 other respondents, mainly nurses (51 primary care nurses, 14 general

**Figure 1** Self-estimated immunotherapy knowledge.

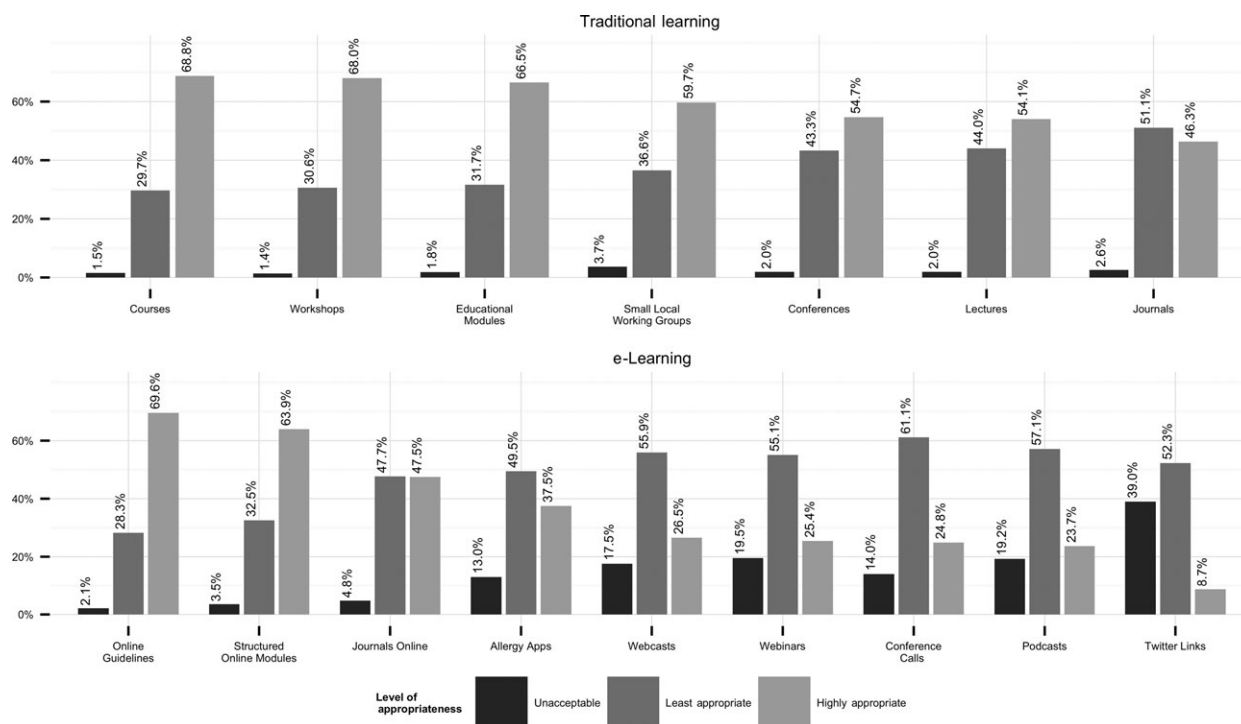


Figure 2 Acceptability of learning methods.

nurses and three allergy nurses), 2 dieticians and 6 academics and 60 not specified.

The study suffers from some weaknesses. Given the need to publicize the questionnaire through relatively specialist websites and personal contacts, the knowledge levels of respondents may be somewhat inflated compared to the norm with the true picture being somewhat worse than that represented here. No specific comparisons could be drawn between countries as sample sizes were too small. We have also no verification of the stated professional experience or qualifications of responders. Questionnaires were not professionally translated and back-translated by linguistic experts to ensure reproducibility.

Nonetheless, we have a picture of the relative confidence in perceived knowledge concerning those conditions managed frequently in primary care. Although knowledge was not formally tested in any manner, it is clear that in most instances, doctors felt that they could increase their knowledge.

Knowledge and educational need

In most situations, the expressed educational need was higher than the perceived adequacy in knowledge. Of note, the educational need for the most commonly encountered conditions – asthma, allergic rhinitis and eczema/atopic dermatitis – was still high in spite of a perceived high level of knowledge, perhaps representing the fact that the more

that is known, the more there is a realization that current personal knowledge is inadequate and demonstrating a hunger for self-improvement. At the other end of the scale, the demand for knowledge was less for conditions that are rarely seen (or recognized) in primary care, such as venom, occupational and latex allergy.

Studies elsewhere have demonstrated the range of approaches to allergic disorders in primary care across Europe with widely different ranges of performing investigations and administering treatments, especially immunotherapy. For example, the range of allergy diagnosis made by GPs varied from over 50% by GPs in the UK to fewer than 20% by Austrian GPs. On the other hand, diagnostic tests were performed infrequently with an average of 33% of patients receiving some sort of diagnostic test, ranging from 85% in Germany but only 32% in the UK (18).

It is probable that immunotherapy will continue to be managed by allergists but in collaboration with primary care teams although the 24% of the respondents stating they perform Allergen Immunotherapy (AIT) could also correspond to those participants who indicated they are allergy specialists, probably working either as allergists in the community or as GPSIs (Annex S4). It is of concern that >70% of respondents expressed a great lack of confidence in identifying patients for referral, and this was more apparent for SLIT than SCIT, suggesting even greater lack of familiarity with this modality of AIT (19, 20).

Developing a cohort of GPs with a special interest (GPSIs) particularly in countries where there is a deficit of allergists may also offer a solution as might developing shared care protocols for continuation of therapy commenced by specialists in general practice (10).

Allergy care is an area of great educational need with the need to develop algorithms (preferably clinical decision support systems within the context of integrated care pathways) to aid in the identification of patients who may benefit from referral coupled with appropriate laboratory investigations prior to referral (21, 22); any efforts to extend the role of immunotherapy either as preventative treatment or therapeutic treatment is destined to fail if this is not urgently addressed.

Meeting educational needs

Most educational methods suggested, with the distinct exception of Twitter links, were deemed acceptable, although there was a clear age gradient between the age tertiles which suggests we need to be aware of how different age groups access educational tools. Older GPs may need more time and clearer instructions and feel generally less comfortable in using technological learning tools (23). There were, however, clear preferences expressed for small group teaching and structured educational modules, whether in person or online.

Nonetheless, this is the largest survey in existence ascertaining the educational needs of GPs by GPs in allergic disease; we would suggest that national allergy societies reach out and build bridges with national primary care societies to harmonize patient care and to discuss and collaborate on delivering educational packages at a national level in order to achieve recognition of allergy as a major problem area in primary care.

It is clear that the burden of allergic disease is so large that it cannot be met globally by allergy specialists alone. Any improvements are thus reliant on developing a sustainable level of knowledge and skills in primary care, without which steps any initiatives are likely to be unsuccessful. Given the recent advances in allergy therapeutics, there is now some urgency in ensuring that the present state of knowledge which exists in primary care is addressed (24).

Summary

GPs are realistic about their lack of skills and knowledge in the field of allergy. They identify what their educational priorities are and how they would like to have these met. Allergy education of healthcare providers needs to be developed to reduce personal and societal costs of late-diagnosed allergic diseases. Given the rapidly changing face of allergen immunotherapy, urgent consideration needs to be given on to how to equip primary care with the necessary knowledge, skills and pathways to ensure that those who might benefit from this treatment modality, do so.

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Author contributions

All the authors are members of the Primary Care Interest Group of EAACI, and the Task Force on Allergy Educational Needs in Primary Care conceived and designed the study protocol. DR, EA and MG developed the concept. DR, EA and RG performed literature search and assessed study detail. DR, DC, NL and MG contributed to acquisition of data. KN checked data quality. MB performed statistical analysis. DR, EA, DC, NL, KN and RG contributed to interpretation of results. DR, EA and DC wrote the first draft of the manuscript, which was critically revised by all the other authors. All authors approved the final version of the manuscript.

Conflicts of interest

Conflict of interests are recorded in the IJCM forms. Dr. Ryan reports grants from EAACI, during the conduct of the study, personal fees from Stallergenes, personal fees from Uriach, personal fees from TEVA, personal fees from AstraZeneca, personal fees from MEDA, and personal fees and funding to attend a scientific meeting from Chiesi outside the submitted work; he is the chairman of the Primary Care Interest Group of the European Academy of Allergy and Clinical Immunology. Dr Angier reports she has attended one advisory panel for each of Stallergenes, Schering Plough and MEDA. She was supported by ALK to attend 2 SOSA meetings. (Symposium on Specific Allergy) Dr. Gomez, Dr. Church, Dr. Batsiou, Dr. Nekam, Dr. Lomidze and Dr. Gawlik has nothing to disclose.

Supporting Information

Additional Supporting Information may be found in the online version of this article:

Annex S1. Demographic characteristics.

Annex S2. Language breakdown of questionnaire: 211 not in English.

Annex S3 Access to diagnostics.

Annex S4. Self estimated immunotherapy knowledge and educational need, confidence in recommending (referring) a patient for immunotherapy and confidence in performing immunotherapy, categorised by GP, GPSI and GP trainee and by SCIT and SLIT.

Annex S5. E-Learning acceptability by Age group.

Annex S6. E-Learning platforms by Age group.

Annex S7. Acceptability of formal assessment.

References

- Francino MP. Early development of the gut microbiota and immune health. *Pathogens* 2014;**3**:769–790.
- Gruzieva O, Gehring U, Aalberse R, Agius R, Beelen R, Behrendt H., et al. Meta-analysis of air pollution exposure association with allergic sensitization in European birth cohorts. *J Allergy Clin Immunol* 2014;**133**:767–776.
- Ryan D, Van Weel C, Bousquet J, Toskala E, Ahlstedt S, Palkonen S et al. Primary care: the cornerstone of diagnosis of allergic rhinitis. *Allergy* 2008;**63**:981–989.
- Yasser S, Ross M, Sheikh A. Undergraduate allergy teaching in a UK medical school: mapping and assessment of an undergraduate curriculum. *Prim Care Respir J* 2006;**15**:173–178.
- Potter PC, Warner JO, Pawankar R, Kaliner MA, Del Giacco S, Rosenwasser L. Recommendations for competency in allergy training for undergraduates qualifying as medical practitioners: a position paper of the World Allergy Organization. *World Allergy Organ J* 2009;**2**:150.
- Grabenhenrich L, Hompes S, Gough H, Ruëff F, Scherer K, Pfohler C et al. Implementation of anaphylaxis management guidelines: a register-based study. *PLoS One* 2012;**7**:e35778.
- Kastner M, Harada L, Wasserman S. Gaps in anaphylaxis management at the level of physicians, patients, and the community: a systematic review of the literature. *Allergy* 2010;**65**:435–444.
- Convers KD, Slavin RG. Attitudes toward allergy: what do the pediatricians think? *Ann Allergy Asthma Immunol* 2014 Nov **30**:113:544–548.
- Wallengren J. Identification of core competencies for primary care of allergy patients using a modified Delphi technique. *BMC Med Educ* 2011;**11**:12.
- Ryan D, Levy M, Morris A, Sheikh A, Walker S. Management of allergic problems in primary care: time for a rethink? *Prim Care Respir J* 2005 Aug **31**:14:195–203.
- Jutel M, Angier L, Palkonen S, Ryan D, Sheikh A, Smith H et al. Improving allergy management in the primary care network—a holistic approach. *Allergy* 2013;**68**:1362–1369.
- El-Shanawany TM, Arnold H, Carne E, Misbah SA, Egner W, Wallington TB et al. Survey of clinical allergy services provided by clinical immunologists in the UK. *J Clin Pathol* 2005;**58**:1283–1290.
- Conlon NP, Abramovitch A, Murray G, O'Hanrahan A, Wallace D, Holohan K et al. Allergy in Irish adults: a survey of referrals and outcomes at a major centre. *Ir J Med Sci* 2015;**2**:349–352.
- Jones RB, Hewson P, Kaminski ER. Referrals to a regional allergy clinic—an eleven year audit. *BMC Public Health* 2010;**10**:790.
- Schafer T. Epidemiology of complementary alternative medicine for asthma and allergy in Europe and Germany. *Ann Allergy Asthma Immunol* 2004;**93**:S5–S10.
- Dhami S, Nurmatov U, Halken S, Calderón MA, Muraro A, Roberts G et al. Allergen immunotherapy for the prevention of allergic disease: protocol for a systematic review. *Pediatr Allergy Immunol* 2016;**27**:236–241.
- Canonica GW, Bachert C, Hellings P, Ryan D, Valovirta E, Wickman M et al. Allergen Immunotherapy (AIT): a prototype of Precision Medicine. *World Allergy Organ J* 2015;**8**:31.
- Chivato T, Valovirta E, Dahl R, DeMonchy J, Bloch Thomsen A, Palkonen S and Jacobsen L. Allergy living and learning: diagnosis and treatment of allergic respiratory diseases in Europe. *J Invest Allergol Clin Immunol* 2012;**22**:168.
- Canonica GW, Cox L, Pawankar R, Baena-Cagnani CE, Blaiss M, Bonini S et al. Sublingual immunotherapy: World Allergy Organization position paper 2013 update. *World Allergy Organ J*, 2014;**7**:1.
- Hannachi F, Demoly P, Chiriac AM, Bourrain JL, Dhivert-Donnadieu H, Costa D et al. The place of new grass pollen immunotherapy tablets for the management of patients with respiratory allergies in primary care. *Revue Française D' Allergol* 2015;**55**:506–516.
- Yao W, Kumar A. CONFlexFlow: integrating flexible clinical pathways into clinical decision support systems using context and rules. *Decis Support Syst* 2013;**55**:499–515.
- Bousquet J, Schünemann HJ, Hellings PW, Arnavielhe S, Bachert C, Bedbrook A et al. MACVIA Clinical Decision Algorithm in Allergic Rhinitis in adolescents and adults. *J Allergy Clin Immunol* 2016;**138**:367–374.
- Garcia P, Qin J. Identifying the generation gap in higher education: “Where do the differences really lie?”. *Innovate J Online Educ* 2007;**3**:3.
- The rising importance of family medicine. http://www.who.int/dg/speeches/2013/family_medicine_20130626/en/ (Accessed 13 February 2017).

Annex 1 Demographic Characteristics

Age Group (categorised)		21-40 n(%)	197 (29.4)
		41-52 n(%)	234 (35)
		53-80 n(%)	238 (35.6)
		Total n	669
Gender		Female n(%)	441 (64.4)
		Male n(%)	244 (35.6)
		Total n	685
Country of Employment (Europe)		Yes n(%)	390 (58.4)
		No n(%)	278 (41.6)
		Total n	668
Qualification	GPs n=516 (current employment)	GPs n(%)	364 (54.7)
		GPs with a special interest n (%)	116 (17.5)
		Trainees n(%)	36 (5.4)
	Nurses (current employment)	Primary Care Nurse n(%)	72 (10.8)
		General Nurse n(%)	31 (4.7)
		Allergy Specialist Nurse n(%)	6 (0.9)
	Other	Dietician n(%)	6 (0.9)
		Academic n(%)	34 (5.1)
Total		665	
Further Specialist Qualification		MD n(%)	78 (26.1)
		PhD n(%)	40 (13.4)
		Diploma n(%)	91 (30.4)
		Other n(%)	90 (30.1)
		Total n	299
Language		English n(%)	481 (69.5)
		Other n(%)	211 (30.5)
		Total n	692
Stated specialty (Doctors) Note: some do not consider GP as a specialty		GP	247 (62.8)
		Paediatrician	51 (13)
		Allergist	49 (12.5)
		General Medical Specialist	46 (11.7)
		Total	393

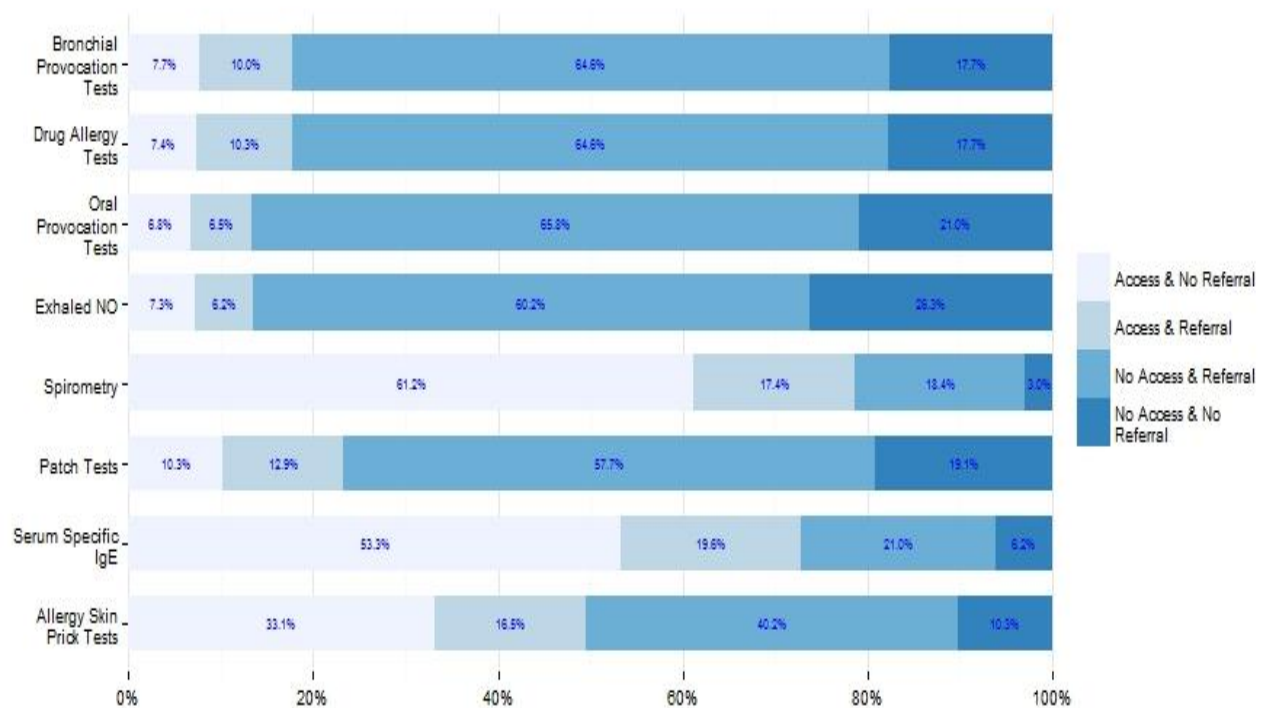
Annex 2. Language breakdown of questionnaire: 211 not in English

Translated, by colleagues into (number replying in this language) Serbian (1), Hungarian (1), Greek (5), Italian (5), French (7), Dutch (11), Portuguese (13), Russian (34), Romanian (64), Spanish (70), Polish (0), German (0).

Annex 3

Access to diagnostics

Participants were asked whether particular investigations were directly accessible or accessible by referral, not directly accessible but accessible by referral or not accessible either directly or by referral (i.e. not available). More than three quarters of the responders had access to all investigations either directly or indirectly through specialist referral.

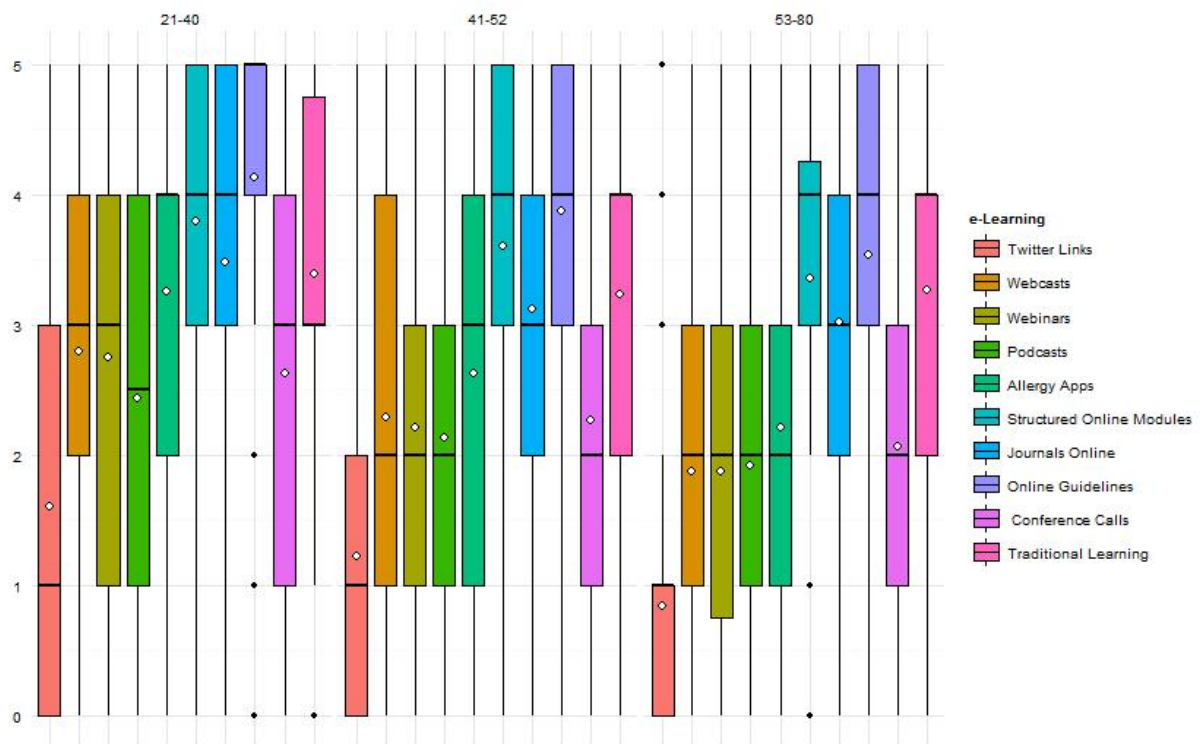


Annex 4 Self estimated immunotherapy knowledge and educational need, confidence in recommending (referring) a patient for immunotherapy and confidence in performing immunotherapy, categorised by GP, GPSI and GP trainee and by SCIT and SLIT.

SCIT					
		GP	GP with a specialist interest in Allergy	GP trainee	TOTAL
Knowledge	Median (IQR)	2 (1,3)	3 (2,4)	2 (1,3)	2 (1,3)
	Inadequate n (%)	277 (83.7)	61 (54.5)	30 (83.3)	368 (76.8)
	Adequate n (%)	54 (16.3)	51 (45.5)	6 (16.7)	111 (23.2)
	Total n	331	112	36	479
Educational Need	Median (IQR)	4 (3,5)	3 (2,5)	5 (4,5)	4 (3,5)
	Not Immediate n (%)	109 (36.9)	59 (56.7)	6 (16.7)	174 (40)
	Great n (%)	186 (63.1)	45 (43.3)	30 (83.3)	261 (60)
	Total n	295	104	36	435
Confidence recommending a patient for Immunotherapy	Median (IQR)	2 (1,3)	3 (1,4)	3 (1,4)	2 (1,4)
	Not confident n (%)	234 (78.5)	60 (57.7)	25 (69.4)	319 (72.8)
	Confident n (%)	64 (21.5)	44 (42.3)	11 (30.6)	119 (27.2)
	Total n (%)	298	104	36	438
Confidence in performing Immunotherapy	Median (IQR)	3 (1,3)	4 (3,5)	3 (1,4)	3 (2,4)
	Not confident n (%)	232 (75.3)	48 (45.3)	27 (75)	307 (68.2)
	Confident n (%)	76 (24.7)	58 (54.7)	9 (25)	143 (31.8)
	Total n	308	106	36	450
SLIT					
		GP	GP with a specialist interest in Allergy	GP trainee	TOTAL
Knowledge	Median (IQR)	2 (1,3)	3 (2,5)	1 (1,3)	2 (1,3)
	Inadequate n (%)	251 (83.9)	57 (54.8)	27 (77.1)	335 (76.5)
	Adequate n (%)	48 (16.1)	47 (45.2)	8 (22.9)	103 (23.5)

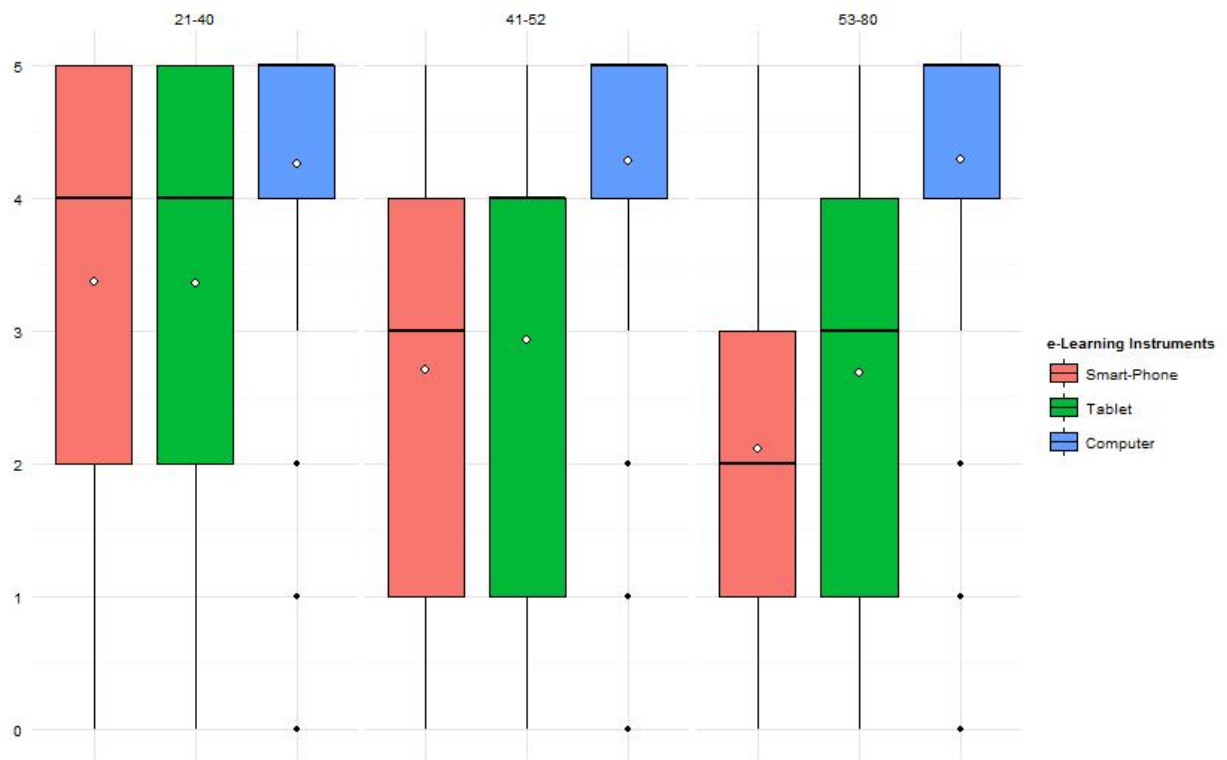
	Total n	299	104	35	438
Educational Need	Median (IQR)	4 (3,5)	3 (2,5)	3 (2,5)	4 (2,5)
	Not Immediate n (%)	116 (39.6)	58 (57.4)	18 (51.4)	192 (44.8)
	Great n (%)	177 (60.4)	43 (42.6)	17 (48.6)	237 (55.2)
	Total n	293	101	35	429
Confidence recommending a patient for Immunotherapy	Median (IQR)	1 (1,3)	3 (2,4)	1 (1,3)	2 (1,3)
	Not confident n (%)	255 (87)	62 (61.4)	31 (88.6)	348 (81.1)
	Confident n (%)	38 (13)	39 (38.6)	4 (11.4)	81 (18.9)
	Total n	293	101	35	429
Confidence in Performing Immunotherapy	Median (IQR)	1 (1,3)	3 (2,4)	1 (1,3)	2 (1,3)
	Not confident n (%)	290 (89.8)	69 (62.2)	28 (80)	387 (82.5)
	Confident n (%)	33 (10.2)	42 (37.8)	7 (20)	82 (17.5)
	Total n	323	111	35	469

Annex 5:E- Learning acceptability by Age group



0= Unacceptable 1= Least Appropriate, 5= Highly Appropriate

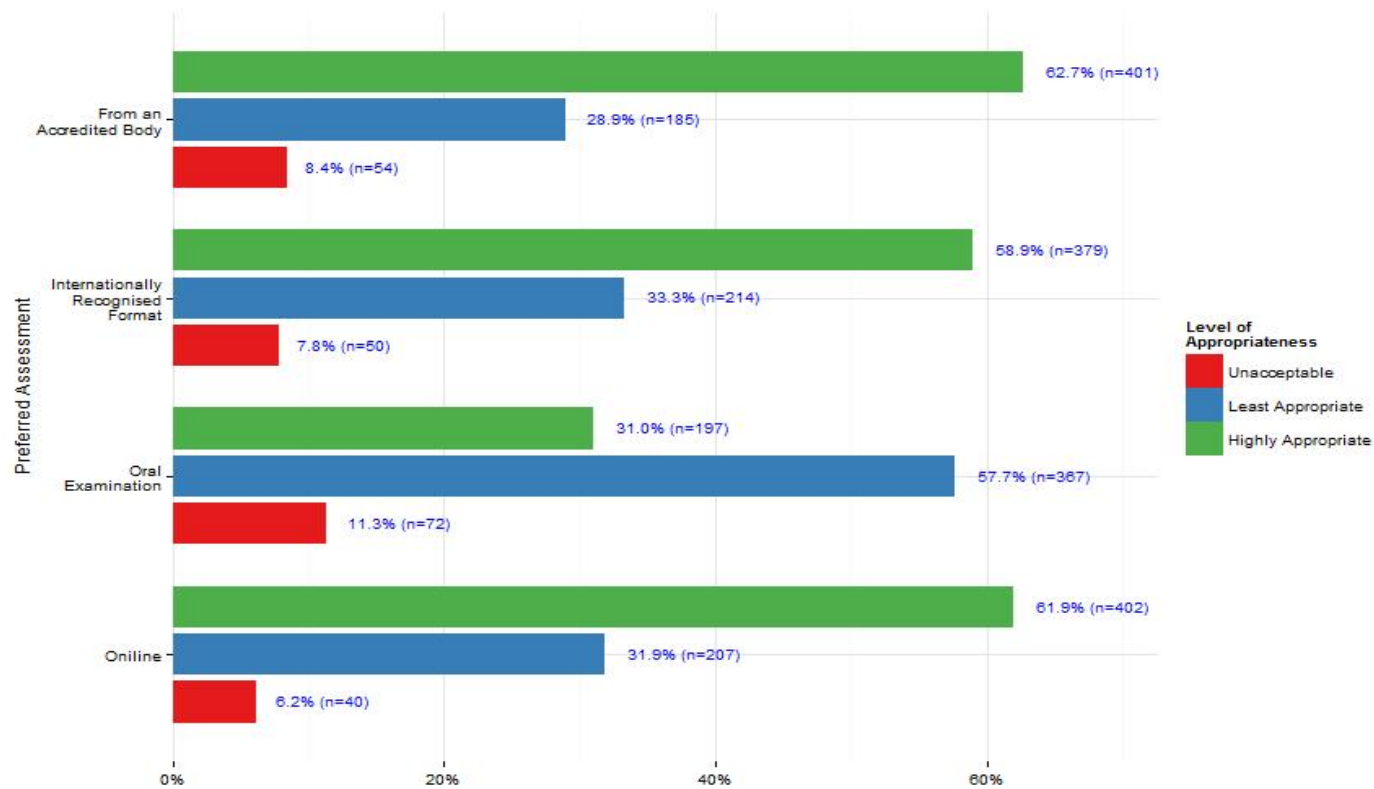
Annex 6: E- Learning platforms by Age group



0= Unacceptable 1= Least Appropriate, 5= Highly Appropriate

Annex 7. Acceptability of formal assessment

Preferred format of assessment



Online (Structured Online Examination Format); Face-to-face Oral Examination; Internationally Recognised Format (Diploma.); From an Accredited Body (University, National Society, EAACI)