

POSITION PAPER

Improving allergy management in the primary care network – a holistic approach

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Abstract

The incidence, prevalence and costs of allergy have increased substantially in recent decades in many parts of Europe. The dominant model of allergy care within Europe is at the moment specialist-based. This model will become unsustainable and undeliverable with increasing disease prevalence. One solution to increase provision of allergy services is to diversify the providers. A new model for the provision of allergy care in the community with the general practitioner at the forefront is proposed. Pre- and postgraduate allergy education and training, implementation of pathways of care, allergy specialization and political will to generate resources and support are essential to achieve this new model. In parallel the holistic view of allergic diseases should be maintained, including assessment of severity and risk, psychological factors and health-care related costs in the context of the patient-centered decision making process.

IgE-mediated allergies constitute an important and increasing health problem responsible for significant morbidity and potential mortality. Correct diagnosis with identification of all offending allergens is an absolute prerequisite for appropriate management, including allergen-specific immunotherapy. In most of the European countries, the majority of patients who seek medical advice for allergy and asthma are first seen in a primary care (PC) setting partly because relative ease of access but also because of the paucity of trained allergists to meet the ever growing demand. Hence, the importance of the general practitioner (GP) as the first-line worker for correct diagnosis and management of allergic diseases is beyond any doubt.

The significant workload of a PC setting and the impressive panel of pathologies managed there call for consideration of several issues:

- There is a predictable 'risk' that allergic diseases are under diagnosed and incorrectly treated.
- A simplified pathway for management of allergic diseases should be available and adapted to local (national) conditions.
- Clear referral criteria should be implemented, validated by local (national) circumstances and by cost-efficiency evaluation.
- While trying to simplify the management pathway, the holistic view of allergic diseases should be maintained, including assessment of severity and risk, psychological and healthcare-related costs in the context of the patient-centered decision-making process.
- Educational programs should be implemented both for PC settings and the general public.
- Empowering the allergic patient in the decision-making process together with raising awareness of the patients/general public and redefining 'allergy' in a patient friendly way is of paramount importance.

To achieve the best care for the allergic patients the EAACI Task Force for Allergy Management in Primary Care created a contextual, creative, and patient-centered framework bringing together the opinion of the primary care physicians, allergy specialists, and patient's organizations.

Improving provision of allergy care in the community – a new model for primary care

The dominant model of allergy care within Europe is at the moment specialist based. This model will become unsustainable and undeliverable with increasing disease prevalence. One solution to increase provision of allergy services is to diversify the providers. The primary care physician (PCP), sometimes referred to as family doctor or GP, is well placed to care for patients with mild and moderate allergic disorders and can provide the effective co-ordination of specialist care for more complex cases. PCP specializes in the provision of person-focused rather than disease-oriented care. They provide care for all but very uncommon or unusual conditions and coordinate or integrate care provided elsewhere or by others (1). Their role is particularly important in the management of long-term conditions, and allergy is an obvious example of a common chronic condition that presents in PC. Providing the basic allergy assessment and management PC could both enhance availability of allergy care and also liberate secondary care colleagues from the management of mild-to-moderate disease and allow them to focus their expertise on patients with complex disorders.

A PCP can be trained in the delivery of a structured allergy history, the choice of appropriate tests, test result interpretation in light of the patients' clinical history, and the development of a management plan tailored to the patients' symptoms. Several steps are needed to achieve this new model.

Knowledge and education

A key factor impairing the quality of care delivered to allergic patients is the paucity of allergy education or training given or undertaken at either undergraduate or postgraduate level (2). A core allergy curriculum ensuring that all doctors graduate with a basic training in management of allergic diseases and offering proper postgraduate education is essential. To have sustained utility, such a core curriculum needs to be dynamic, reflecting advances in diagnostics and treatment.

In parallel with strengthening allergy training for undergraduates and for PC practitioners in training, there still remains a need to devise and deliver educational resources to extend the clinical competencies of those already established in practice. The UK Royal College of Paediatrics and Child Health (RCPCH) together with the Royal College of General Practitioners and other professional organizations has developed a series of care pathways for the management of children with allergic problems and has identified core competencies that should be expected from those providing allergy care. Details of these pathways and associated tools to support implementation are available from <http://www.rcpch.ac.uk/allergy>. These competency statements can easily

be adapted as learning outcomes for the continuing medical education. The development of such competency statement is resource intensive but by sharing the methodology and care pathways; these could easily be adapted to suit the organizational context of other countries (3).

Generating political will to address the unmet needs for allergy services

Securing the investment necessary to deliver this new model requires political will. Unlike cancer and heart diseases, which are major causes of mortality, allergic diseases mainly cause morbidity and impaired quality of life. This has sometimes meant that allergy has had a lower priority for service development especially when health services are under increasing financial pressure. Groups working on this agenda across Europe need to meet and share their experiences of lobbying and advocacy. Successful campaigns can be replicated and past errors avoided.

Availability of specialist centers to act as an expert resource

Greater engagement of PC in allergy cannot be achieved in isolation. Secondary and tertiary centers have a wealth of expertise that can be used to 'kick start' PC services and support them as they develop. Some regions have very limited specialist capacity (4), and optimal allergy care will require an integrated approach tailored to local circumstances. There is a case to be made for setting up clinics run by GPs with a special interest in Allergy as a means of addressing the shortage of specialists and specialist skills (5).

Allergy specialization within primary care

Specialization within PC appears at first sight to be a contradiction in terms because one of the unique features of primary medical care is 'generalism', orientated to the whole person not their diseases. However, in reality, many GPs do have special clinical interests. A survey in the UK found 16% GPs involved in delivering a clinical service linked to their special interest (6).

The range of services offered by a GP with a special interest varies depending on local services and the nature of the unmet need. For allergy, GP specialization could work in a variety of ways, including the provision of a local referral service for patients, the provision of education and training for other PC health professionals, advice to schools and local caterers, and coordination of services (5). This type of service can achieve excellent patient acceptability and deliver care in a cost-effective manner (7). Implementation of the new model of care requires clarity of the role, definition of competencies, and a formal process of accreditation and specialist mentorship.

Defining clinical pathways

Clinical pathways differ from practice guidelines, protocols, and algorithms as they are utilized by a multidisciplinary

team and address the quality and coordination of care. Essentially they are structured as multidisciplinary plans of care designed to support the implementation of guidelines and protocols. Care pathways provide detailed guidance for each stage (investigations, treatment, monitoring) in the management of the patient with a specific condition over time. Pathways are particularly important for the PCP who needs to keep up to date with the management of a very wide spectrum of disease and technologies. Certainly a common request to pathways is for clarity about referral thresholds for specialist assessment (e.g., challenge testing, immunotherapy).

Care pathway development needs collaboration across the primary and secondary interface. The best pathways are informed by excellent evidence, patients' experience, and professional judgment. Generalists and specialists need to work together to provide pragmatic solutions (8, 9). Once developed, care pathways can act as explicit standards against which patient care can be monitored and improved.

Evidence that this approach can lead to improved health outcomes can be found in Finland where the Finnish Health Service has focused on improving quality of care underpinned by education and skills training, motivation of the work force, and organization of the service. Programs to address cardiovascular disease (10), asthma (11), and COPD (12) have succeeded, and a ten-year program to reduce the burden of allergy has recently been commenced (13). The Finnish experience suggests that the management of patients with allergy in the PC setting has the potential to be transformed.

Focus on psychological and social aspects

Allergic diseases are chronic, but rarely life-threatening, with symptoms often perceived as trivial, for example runny nose or skin rash. Although unexpected, there is increasing evidence that allergic diseases generate significant psychological and social problems.

Relationship between allergy and mood

Several epidemiological studies have found associations between allergy and depression (14–17) and to a lesser extent to anxiety disorders (17, 18). Stress has been recognized as a trigger for atopic disorders flares, for example eczema, and conversely post-traumatic stress disorder may follow near fatal episodes of asthma or anaphylaxis.

The mechanisms underlying the observed relationships between allergy and mood are not fully understood (19). The relationship may be bidirectional: physical illness being a risk factor for mood disorders because of the psychosocial stressors and functional impairment it causes and mood impairment may act as an etiological factor in the natural history of allergic disorders. Alternatively there may be a third factor common to both the pathophysiology of allergy and mood disorders. Whatever the underlying mechanisms, it is important for clinicians to recognize the interplay between their patient's organic disease and their emotional state.

Impaired performance

Under performance and lack of attentiveness may arise from the allergic symptoms themselves, from disease complications or from treatments. Decreased productivity in the work place can originate from absenteeism or from suboptimal performance when present. Claims for work-related injuries are 50% higher in worker who self-medicate with sedating antihistamines for their allergic rhinitis (20). In children, underperformance in the classroom may have a critical impact on their educational attainment and socialization. A case-control study of teenagers who had hay fever on the day of a school examination found they were 40% more likely to drop below their expected grade (21).

Decreased quality of life

All allergic diseases impact on the quality of patients' lives. The magnitude of this impact has been demonstrated using objective generic, health- or disease-specific quality of life (QoL) measurements. Many of the newer questionnaires are for children or their parents, reflecting how the rise in allergic disease over the last two decades has predominantly affected children. Parental proxy reports of QoL are only moderately correlated with child reports, as children may interpret items differently and parental views may also be influenced by their own physical and psychological well-being. It has also been recognized that even when there is close correlation, this may be coincidence rather than concordance as the parent's and child's answers to health related QoL items may be based on different reasoning (22).

Impacts on carers and family of patients with allergic disease

Allergic diseases rarely impact solely on the affected individual, but their effects ripple out to parents, dependents, friends, and peers. Examples include eczematous itching disturbing the sleep patterns of both parents and child, or the snoring and sneezing of a rhinitic adult interrupting their partner's rest. Food avoidance within a family appears to have exceptionally far-reaching impact; it may distort everyone's dietary intake, reduce family cohesion, inhibits family activities, and make mealtimes particularly stressful (23).

Stigma and bullying

A recent paper highlighted that 25% of food allergic children are bullied, teased, or harassed because of the need to avoid certain foods and to carry medication with them at all times (24). Unfortunately the perpetrators were not just their peers, 1 in 5 affected children reported that school staff made them feel vulnerable and powerless. Clinicians need to be alert to the possibility, attentive to changes in their patient's emotional well-being, and be willing to work with schools or workplaces to generate a safe and supportive environment.

Focus on health economics

It is well recognized that allergic disorders are characterized by a major impact on patients in terms of impairment of quality of life, work and school performance. Patients may experience sleep disorders, impairment of cognitive function, depression, and anxiety. The high and increasing prevalence of these disorders may lead to substantial direct and indirect costs of disease.

Costs of illness

The reported costs of allergic rhinitis (AR) in Europe widely vary. In Turkey, the annual costs of seasonal allergic rhinitis (SAR) amount 79 US \$ (25) and in Germany, 1089 € in children and 1098 € in adults (26). One study shows that the total costs of persistent rhinitis equals 335 € (27). This total amount can be divided into direct costs (8 €), costs for work absence (34 €), reduced productivity (49 €), and impairment of daily activities (234 €). Although this study represents the costs of illness in Belgium, France, Italy, Germany, and Spain, the interpretation of these costs is limited as the calculations are made in the framework of a randomized clinical trial to the cost reductions by levocetirizine.

It was assessed that 300 million people in the world have asthma (28). The number of disability-adjusted life years (DALYs) lost due to asthma worldwide has been estimated to be currently about 15 million per year. Worldwide, asthma accounts for around 1% of all DALYs lost, which reflects the high prevalence and severity of asthma. The number of DALYs lost due to asthma is similar to that for diabetes, liver cirrhosis, or schizophrenia. When ranking chronic diseases, asthma was the 25th leading cause of DALYs lost worldwide in 2001. An estimate of the total costs of asthma in children in 25 EU countries published in 2005 indicates € 3000 million (29). The use of wheeze as definition of asthma leads to considerable higher costs of € 5200 million. Annual costs for childhood per patient vary widely ranging from € 142 in Estonia to € 1529 in Hungary. More recent studies estimated the annual costs per asthma patient at € 741 for Italy (30), \$ 991.70 for Turkey (31), and \$ 1592 for Sweden (32). Focusing on specific populations such as persistent asthma may generate high costs (\$ 4412 for health care and \$ 924 for work loss) (33). Not surprisingly, there is a difference between well-controlled and poorly controlled asthmatics (€ 379 vs € 1341) (30).

Asthma can be accompanied by AR. Whereas the costs of SAR in Germany were estimated at € 1098 for children and € 1098 for adults, these figures amounted € 2202 and € 2745 in subjects with rhinitis and asthma. Price et al. (34) calculated the additional costs of rhinitis in PC among adults. Compared with those with asthma alone, patients with concomitant AR experienced more GP visits (5.2 vs 4.2; $P < 0.0001$) and more hospitalizations for asthma (0.76% vs 0.45%; $P < 0.01$) during the 12-month follow-up period. Also, compared with children with asthma alone, children with comorbid AR experienced more GP visits. Rhinitis was associated with increases in the number of asthma-related

GP visits and asthma drug costs (mean increase in : 6.7; 95% CI: 6.5–7.0).

The combination of asthma and rhinitis may influence work absence. In a prospective cohort study of 48 296 Finnish public sector employees (35), the mean sick leave days per year for respondents were 17.6 days for rhinitis alone, 23.8 days for asthma alone, and 24.2 days for both conditions combined. Respondents with neither condition were absent for a mean of 14.5 days annually.

The literature on costs of atopic dermatitis (AD) is characterized by a substantial diversity in reported costs, depending on the country, the source of data, and the methods of data collection (Table 1). Treatment costs for patients with AD increase substantially after they develop other atopic manifestations (45). The additional financial burden was estimated to be \$ 482 per year, an almost 1.5-fold increase compared with AD cost alone (from \$338 to \$ 820, $P < 0.001$), with approximately equal distribution of costs between medical services (\$ 243) and prescription drugs (\$ 239). The largest incremental costs were observed in asthma (\$ 973), followed by allergic rhinitis (\$ 341).

Few papers are available on the costs of food allergy. A pilot study performed in the UK and the Netherlands for the development of a questionnaire estimated the extra costs of households with members having self-reported food allergy at € 3933 per year (46). A French study estimated the costs for food- or drug-associated anaphylaxis at 1895 € per case (47). In a study to the costs of cow milk's allergy (CMA) in the Netherlands, the expected cost of healthcare resource use attributable to managing 4,382 new CMA sufferers up to 1 year of age following initial consultation with a community-based physician at a mean 3 months of age was estimated to be €11.28 million (95% CI: €7.82 million; €14.33 million) (48). The total cost of managing CMA over the first 12 months following initial presentation to a GP in the UK was estimated to be 1381 per patient and 25.6 million for an annual cohort of 18 350 infants (49).

Costs of allergy diagnosis

There are sparse data on the economics of allergy diagnosis. Most importantly, the costs of allergy diagnosis are low compared to other direct and indirect costs.

One analysis calculated the costs of assessing specific IgE vs no testing using a clinical decision model based on a prospective clinical trial performed in primary care. The expected costs per patient over 2 years decreased from € 802 in the 'no-test strategy' to € 560 in the specific IgE 'test strategy' (50). Cost savings persisted even after assumptions about the prevalence of allergy and the prices of medications were changed. The 'test strategy' increased the percentage of patients correctly diagnosed from 54 to 87%.

Data from the NICE clinical guideline 116 entitled 'Food allergy in children and young people' (51) indicate that the costs of food allergy testing per person are 47.27 and 126.97 for skin prick tests and blood tests, respectively.

In the NICE guideline, the costs of diagnosis using skin prick tests and blood investigation in PC are compared with

Table 1 Costs of atopic dermatitis

Author	Costs (direct-indirect)	Country
Witt et al. (36)	Part of a RCT! Total costs: 721.2 € Indirect cost: 148.8 € Medication: 156.8 € Physicians: 458.5 € Medical aids: 211.0 €	Germany
Mancini et al. (37)	Systematic review (mainly direct cost-identification analyses)	USA
Fowler et al. (38)	364 million – 3.8 billion US \$ Employer payer perspective Total costs: 991 US \$	USA
Barbeau and Bpharm (39)	Total cost: 1.4 billion Canadian \$ Annual costs per patient: Mild AD 282 \$ Moderate AD 454 \$ Severe AD 1242 \$	Canada
Ehken et al. (40)	Annual costs per patient Total 1425 € Mild AD 956 € Severe AD 2068 €	Germany
Jenner et al. (41)	Annual costs per patient Medical aid/products 425 A\$ Consultations 120 A\$	Australia
Kemp (42)	Atopic dermatitis in children. Review USA: 364 million – 3.8 billion US \$ UK: personal costs to patients 297 million, health services 125 million, cost to society 43, total costs: 465 million	USA UK
	Australia: 1142 (mild) – 6099 (severe AD) A\$ per patient. Total costs 316.7 million A\$	Australia
Verboom et al. (43)	Total costs per patient 71 US \$ GP visits 32 US \$ Medication 21 US \$ Costs per patient referred to specialist 186 US \$	Netherlands
Ellis et al. (44)	Third party cost by payer: 0.9 billion to 3.8 billion US \$	USA

oral food challenge tests in secondary care. The latter costs amount £ 516, which means a potential saving of 468.78 and 389.03 for skin prick tests and blood investigation, respectively. However, this comparison does not take into account that tests for sensitization are being compared with a test to establish clinically relevant allergy. It is suggested that the use of IgE antibody tests or skin prick tests are cost-effective (52).

Costs of allergy management in primary and secondary care

In general, studies do not report the costs of allergy management in both primary and secondary care. Most studies either address specialist care or estimate total healthcare expenditure. Few publications from the UK focus on PC.

Gupta (53) reported that allergic problems are responsible for 12.5 GP consultations per year resulting in an estimated cost of £ 224 million per annum. PC subscriptions for asthma and other allergic disorders account for 11% (0.6 billion £) of all subscriptions, compared to 10% for gastrointestinal and 23% for cardiovascular disease. Allergic disorders are responsible for 183 000 bed-days each year resulting in £ 68 million per annum.

Literature on comparisons between primary and secondary healthcare costs in the allergy field is sparse. The NICE clinical guideline 'Anaphylaxis: assessment to confirm an anaphylactic episode and the decision to refer after emergency treatment for a suspected anaphylactic episode' (2011) reports a cost-utility analysis on the costs of management of anaphylaxis in primary and secondary care

Table 2 Key recommendations for evaluating health economics in primary care

Clear definitions of allergic disease	Questionnaire based? Self-reported/medical diagnosis?
Define the source population being evaluated	National databases for prevalence and associated direct and indirect costs of allergic diseases Primary care based registries Less appropriate sources: Selected patient groups Patients from specialist care Data from RCT's
Assessment of both direct and indirect costs	Agreement on the methods

with or without the use of adrenaline injectors. From this analysis, it appeared that secondary care is cost-effective compared to PC with or without the provision of adrenaline injectors. In PC, providing adrenaline is cost-effective compared to the situation that adrenaline is being withheld.

The TF key recommendations for evaluating health economics in PC are presented in Table 2.

Toward a patient-centered attitude

Primary care is literally at the forefront of good allergy management. Good PC is a blockbuster of the traditional blockers in getting the appropriate management of allergic diseases, especially for multiple and changing allergies from birth to old age. These blockers include the low priority to allergy at political level, downplaying or trivializing allergy by the public, healthcare professionals and patients, lack of specialists or of specialty on allergy in some countries and sometimes the very complex nature of allergies often requiring multidisciplinary team. PC can help to break these barriers by coordinating and advising from whom or where to seek advice and support.

In principle, for the patient, it is just the same who delivers the care, as long as it is properly delivered. The PCP usually is involved being the closest to the home and family environment.

Table 3 Key messages

1. A new model for the provision of allergy care in the community is proposed with the GP at the forefront. Pre- and postgraduate allergy education and training, GP allergy specialization, implementation of pathways of care and political will to generate resources and support are essential to achieve this new model.
2. Adopting a psychosocial approach when consulting with allergic patients will ensure that clinicians deal with not just the physical symptoms but with the wider consequences of allergic disease
3. Several key recommendations need to be followed for a correct evaluation of health economics in primary care
4. Patients empowerment and involvement in all decision steps is essential for a successful health management plan

There is a need to develop and promote and disseminate simple easy-to-understand educational services for PCP, other specialists and patients, available in local languages, including guided self-management tools.

Empowerment of the patients is essential, such as being able to manage their daily life both indoors and outdoors and control unexpected situations and environments, during different seasons or while traveling. Empowerment starts with a correct and early diagnosis followed by a detailed self-management and follow-up plan. Its enactment requires dialogue and coordination, not only between the patient/carer and doctor, but also between primary and secondary care and sometimes between different secondary care specialties.

The system needs to make a conscious decision on who is responsible on what and take the right steps for implementing education and generate resources and compensation. Involving patient and healthcare professional representatives in the decision process is essential to ensure that the health programs correspond to the needs and are practical. One example is the Finnish National Allergy Programme (13), following in the steps of the successful Asthma Programme (11).

At the forefront of patient advocacy the European Federation of Allergy and Airways Diseases Patients' Associations (EFA) launched a call-to-action aiming to

- 1 increase the political recognition of respiratory allergy;
- 2 promote national programs on respiratory allergies;
- 3 prioritize their prevention, management and control;
- 4 promote training for healthcare professionals;
- 5 align healthcare and reimbursement policies to support appropriate disease management;
- 6 improve air quality.

These challenges can be effectively met only if there is close collaboration among all stakeholders: healthcare authorities, healthcare workers, pharmacists, patients' associations, patients, and their families and media. The EFA project is carried out in partnership with EAACI, Allergic Rhinitis and Its Impact on Asthma Initiative (ARIA), International Primary Care Respiratory Group (IPCRG), European Respiratory Society (ERS), European Lung Foundation (ELF), and the Pharmaceutical Group of the EU (PGEU) representing community pharmacists. This collaboration can achieve real results based on the needs of patients in primary care.

Conclusion

Services for patients with allergic conditions will develop at different rates in different countries across Europe. A systematic and integrated approach should be taken, with a focus on the patient perspective. Services should learn from each other and avoid necessary duplication of effort. Specialist societies such as EAACI can serve as a forum for discussion and a repository of good examples.

The psychological and social aspects of allergic disease have been increasingly recognized in recent years, but research into this area still lags significantly behind our understanding of the molecular and cellular basis of the physical aspects of allergy. Clinicians need to be aware of the

possible psychological effects of allergic illness and its management on both the patient and their family. Patients with atopic disease require not just an in-depth assessment of their physical problems, appropriate medication and advice, but also consideration of the psychosocial aspects of their condition.

The costs of allergic disorders are substantial, and some studies indicate that the costs are rising. The high costs are not surprising given the high prevalence of allergic disease. However, costs vary substantially (up to 10-fold) or more between studies and countries between studies. Factors that may contribute to this variation may be the registration of disease and associated reported prevalence, the source of data (national

registries, hospital clinics, GPs, third parties, retrospective, prospective, RCTs etc.), and differences in healthcare systems. There are surprisingly few data on the costs of the diagnosis of allergy. Finally, the question needs to be addressed to what extent primary and secondary care is cost-effective in the field of allergy. Effective ways of cooperation need to be established. Local healthcare systems, the level of education, and accessibility to experienced primary care physicians and specialists will substantially influence such cooperation (Table 3).

Conflict of interest

None in relation to the submitted manuscript.

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