

REVIEW

Pediatric allergy and immunology in Spain

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Abstract

The data of the ISAAC project in Spain show a prevalence of childhood asthma ranging from 7.1% to 15.3%, with regional differences; a higher prevalence, 22.6% to 35.8%, is described for rhinitis, and atopic dermatitis is found in 4.1% to 7.6% of children. The prevalence of food allergy is 3%. All children in Spain have the right to be visited in the National Health System. The medical care at the primary level is provided by pediatricians, who have obtained their titles through a 4-yr medical residency training program. The education on pediatric allergy during that period is not compulsory and thus very variable. There are currently 112 certified European pediatric allergists in Spain, who have obtained the accreditation of the European Union of Medical Specialist for proven skills and experience in pediatric allergy. Future specialists in pediatric allergy should obtain their titles through a specific education program to be developed in one of the four accredited training units on pediatric allergy, after obtaining the title on pediatrics. The Spanish Society of Pediatric Allergy and Clinical Immunology (SEICAP) gathers over 350 pediatric allergists and pediatricians working in this field. SEICAP has a growing activity including yearly congresses, continued education courses, elaboration of technical clinical documents and protocols, education of patients, and collaboration with other scientific societies and associations of patients. The official journal of SEICAP is *Allergologia et Immunopathologia*, published every 2 months since 1972. The web site of SEICAP, <http://www.seicap.es>, open since 2004, offers information for professionals and extensive information on pediatric allergic and immunologic disorders for the lay public; the web site is receiving 750 daily visits during 2011. The pediatric allergy units are very active in clinical work, procedures as immunotherapy or induction of oral tolerance in food allergy, contribution to scientific literature, and collaboration in international projects.

Burden of pediatric allergic disease in Spain

According to the ISAAC phase III study in Spain (2001–2002), the prevalence of asthma in children at the ages of 6–7 and 13–14 yrs ranged from 7.1% to 12.9% and from 7.1%

to 15.3%, respectively (1). This ISAAC phase III study was undertaken in eleven metropolitan areas: four in the cold, humid North Atlantic coast, four in the warm, humid Mediterranean coast, and three in the cold, dry inner land. There is high exposure to house dust mites in the coastal areas,

while it is very low in the inner land. Conversely, the pollen counts are very high, although for short periods of time, in the inner land, and they are lower but for longer periods in the coastal areas (2, 3). The ISAAC survey revealed important differences, showing the highest risk for recent wheezing in the North Atlantic coast. The prevalence of 'rhinitis during the last year' in 13- to 14-yr-old children is 22.6–35.8% and that of 'atopic dermatitis during the last year' is 4.1–7.6% in the same age group (4, 5). The prevalence of food allergy in 5- to 16-yr-old children is around 3% (6). Overall, the prevalence of allergic or allergy-like diseases in Spain is in the low–mid-range compared to other countries, although the symptoms are less severe.

Alergologica 2005 (7) was a prospective survey, promoted by the Spanish Society of Allergy and Clinical Immunology [Sociedad Española de Alergología e Inmunología Clínica (SEAIC)] and sponsored by Schering–Plough Laboratories, which evaluated a wide and representative sample of patients seen in a first visit for suspect allergic symptoms. Regarding children, the diagnoses registered in that first visit are shown in Table 1. Asthma was graded as mild in 62%, moderate in 36.8%, and severe in 1.1% of children. Sensitization to inhalants is detailed in Table 2. The performed diagnostic tests and the recommended treatment for respiratory allergy are shown in Table 3.

Atopic dermatitis was diagnosed in 11.5% of the children: no sensitization was found in 61% of cases, sensitization to inhalants was found in 24%, and to food in 15%. Concerning food allergy, it was found in 14.5% of the children in the sample. Children younger than 2 yrs accounted for 60.2% of the cases. The offending foods in those with confirmed allergy are shown in Table 4. Any child with suspect allergy symptoms, if not in an emergency, must first consult the Primary Care System.

The Primary Care System

Spain is organized into 17 autonomous communities with their own competence to organize the medical care, but it is

Table 1 Diagnoses (in %) in children <14 yrs (mean $\pm$ SD age 7.58 $\pm$ 3.87 yrs) seen in a first visit. There were patients with more than one disorder

	n = 917 (55% males)
Rhinitis/conjunctivitis	46.3
Asthma	40.5
Food allergy	14.5
Atopic dermatitis	11.6
Other non-allergic conditions	8.4
Urticaria/angioedema	7.2
Drug hypersensitivity	3.0
Insect hypersensitivity	0.9
Other allergic conditions	0.9
Contact dermatitis	0.5

Data from Alergologica 2005 (7).

Table 2 Sensitization to inhalants (in %) according to disease

	Rhinitis	Asthma
Any allergen	86	82
Dermatophagoides pteronyssinus	41.9	41.5
Dermatophagoides farinae	32.2	34.2
Other mites	6.1	–
Alternaria	12.5	14.8
Aspergillus	1.4	2.2
Other molds	0.9	2.9
Grass pollen	33.6	23.7
Olive tree pollen	28.2	22.1
Platanus pollen	5.4	3.0
Cypress pollen	5.9	2.4
Parietaria pollen	3.3	2.4
Other pollens	18.5	14.8
Cat	10.6	10.8
Dog	–	9.4
Horse	2.6	1.9
Other animals dander	2.8	1.9
Cockroach	0.7	0.3

Data from Alergologica 2005 (7).

Table 3 Diagnostic procedures performed in children with asthma and/or rhinitis and treatment to which they were recommended (in %)

Diagnostic procedures	
Skin tests	95
Serum-specific IgE	50
Spirometry	72
Bronchodilator test	33
Unspecific bronchial hyperreactivity test	7
Nasal challenge test	2.4
Others	4.3
Recommended treatment	
Allergen avoidance	68
Inhaled bronchodilators	80
Inhaled corticosteroids	36
Antileukotrienes	44
Combined inhaled corticosteroids and long-acting bronchodilators	16
Antihistamines	31
Immunotherapy	44
Others	11

Data from Alergologica 2005 (7).

quite uniform all throughout Spain. Most of the children are visited by pediatricians at the Primary Care level; only those living in smaller villages are visited by general practitioners. This model of pediatric care is lately being put in danger because of a relative lack of pediatricians: to keep the quality of pediatric care, an additional 10% would be needed along with the current number of more than 9500 pediatricians.

Table 4 Percentage of sensitizing allergens in children with confirmed food allergy, according to age

	0–2 yrs	3–6 yrs	7–10 yrs	11–14 yrs
Cow's milk	60.4	14	15.4	10
Egg	39.6	50.9	15.4	–
Fish	5.7	19.3	7.7	–
Cereals	1.9	1.8	7.7	10
Legumes	–	10.5	23.1	40
Nuts	–	29.8	38.5	30
Seafood	–	10.5	15.4	–
Fruits	1.9	14	23.1	40

Data from Alergologica 2005 (7).

Pediatricians

Medical students in Spain receive a 6-yr period of education, which entitles them to work as general practitioners. For long, education on allergy was divided among other subjects such as pneumology, dermatology, or otolaryngology. Some university chairs of pediatrics were pioneers in including allergy in the contents of their programs, and recently, allergy has become a core course in some universities, while it is elective in others. To obtain the title of specialist in pediatrics, a 4-yr period in the Spanish state medical residency training program in authorized services of pediatrics is required. This program can be quite variable; education is mandatory in specialties like neonatology, but education in pediatric allergy and clinical immunology often remains voluntary. Residents in pediatrics may receive up to 1 yr of specific education in pediatric allergy, but shorter periods, or even none, are most common. Through their on-duty activity, the residents become acquainted with the evaluation and treatment of acute allergic episodes, but they can obtain their titles with scarce, if any, education in the evaluation and follow-up of chronic allergic conditions.

The child with allergic or allergy-like symptoms is first visited by the Primary Care pediatrician (or general practitioner). Skin prick tests are very seldom performed in Primary Care centers; there is quite often availability to perform spirometric studies, and the access to measure serum total and specific IgE is very variable. Primary Care physicians are free to decide when to refer a child for a specialized allergologic study, according to their own personal knowledge, confidence and skills, and to the availability and quality of a reference unit, so there is also a great variability across centers. There is a lack, and a need, of wide agreement to define clear criteria for referral of patients to the specialist, although in some areas Primary Care pediatricians and pediatric allergists have developed local criteria. These mainly depend on the burden of allergic problems in that area and on empathy between Primary Care pediatricians and specialists. Once a consultation with the specialist is requested, a variable lapse of time will go by. Most of the pediatric allergy clinics have waiting lists, with a mean waiting time of 65 ± 109 days, according to the Alergologica 2005 survey (7); periods longer than a year may be occasionally found in

some places. The specialized study will commonly be performed in pediatric allergy units.

Pediatric allergy units

There is a large net of public hospitals, most of which have services of pediatrics. Many of these, especially the large reference centers, have outpatient clinics devoted to pediatric allergic and immunologic disorders. In some, mainly newer and smaller, hospitals, with small services of pediatrics, unable to take care of allergic children, these are visited by specialists of adults.

The Spanish Society of Pediatric Allergy and Clinical Immunology [Sociedad Española de Inmunología Clínica y Alergia Pediátrica (SEICAP)] recognizes those centers that fulfill the conditions to be considered as pediatric allergy units, according to the criteria of experience, knowledge, skills, and technical tools for the diagnosis and treatment of allergic conditions in children. So far, 64 centers scattered throughout the whole country have reached this status (Fig. 1). The accreditation by SEICAP is not a required condition to practice pediatric allergy, but rather recognition of scientific quality and skill of the units and of the pediatric allergists.

Pediatric allergists

The Spanish Association of Pediatrics [Asociación Española de Pediatría (AEP)] issues a National Certificate of Pediatric Allergist to physicians who have the official title of pediatrician and can certify a period of at least 2 yrs of education in a recognized pediatric allergy unit. This Spanish certificate has an academic value, but no legal rights so far, just like the rest of pediatric subspecialties.

The recognition of pediatric subspecialties in Spain is an ongoing process that started half a century ago (8). The AEP was founded in 1949. Education on pediatrics was provided by then in professional schools, depending on the university chairs of pediatrics. It was in the 1960s, when large hospitals were opened, the residence system of education was implemented, and the first specialists in pediatric allergy began their education.

In March 1979, the National Commission on Education in Pediatrics and Pediatric Subspecialties develops the first educational program and appoints pediatric allergy and immunology as one of the pediatric specialties that will require additional specific accreditation. In 1984, the order in council 127/1984 regulates the medical specialized education and creates the National Council of Medical Specialties (CNEM), an advisory board for the Ministries of Education and Health. In 1995, the CNEM approves the definition and requirements for the areas of specific training to apply for official recognition, regarding the contents of knowledge, specific skills, required training, scientific or social interest, access, accreditation, and report of results.

However, pediatric specialties have not been officially recognized so far, even though the Public Health System offers most of the pediatric specialties in its portfolio of services,



Figure 1 Centres with clinical activity in pediatric allergy or clinical immunology and collaboration in internacional projects. All pediatric allergy units have immunotherapy units.

and some private insurance companies include pediatric specialties among their services.

Because of the difficulties in developing a program of education and accreditation in pediatric allergy in Spain, SEICAP drove a process of European accreditation in pediatric allergy, in the frame of legal and scientific integration in Europe, to support the title of European pediatric allergist.

European pediatric allergist

In May 2001, the former European Society of Pediatric Allergy and Clinical Immunology merged with the European Academy of Allergy and Clinical Immunology (EAACI) to constitute the EAACI-Pediatrics Section. In the agreement, it was stated that EAACI supports the concept that pediatric allergology should be a subspecialty within Pediatrics.

The European Board of Pediatrics, in 2003, and the Education and Training Committee on Pediatric Allergy (ETC-PA), in 2005, approved and published the criteria for accreditation. During 2007, the applications and curricula of the members of SEICAP who fulfilled those criteria were sent to the European Union of Medical Specialists and to ETC-PA,

and so far 112 Spanish physicians, 100 pediatricians, and 12 allergists with exclusive or preferential dedication to pediatric allergy have obtained the 'Certificate of European Pediatric Allergist'.

Furthermore, the basic requirements for the education and training units where future pediatric allergists would be educated were published. After a selection and the required audit by ETC-PA, four centers obtained the certificate of training unit in European pediatric allergy in December 2008. These four centers are as follows:

Section of Pediatric Allergy, University General Hospital, Valencia.

Section of Pediatric Allergy and Clinical Immunology, Hospital Sant Joan de Deu, Barcelona.

Section of Pediatric Allergy and Pneumology, Children's Hospital La Fe, Valencia.

Section of Pediatric Allergy, Consorci Hospitalari Parc Tauli, Sabadell, Barcelona.

The Guide for Education in Pediatric Allergy was elaborated and finally approved in 2011. This guide describes an educational program to be developed in the training units, with 2 yrs duration, and includes a final examination for the

trainees. Those who pass this examination will obtain the certificate of European pediatric allergist.

This process of specialized education is considered clue for an excellent treatment of allergic children and to reduce the clinical burden as well as the costs of pediatric allergy.

Costs of pediatric allergy

The general cost of allergic diseases in Spain was estimated in a study by Nieto et al. (9). It was found that there was a significant negative correlation ($r = -0.64$, $p = 0.005$) of the total expenses for antiasthmatic medication with the number of allergists per 100,000 inhabitants and also with the cost of immunotherapy, so the higher number of allergists and the higher expenses in immunotherapy, the lesser cost of total antiasthmatic medication. There are no detailed data about the costs of rhinoconjunctivitis or atopic dermatitis. The cost of childhood asthma in Spain has been recently assessed in a study by Blasco Bravo et al. (10). They estimated the cost for the management of asthma in children younger than 16 yrs of age during 2008. They built a model of evaluation of costs considering several factors such as prevalence, distribution of severity, age, frequency of use of resources according to severity and cost for each resource. They could estimate the total cost of childhood asthma in Spain to around 532 millions of euros, with a confidence interval between 392 and 693 millions of euros. Direct costs (health system costs) accounted for 60% and indirect costs (work loss of parents) for 40%. The mean yearly cost for an asthmatic child is 1149 euros, ranging from 403 euros for mild cases to 5380 for the most severe ones. The authors conclude that the cost of childhood asthma in Spain is very high and depends on the severity of the disease and that although the cost of the health system is most important, the indirect costs are not negligible, and there are also direct costs for the patients.

Costs for the patients

The National Health System (NHS) in Spain covers practically the whole population. There is a deduction in the wages of all hired workers to support the social security system; part of this deduction is used to maintain the NHS. Self-employed workers have the choice to join the NHS or mutual insurance companies. Finally, there is a strong private health system. All children, by law enforcement, have the right to be seen in the NHS. Medical visits in the NHS, whether at primary or specialized care setting, hospitalizations, and '*in vivo*', '*in vitro*', or imaging studies have no cost for the patient. Drugs for ambulatory treatment are purchased at a reduced cost; the patient must pay 40% of the retail price. The price of immunotherapy ranges between 180 and 430 euros per year in the case of subcutaneous immunotherapy (SCIT) depot products, between 288 and 1214 for polymerized vaccines, and between 408 and 1167 euros per year in the case of sublingual immunotherapy (SLIT). The rest of the drugs used for allergic diseases are also obtained at 40% of the retail price, but some of them (bronchodilators, inhaled corticosteroids, anti-leukotrienes) are classified as medication

for chronic conditions. In this case, the price for the patient is no more than 2.64 euros per package regardless of the retail price, but the burden cost still remains for the NHS; immunotherapy is not included in this classification. For patients with low income, the price may become an important drawback in the case of immunotherapy.

Immunotherapy

Spain is the third-largest European market, after Germany and France, regarding the use of immunotherapy. According to the data from the Spanish Association of Pharmaceutical Research and Marketing, there were around 442,000 immunotherapy prescriptions during 2009, distributed in 70% for the SCIT and 30% for the SLIT route. Data from the Alergologica 2005 survey (7) show that 34.6% of the children with allergic rhinitis visited in allergy clinics are treated with immunotherapy (77% SCIT, 23% SLIT), as well as 44.2% of the children with asthma (75% SCIT, 25% SLIT).

On the other side, data from a survey performed by PSYMA Iberica in October 2009, commissioned by manufacturers of immunotherapy in Spain, show that 79% of the prescribers of immunotherapy in Spain are allergists (pediatric and adult), 9% are pediatricians, 6% are pulmonologists, 5% otolaryngologists, and 1% others.

Other data show that the subcutaneous is the preferred route by Spanish allergists (74.5% SCIT vs. 25.5% SLIT), while the sublingual route is more often used by non-allergist specialists (54.1% SLIT vs. 45.9% SCIT). In fact, data from Alergologica 2005 (7) show that 28.6% of the asthmatic patients who are already being treated with immunotherapy by a specialist other than a pediatric allergist or allergist receive SLIT, and 71.4% receive SCIT; after consultation with the allergist, the figures change to 17.1% and 82.9%, respectively.

These results show that allergists in Spain trust SCIT over SLIT. Some concerns about the clinical results of SLIT have been raised (11), but one of the main reasons for this lies on the fact that there exists a large net of immunotherapy units, which allows for a closer follow-up and control of SCIT, with compliance rates in real life that reach 87.6% after 4 yrs (12). While compliance is quite high in these immunotherapy units, it is lower when SCIT is administered out of the hospital, in Primary Care centers, and it further decreases regarding SLIT. According to the data provided by two major manufacturers of immunotherapy in Spain, the proportion of patients who ask for SCIT maintenance treatment is 64% after 1 yr, 50% after 2 yrs, and 35% after 3 yrs. In the case of SLIT, the figures are 43%, 29%, and 19%, respectively. An additional reason to choose SCIT might be related to the aforementioned costs for the patients. In contrast, there is no cost for them in procedures such as the induction of oral tolerance.

Induction of oral tolerance

Until recently, the only treatment for patients with food allergy was avoiding the offending food. In the last years, the induction of oral tolerance is gaining wide acceptance. Many of the Spanish pediatric allergy units are now performing this

procedure (13–15), even in highly sensitive patients with history of anaphylactic reactions. This procedure is most often used in children with allergy to cow's milk or egg proteins, by far the two most common allergy eliciting foods in Spain. Induction of oral tolerance was initially started in children older than 5 yrs, but because of its excellent results, many younger children are currently undergoing this procedure. Even in some hospitals, such as the Hospital Miguel Servet in Zaragoza, newly diagnosed infants are treated with this procedure since the first moment. Protocols are adjusted to individual responses, but to start with, a specific protocol has been developed by a working group of SEICAP (13).

Spanish Society of Pediatric Allergy and Clinical Immunology

The SEICAP gathers most of the pediatric allergists and pediatricians working in this field. It was born as a Section of AEP in 1976 and became an independent society in 1995, although keeping continued collaboration with AEP. In fact, the president of SEICAP is a natural member at large of the Executive Committee of AEP. SEICAP is a society independent of the Spanish adult society (SEAIC), although many of members of SEICAP have dual membership.

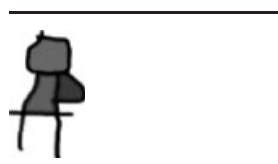
The Spanish Society of Pediatric Allergy and Clinical Immunology currently has over 350 members, 112 of whom have obtained the certificate of pediatric allergist. This makes Spain the European country with the highest number of pediatric allergists. SEICAP holds yearly congresses, 35 so far, and accepts abstracts and oral communications, with figures exceeding one hundred in the latest editions. Every 2 yrs, the congresses hold specific sessions for nurses working in pediatric allergy. In the last 4 yrs, sessions for education of teachers are also included, as well as public open activities for patients and families at the 'Tent of the allergic child'. SEICAP comprises several working groups (Table 5) whose objectives are producing clinical and education documents, coordinating multicentric clinical research studies, and disseminating

knowledge and awareness on pediatric allergic and immunologic diseases.

Allergologia et Immunopathologia was founded in 1972 by Dr. A Oehling, and it became the official journal of SEICAP in 1996. It currently publishes six issues a year, with contents varying from original research articles to short reports or reviews. Contributions come from all countries worldwide, mainly from Spain and other Southern European countries. The mean time from reception of manuscripts to first decision is 39 days. Its Editorial Board, for long led by Dr. Francisco Muñoz Lopez, and currently by Dr. Luis Garcia-Marcos, comprises members from Spain, other countries in Europe, North, Central and South America, and Asia. Initially published in Spanish, it is now published in English by Elsevier to reach more readers worldwide. It is indexed in Medline, EMBASE/Excerpta Medica, IME, Cancerlit, Bibliomed, Cab Health, Scisearch, Healthstar, SCOPUS, Prous Science Integews, and Science Citation Index Expanded. The number of citations of Allergologia et Immunopathologia is steadily rising, and the most recent impact factor, that of 2010, is 0.779.

The Spanish Society of Pediatric Allergy and Clinical Immunology has its own web site (<http://www.seicap.es>) since 2004. It is receiving a mean figure of 750 daily visits during 2011, compared with 500 during 2008 (+ 50% in 3 yrs). A section is devoted to members and professionals and offers information on continued education courses, scientific meetings, and activities, including SEICAP annual congress, news regarding aspects in which pediatric allergy is involved, and medical reports, information, and guidelines for the common pediatric allergic diseases. Another section is dedicated to lay readers: it publishes news, and it has probably the widest information about pediatric allergy and clinical immunology in Spanish. It is organized in a format of questions and answers covering practically all topics of the specialty. This section also holds an open active forum where patients and families share their worries, doubts, and solutions concerning the allergic child. With this regard, there is also extensive collaboration of SEICAP with associations of patients.

Table 5 Main activities of the Spanish Society of Pediatric Allergy and Clinical Immunology SEICAP

	Sociedad Española de Inmunología Clínica y Alergia Pediátrica (SEICAP)
Working groups	Food allergy Respiratory allergy Immunotherapy Clinical immunology Continued education Health education Drug allergy Allergy nursing
Journal	Allergologia et immunopathologia
Web site	http://www.seicap.es

Associations of patients

There exist several associations of patients with asthma and allergic diseases in Spain. Most of them operate at a regional level; some are devoted to asthma and others to allergy to food and latex, mainly involving adult patients. There is a national society since 1996, with wide implantation, specifically focused on children with food and latex allergy (AEPNAA). To disseminate awareness, AEPNAA organizes courses and workshops directed to school and catering personnel, in collaboration with SEICAP, with very good attendance. This kind of meetings have been now routinely included in the annual congress of SEICAP during the last years. The topics in these meetings are developed and discussed by pediatric allergists, allergy nurses, and representatives of patients, thus offering varied points of view. One major objective of these activities is to achieve a safer environment for the allergic child at school.

The allergic child at school

Similar to health care, the competences of primary through university education in Spain depend on each autonomous community. In most of the cases, there is no special program for the care of the allergic child at school, except for voluntary attitudes. Nevertheless, in one of the autonomous communities, Galicia, a plan, called *Alerta Escolar*, has been implemented in the last 2 yrs. The center for emergency calls holds a database with the names and medical problems of children previously registered by their parents. This is meant not only for allergic children, but also for those with diabetes and epilepsy. In case of emergency, when the school personnel calls for medical help, if the child is registered, a health professional will check the data, provide phone instructions about what to do and how to assist the child, and hold the line for continued help until a medical unit arrives. In another community, Andalucia, a similar plan, named *AIRE*, has been developed for children and adults with severe asthma or with anaphylaxis. The emergency calls service personnel has access to a medical database and will assist by phone until direct medical care arrives. There are currently over 300 patients included in this plan.

Regarding meals at schools, specific menus are considered for children with celiac disease, but in June 2011, a national law has been passed that does not make it compulsory to elaborate menus for children with food allergy, until 'the state of science and technical advances in food industry allow for it'. This has been disappointing, in contrast to the described plans, which are much appreciated in schools, although they replace neither education of teachers nor education of patients.

Education of patients

In addition to individual education provided in medical visits, meetings for parents of food allergic children are organized by AEPNAA with participation of pediatric allergists. Camps for asthmatic children are organized every year. In these camps, asthmatic children receive education on their disease, regarding recognition of symptoms, self-assessment, and proper use of medication, and learn to cope with the many problems they can face. At the same time, they can enjoy their stay and activities with peers, leading to better self-esteem and confidence. The Society of Allergology and Clinical Immunology of Madrid-Castilla La Mancha and the Service of Allergology of the University General Hospital of Valencia have long experience in summer camps of 1 wk duration and recently in week-end camps. Likewise, Dr. Carles Lucas, from the Service of Allergy of the Hospital Sant Pere Claver in Barcelona, has been organizing summer camps for asthmatic children for over 20 yrs. These camps were awarded the prize 'Jaume Suñol i Blanchart' of the Academy of Medical Sciences of Cataluña and Balearic Islands, for their contribution to 'knowledge of disease, autonomy of patients, and better use of resources'.

The web site of SEICAP, as mentioned before, offers open-access material, in its area for patients and families, for continued education 24 h a day. The Section of Pediatric

Allergy and Pneumology of the Hospital La Fe in Valencia also holds a web page (<http://www.alergiainfantillafe.org>) that is the best placed in internet searchers in the field of infantile allergy in Spanish. The Section of Allergy of the Althaia Foundation in Manresa has a web page (http://clic.xtec.cat/db/act_ca.jsp?id=3316) for children, with didactic material on childhood asthma. Thus, pediatric allergists are committed to the tasks of education, direct care of patients, and clinical research as shown in their scientific production and contribution to the journal *Pediatric Allergy and Immunology*.

Contribution to Pediatric Allergy and Immunology

An in-depth evaluation of the scientific production of Spanish pediatric allergy exceeds the limits of this article, as there is abundant production of both basic and applied investigation. Under the direction of Dr. M Anunciacion Martin-Mateos, several members of SEICAP have elaborated the *Tratado de Alergología Pediátrica*, a reference book in Spanish for practising clinicians (16). Regarding the presence in the EAACI-Section on Pediatrics official journal, *Pediatric Allergy and Immunology* (PAI), we can find contributions to most fields of pediatric allergy. In the last 2-yr period, 2009–2011, several studies have been published in PAI. A study by Diaz-Vazquez et al. (17) found a good diagnostic value for the ImmunoCAP Rapid test in the diagnosis of allergic sensitization in children with recurrent wheezing in a Primary Care setting. Another study, by Martinez-Canavate et al. (18), found beneficial effects on immune parameters, such as a reduction in serum IgE and an increase in regulatory T cells, in allergic children fed a dairy product with probiotics. The search for the genetic basis of asthma has an example in the investigation of a new PTGDR promoter polymorphism, in asthmatic children compared to controls, assessed by Sanz et al. (19). Data on efficacy and safety of a new rice-based hydrolyzed formula for infants with allergy to cow's milk protein were presented in a study by Reche et al. (20). Garcia-Marcos et al. (21) have contributed papers about the effect of early exposure to paracetamol and antibiotics on eczema at school age, about risk factors for occasional and recurrent wheezing in a large population of 28,687 infants of affluent and non-affluent countries (22), and about the family organ-specific effect of sensitization to house dust mites (23). Most recently, Palacin et al. (24) have published a study on the characterization and cross-reactivity of banana allergens in allergic children. This interest on PAI is an example of Spanish pediatric allergy contribution to EAACI.

Contribution to European Academy of Allergy and Clinical Immunology

Spanish Society of Pediatric Allergy and Clinical Immunology organized in Valencia, in November 2002, the First Joint Meeting of the EAACI-Pediatrics Section and the European Respiratory Society-Pediatric Assembly, was attended by nearly 500 delegates. The fifth edition of this meeting, the Pediatric Allergy and Asthma Meeting, PAAM 2011, is to be

held in Barcelona in October 2011; there are several members of SEICAP in the organizing committee of this meeting. Barcelona also hosted the 27th Congress of EAACI in 2008, chaired by Dr. Ignacio Ansotegui; it was the most successful meeting on allergy until then. The institutional presence of Spanish pediatric allergists in EAACI began when Dr. Cristina Pascual was elected for the Board of the EAACI-Pediatric Section for the period 2001–2003 and 2003–2005; later Dr. Antonio Nieto was a member of the Board between 2005 and 2009, and in 2009 and again in 2011, Dr. Angel Mazon was also voted for the Board, where he is in charge of the Pediatrics Section web corner. The current EAACI Vice-President for Communications and Membership is Dr. Victoria Cardona, so she is in charge of all information to associates, through journals, newsletters, or the web. Dr. M. Anunciacion Martin-Mateos, as Spanish coordinator for the European Education in Pediatric Allergology, is a member of the ETC-PA of the EAACI, where she has participated since the beginning in the process of accreditation of pediatric allergists and training units. Besides these academic activities, there is also Spanish participation in international research.

Participation in international research

There has been extensive participation of Spanish pediatric allergy in many projects (Fig. 1); among those currently ongoing, we can mention participation in the ISAAC project of several centers across Spain. It is led in Spain by Dr. Luis Garcia-Marcos, who is also a member of the International Executive Committee of the project and has delivered numerous manuscripts regarding descriptive epidemiological results and also investigated possible risk factors involved in the epidemics of allergy (4, 5, 25–29).

The Mechanisms of the Development of ALLergy (MeDALL) Project is a collaborative project supported by the European Union under the Health Cooperation Work Program of the 7th Framework program (Grant agreement number 261357). It encompasses 23 public and private institutions of Europe and America and is aimed to study the factors leading to the appearance of allergic diseases. A part of the project includes evaluation of birth cohorts, regarding respiratory and allergic disorders. Cohorts of Spanish children born in Menorca (AMICS Project), Sabadell, San Sebastian, and in Valencia, in collaboration with the Pediatric Pneumoallergy Unit of Hospital La Fe (INMA Project), will be assessed.

There is also international and fruitful cooperation of Spanish researchers from the Hospital Sant Joan de Deu of Barcelona in multicentric studies related to clinical immunology (30–33).

Clinical immunology

Besides allergy-related activity, some of the largest departments located in third-level hospitals are enabled to diagnose and treat primary immune deficiencies. Their activity is partially recorded in a National Register of Primary Immune Deficiencies (REDIP) that holds a total of 1630 patients up to June 2011. These allergy and clinical immunology units are listed in REDIP web site. Most of the clinical immunologists in Spain who work on primary immune deficiencies have been included as referral physicians in the Jeffrey Modell Foundation Network, the most important international patient-centered organization on primary immune deficiencies.

Conclusions

Spain, like other Western countries, is experiencing the allergy epidemics, which affects specially children. To cope with it, there is a strong Public National Health System, although the increasing costs are becoming a problem for the sustainability of medical services. There is a high level of specialized care for allergic and immunodeficient children in the pediatric allergy units, but the number of pediatric allergists is lower than needed, which gives rise to waiting lists and to the lack of this specialized care in some areas of the country. The education on pediatric allergy and clinical immunology must be improved during the residency period of Pediatricians, as many of them must often face children with allergic chronic conditions and suspect immunodeficiencies in the Primary Care setting with little knowledge and experience; steps are being taken to correct this weakness. Most of the pediatric allergists and clinical immunologists in Spain have joined SEICAP, which is becoming a progressively more active organization, involved in all aspects of pediatric allergy and clinical immunology. More attention is being paid to clinical care, basic and applied research, education of physicians, patients and families, and awareness of pediatric allergic disorders by the whole society. The individual attitudes, the collaboration with other national and international societies, and the use of modern technology are the key factors for obtaining an important impact. Although education should be improved at all levels, the process of European accreditation of pediatric allergists and of pediatric allergy training units in Spain can be considered a model for other European countries. The international presence of Spanish pediatric allergy is reflected in its scientific contribution to international journals and in the cooperation in European and worldwide projects and societies, which is expected to consolidate and grow in next years.

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