



WORLD ALLERGY ORGANIZATION

**WAO White Book
on Allergy 2011-2012:
Executive Summary**

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WORLD ALLERGY ORGANIZATION

A World Federation of Allergy, Asthma
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WAO White Book on Allergy 2011-2012: Executive Summary

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Introduction to the Executive Summary

Allergic Diseases as a Global Public Health Issue

1. INTRODUCTION

The prevalence of allergic diseases worldwide is rising dramatically in both developed and developing countries. These diseases include asthma; rhinitis; anaphylaxis; drug, food, and insect allergy; eczema; and urticaria (hives) and angioedema. This increase is especially problematic in children, who are bearing the greatest burden of the rising trend which has occurred over the last two decades. In spite of this increase, even in the developed world, services for patients with allergic diseases are fragmented and far from ideal. Very few countries have comprehensive services in this field of medicine.

There are almost no specialized services for patients in many countries, other than care delivered by organ-based specialists such as respiratory physicians, ear, nose and throat specialists (otorhinolaryngologists), and dermatologists. While the care provided in many cases is adequate, such specialists generally view allergy only through their organ of interest, while the vast majority of patients have allergic disease in multiple organs. For example, allergic rhinitis, conjunctivitis, and asthma are three problems which commonly manifest together, yet affect three different organ systems.

Because the prevalence of allergy has increased to such an extent, allergy must be regarded as a major healthcare problem. According to World Health Organization (WHO) statistics, hundreds of millions of subjects in the world suffer from rhinitis and it is estimated that 300 million have asthma, markedly affecting the quality of life of these individuals and their families, and negatively impacting the socio-economic welfare of society.

The provision of allergy care must be led by allergy specialists so that an adequate standard of care is achieved for all patients with these diseases. The lack of such care leads to avoidable morbidity and mortality and to substantial increased and unnecessary cost to health care systems and national budgets. For example, it is estimated by WHO that 250,000 avoidable asthma deaths occur in the world

each year. Because so little effort is made to provide clinical services for patients who suffer from allergies, they often seek non-scientifically-based alternative and complementary diagnostic and therapeutic remedies for their ailments. In some countries, patients are repeatedly told that priorities for diagnosis and treatment of allergic disease are determined at the local governmental level, i.e., by "Primary Care Trusts". However, if representatives at this local level do not understand the prevalence and significance of allergic diseases and their complications, what hope is there for them to choose to provide care for these clinical problems? For example, it is important for a well-trained physician to identify the allergens which cause an allergic disease and to provide patients with the chance to avoid them; the well-trained physician can prescribe appropriate medications, or allergen immunotherapy, a highly effective treatment currently restricted to only a relatively few centres of care throughout the world, despite its proven efficacy. One of the main aspects of good allergy practice is to find the cause and prevent symptoms and disease progression, rather than just rely on medications to suppress the symptoms.

The mission of the World Allergy Organization (WAO) is to be a global resource and advocate in the field of allergy, asthma and clinical immunology, advancing excellence in clinical care through education, research and training as a world-wide alliance of allergy and clinical immunology societies. The Organization presently embraces over 84 regional and national allergy, asthma and clinical immunology society members and affiliated organizations (see home page at www.worldallergy.org).

WAO is greatly concerned about the increasing global burden of allergic diseases. A major focus of the Organization is to create global awareness of allergy and asthma as a major public health problem. The Organization published the first State of World Allergy Report (SOWAR) in 2007, and now presents the first ever global *White Book on Allergy*.

WAO conducts a wide range of activities to support the global allergy community. This includes the provision of resources and promotions such as World Allergy Week to assist the work of member societies as they lobby for the enhancement of services for the diagnosis and treatment of allergic diseases. WAO offers research fellowships, conducts numerous surveys via its member societies and emphasizes the importance of allergy as a necessary field for research both in disease causation and management. The Organization has published position papers on allergy

specialist training and service provision worldwide, and has identified the competencies required by all physicians who treat patients with allergic diseases, asthma, and other clinical immunologic problems. The WAO Position Paper on undergraduate training in allergy proposes that all medical students receive the fundamental knowledge and training to recognize, diagnose, and treat these diseases at the primary level and to know when to refer patients with more complex problems to an allergy/immunology specialist, and a WAO model allergy curriculum is presently being developed to guide undergraduate training.

WAO is in a unique position to provide education about the clinical practice of allergy, synthesizing and disseminating expertise and best practice recommendations from its member societies with well developed services to benefit those in underserved countries. Educational outreach programs, symposia, and lectureships are offered to member societies and health care professionals throughout the world. The WAO Emerging Societies Program helps to create and develop new allergy societies, conducts allergy training schools, and provides educational resources in underserved countries. WAO advises allergy societies about the development and provision of national allergy services and local physician training, drawing on the experience gained over many years by long-established member societies throughout diverse geographic regions.

PURPOSE

Why is it necessary to recognize allergic diseases as a global public health concern?

- A steady increase in the prevalence of allergic diseases globally has occurred with about 30-40% of the world population now being affected by one or more allergic conditions.
- A high proportion of this increase is occurring in young subjects; thus, as this young population reaches adulthood, the burden of allergic diseases is expected to increase even more.
- Complex allergies involving polysensitization and multiple organ involvement are increasing, with a high morbidity placing a higher demand on health care delivery services.
- It is forecast that allergic problems will increase further as air pollution and the ambient temperature increase.

These environmental changes will affect pollen counts, the presence or absence of stinging insects, and the presence or absence of molds associated with allergic diseases.

- In many countries, attempts to tackle these problems on a national basis are widely variable and fragmented, resulting in decreased quality of life, increased morbidity and mortality, and considerable cost to patients with allergic diseases.

This White Book outlines the data which indicate that allergy is a major global public health issue, and provides “high level” recommendations to:

- create a more integrated approach to the diagnosis and management of allergic diseases;
- increase public awareness of allergic diseases and their prevention;
- provide greater education at the primary healthcare level and to non-allergy-oriented secondary care specialists;
- train medical students and other health care professionals, including nurses and pharmacists, to an appropriate level to enable them to collaborate with different organ-based specialists and allergy specialists in providing integrated care for allergy patients;
- institute environmental control measures by the lowering of indoor and outdoor air pollution, tobacco smoking, and allergen and drug exposures, as appropriate;
- encourage a preventative approach to allergic diseases, emphasizing the importance of continued research both in disease causation and management;
- use model projects, for example the Finnish Asthma Program, to disseminate good practice, promote prevention and immune tolerance, and decrease the allergy burden in future years.

2. THE BURDEN OF ALLERGIC DISEASE

Allergic Rhinitis

- Allergic rhinitis (AR) results from an IgE-mediated inflammation of the nasal mucosa.
- The disease currently affects between 10% and 30 % of the population.
- Studies indicate that prevalence rates are increasing worldwide.
- The classification proposed in the Allergic Rhinitis and its Impact on Asthma (ARIA) guidelines is useful for the implementation of treatment.
- AR is a risk factor for asthma.
- Other co-morbidities of AR include: sinusitis, nasal polyposis, conjunctivitis, otitis media with effusion, upper respiratory infections, breathing through the mouth, and sleep disorders.
- AR has a significant impact on patients based on the degree of the severity of their symptoms. It has psychological effects, interferes with social interactions, and creates an economic burden not only for the affected subject, but for the family and for the society at large.
- Management is based on patient education, environmental control measures, pharmacotherapy and specific immunotherapy.

Allergic Conjunctivitis

- Allergic conjunctivitis is an increasingly prevalent allergic disease, with the same clinical gravity as allergic asthma and allergic rhinitis.
- The umbrella term “allergic conjunctivitis” includes distinct clinical entities, from mild but disturbing forms due to IgE sensitization to aeroallergens; to forms of keratoconjunctivitis where the severe allergic inflammation, with corneal involvement, is more difficult to diagnose and treat, and may lead to permanent ocular damage and even loss of vision.

Rhinosinusitis

- Rhinosinusitis (RS) is one of the most common and expensive medical conditions.
- RS occurs in a number of forms, the most common of which are either acute or chronic.

- Initial treatment of RS is usually by a primary care physician (PCP) and if unsuccessful, the PCP should refer either to a surgeon or to an allergist for specialized care.
- In the vast majority of cases, RS is controlled by proper medical management without the need for surgery.
- Surgery should only be considered in those patients who are properly managed but in whom a number of medical treatment programs fail.
- The Allergist, who is trained in allergy, immunology, microbiology, internal medicine and/or pediatrics combined with an expert knowledge of nasal and sinus anatomy and appropriate pharmacology, is best suited to manage RS.

Asthma

- Asthma is a life-long chronic inflammatory disorder of the airways, associated with variable structural changes, that affects children and adults of all ages. It is associated with airway hyperresponsiveness and airflow obstruction that is often reversible either spontaneously or with treatment.
- When uncontrolled, asthma can cause death, and can markedly interfere with normal activities, seriously impacting an individual's quality of life.
- Because of under-diagnosis and inadequate treatment, asthma presents a serious public health problem throughout the world; especially in low and middle income countries.
- Atopy - the genetic predisposition to develop IgE-mediated sensitivity to common aeroallergens, is the strongest identifiable predisposing factor to the development of asthma, especially in children.
- There was a sharp increase in the prevalence, morbidity, and mortality associated with asthma beginning in the 1960s and 1970s in the so-called “Westernized” countries of the world.
- The prevalence of asthma in different countries varies widely, but the disparity is narrowing due to rising prevalence in low and middle income countries as they adopt a more Western-type lifestyle. It is plateauing in high income countries.
- Inhaled corticosteroids are currently the most effective anti-inflammatory medications to treat persistent asthma.
- The monetary costs of asthma are substantial and include both direct medical costs and the indirect costs, the latter associated with time lost from work and premature deaths.

- National efforts to tackle asthma as a public health problem, such as the program introduced in Finland, produce remarkable benefits that are reflected in dramatic reductions in deaths and hospital admissions.
- Many barriers exist to a reduction in the worldwide burden of asthma.
- There are unmet diagnostic, therapeutic, educational and financial needs to achieve better worldwide control of asthma.
- More effort is needed to focus on ways to improve the management of asthma by focusing on disease control rather than treating acute episodes. This concept has to be embedded in healthcare programs.

Atopic Eczema

- An increase in the worldwide prevalence of atopic eczema has been observed.
- Atopic eczema is the most common chronic inflammatory skin disease with a varied clinical spectrum.
- Atopic eczema is often the first manifestation of the atopic patient and early intervention may offer an opportunity to impede or stop the atopic march.
- Atopic eczema represents an important public health issue due to its impact on quality of life and its socio-economic burden.

Anaphylaxis

- Epinephrine, at appropriate doses, is the drug of choice to treat anaphylaxis.
- There is lack of consensus about the definition of anaphylaxis and this lack of consensus in definition contributes to the variability in its identification, treatment and the use of epinephrine.
- The variability and severity of anaphylaxis is somewhat dependent on the route by which the allergen or inciting agent is delivered, i.e. parenteral versus oral administration; the former is commonly associated with more severe reactions.
- There is a variety of other terms which describe anaphylaxis which cause confusion, especially with its definition and treatment. These include: generalized systemic reaction; systemic allergic reaction; constitutional reaction; and serious hypersensitivity reaction.
- Anaphylaxis includes both allergic and non-allergic etiologies.
- The term “anaphylactoid” is outdated.

Food Allergy

- Globally, 220 – 520 million people may suffer from food allergy.
- Food allergy significantly affects the quality of life of sufferers (mainly children).
- Stakeholders must be prepared to meet the needs of patients by enhancing the diagnostic process, the traceability of responsible foods, and the availability of substitute foods, assisting hospitalized patients, and preventing mortality.
- Large areas in the world lack legislation on food labelling.
- As diagnostic and therapeutic decision strategies are not clear-cut, evidence-based guidelines are necessary for clinicians, patients, governments and industry to deal with the challenge of food allergy. Such guidelines, eg, the WAO recommendation on the Diagnosis and Rationale Against Cow's Milk Allergy (DRACMA) are available and are ready to be implemented.
- Epidemiologic studies are necessary, in particular, in less developed areas of the world.
- Oral desensitization represents a promising approach to reduce the burden of disease caused by food allergy.

Urticaria and Angioedema

- Urticaria is a heterogeneous group of disease sub-types characterised by wheals (fleeting elevations of the skin lasting approximately 24 hours) and/or angioedema (deeper swellings of skin and mucus membranes).
- Three major categories exist: a) spontaneous occurrence of wheals, associated with acute and chronic urticaria; b) wheals and angioedema elicited by particular stimuli, and in particular physical urticarias; and c) other urticarial disorders such as exercise-induced urticaria.
- Urticaria occurs frequently with a lifetime prevalence above 20%.
- Except for acute urticaria, diagnostic and therapeutic procedures can be complex and referral to a specialist is often required.
- Untreated, chronic urticaria has a severe impact on quality of life and impairs productivity by up to 30%.
- The socio-economic impact of urticaria is great, since it is a disease which primarily occurs in people of working age.
- Moderate to severe urticaria requires specialist treatment. In many health care systems worldwide, access to specialty care is insufficient.

Allergy to Drugs and Biological Agents

- Adverse drug reactions (ADR) may affect up to 1/10 of the world's population and affect up to 20% of all hospitalized patients.
- More than 10% of all ADR are unpredictable drug hypersensitivity reactions (DHR).
- Both under-diagnosis and over-diagnosis are common.
- The most common DHR involve antibiotics such as penicillins, cephalosporins, and sulfonamides, and aspirin and other non steroidal anti-inflammatory drugs.
- The clinical spectrum of DHR involves various organs, timing and severity.
- DHR can be severe, even life threatening, and are associated with significant mortality rates. Drugs may be responsible for up to 20% of fatalities due to anaphylaxis.
- DHR have a significant socio-economic impact on both direct costs (management of reactions and hospitalizations) and indirect costs (missed work/school days; alternative drugs).
- Diagnostic procedures for DHR should also attempt to identify the underlying mechanisms causing the DHR.
- Diagnosis is critical for DHR management and prevention. Selection of an alternative drug and desensitization is necessary in some cases.

Insect Allergy

- Hymenoptera venom allergy (HVA) is a common global medical problem and refers to subjects who have a sting-induced large local (LL) or systemic allergic reaction (anaphylaxis). A LL reaction is defined as a reaction larger than 10 cm in diameter which lasts over 24 hours in which the signs and symptoms are confined to tissues contiguous with the sting site. Systemic reactions cause generalized signs and symptoms and include a spectrum of manifestations, ranging from mild to life-threatening. Mild systemic reactions may be limited only to the skin and consist of flushing, urticaria, and angioedema. More severe systemic reactions can involve bronchospasm, laryngeal edema, and hypotension. HVA can cause fatal anaphylaxis.
- The morbidity rate is underestimated; fatal reactions may not be appropriately recorded, accounting for this underestimation.
- The incidence of positive specific IgE antibodies to venom is high in the general population, but only a fraction of such individuals develop a systemic reaction.

- Fatal reactions occur in up to 50% of individuals who have no documented history of a previous systemic reaction.
- HVA impairs long-term quality of life (QOL) and is the cause of substantial socio-economic problems.
- A subject's QOL is negatively affected when appropriate diagnosis and education are not achieved and when venom immunotherapy (VIT) (a series of injections of the venom to which the subject is allergic and which essentially cures their disease) is not utilized.
- HVA can be effectively treated with VIT and appropriate venom therapies.
- HVA poses a problem in occupational settings, especially in bee keepers and greenhouse workers.
- HVA has important adverse consequences in terms of employment, earning capacity and leisure and sporting activities.
- HVA has a substantial adverse financial impact on healthcare costs.

Occupational Allergy

- Occupational allergic diseases represent an important public health issue due to their high prevalence and their socio-economic burden.
- Occupational asthma (OA) contributes significantly to the global burden of asthma, since the condition accounts for approximately 15% of asthma amongst adults.
- Allergic contact dermatitis (ACD) is one of the most common occupational diseases.
- Occupational allergic diseases remain largely under-recognized by physicians, patients, and occupational health policy makers.
- Occupational allergic diseases can result in long-term health impairment, especially when the diagnostic and avoidance measures are delayed.
- Occupational allergic diseases lead to important adverse consequences in terms of healthcare resources, employment, earning capacity and quality of life.
- Occupational allergic diseases are associated with a substantial adverse financial impact for affected workers, insurance or compensation schemes, health services, and employers.
- Occupational allergic diseases are, by definition, preventable diseases and their burden should be minimized by appropriate preventative strategies.

Sports and Allergies

- Moderate and controlled exercise is beneficial for allergic subjects and should be part of their management.
- Vigorous exercise may trigger or exacerbate several allergy syndromes such as bronchospasm, rhinitis, urticaria-angioedema and anaphylaxis.
- Allergy diagnosis should be part of the routine medical examination in all professional and amateur athletes, in order to adopt adequate preventative and therapeutic measures for controlling the disease, while avoiding potential symptoms occurring on exercise.

3. RISK FACTORS FOR ALLERGIC DISEASE

The Potential of Genetics in Allergic Diseases

- Allergic disorders are heterogeneous and involve important gene-environmental interactions.
- Human genetics has a role to play in understanding susceptibility for disease onset, phenotypes and sub-phenotypes, severity, response to treatments and natural history.
- Although candidate gene association studies have provided some insight into the role of genes in disease susceptibility, most new information is emerging from hypothesis-free approaches such as genome-wide association studies.
- Many early gene association studies were under-powered and the results have not been confirmed in different populations.
- Genetic factors that influence the expression of atopy are different from those that influence disease manifestations or its severity in specific organs.
- Polymorphism of a single gene usually accounts for only a small proportion of the disease phenotype.
- Epigenetic influences involving multiple mechanisms, including methylation of CpG islands in gene promoters, histone acetylation, phosphorylation and methylation and a large number of micro RNAs, explain a proportion of the gene-environmental interactions and trans-generational effects.

- The genetic epidemiological observations for specific candidate genes in atopy and allergic disease require careful replication, enhanced by international collaboration and the availability of large, well-characterized case-control populations for genotyping. The only way to achieve this is to promote greater cooperation among researchers and create multidisciplinary teams including researchers from academia, industry and clinical practice.

Allergens as Risk Factors for Allergic Diseases

- Sensitization (IgE antibodies) to foreign proteins in the environment is present in up to 40% of the population.
- Such sensitization is strongly associated with exposure for proteins derived from pollens, molds, dust mites and cockroaches.
- For asthma, rhinitis and atopic eczema there is a strong and consistent association between disease and sensitization.
- The association between sensitization to grass pollens and symptoms of hay fever occurring during the grass pollen season provides strong evidence for a causal role of grass pollen in the disease.

Environmental Risk Factors: Indoor and Outdoor Pollution

- Epidemiological studies show that indoor and outdoor pollution affects respiratory health, including an increased prevalence of asthma and allergic diseases.
- Outdoor pollution is associated with substantial mortality; for example in China, outdoor pollution is associated with more than 300,000 deaths annually.
- Conservative estimates show that exposure to indoor air pollution may be responsible for almost 2 million deaths per annum in developing countries.
- Exposure to outdoor/indoor pollutants is associated with new onset of asthma, asthma exacerbations, rhinitis, rhinoconjunctivitis, acute respiratory infections, increase of anti-asthmatic drug use, and hospital admissions for respiratory symptoms.
- Abatement of the main risk factors for respiratory disease and, in particular, environmental tobacco smoke, indoor biomass fuels and outdoor air pollution, will achieve huge health benefits.

Socio-economic Factors and Environmental Justice

- The global prevalence, morbidity, mortality and economic burden of asthma have increased over the last 40 years.
- However, the growth and burden of the disease is not uniform. Disparities in asthma morbidity and mortality, with an inverse relationship to social and economic status, are increasingly documented around the world.
- Asthma and other atopic disorders may be more concentrated among those of lower socio-economic status because they also bear a disproportionate burden of exposure to suboptimal, unhealthy environmental conditions (e.g. physical, social, and psychological conditions).
- Future research needs to pay increased attention to the social, political, and economic forces that result in marginalization of certain populations in disadvantaged areas of the world which may increase exposure to known environmental risk factors contributing to the rising asthma burden.

Climate Change, Migration and Allergy

- The Earth's temperature is increasing as illustrated by rising sea levels, glaciers melting, warming of the oceans and diminished snow cover in the northern hemisphere.
- Climate change coupled with air pollutant exposures may have potentially serious adverse consequences especially for human health in urban and polluted regions.
- High summer temperatures have an impact on rates of acute exacerbation and hospital admission for elderly patients with breathing problems and may cause unexpected death.
- Pollen allergy is frequently used to study the interrelationship between air pollution and respiratory allergy. Climatic factors (temperature, wind speed, humidity, thunderstorms, etc.) can affect both biological and chemical components of this interaction.
- Changes in the weather such as thunderstorms during pollen seasons may induce hydration of pollen grains and their fragmentation which generates atmospheric biological aerosols carrying allergens. As a consequence asthma outbreaks can be observed in pollinosis patients.
- Migration from one country to another involves exposure to a new set of pollutants and allergens as well as changes in housing conditions, diet and accessibility to medical services which may affect migrants' health.

- Atopy and asthma are more prevalent in developed and industrialized countries compared with undeveloped and less affluent countries.
- Migration studies provide information on the role of environmental factors on the development of atopy and asthma.
- Physicians should be aware that environmental and climate changes may enhance the development of allergic diseases and asthma.
- Physicians should be aware that migrants, especially from developing to more developed countries, are at increased risk to acquire allergic diseases and asthma and that the effect is age and time-dependent. Early age and longer time increase the likelihood of developing atopy and asthma.

4. EVIDENCE BASED APPROACHES TO DIAGNOSIS AND MANAGEMENT

Diagnosis and Identification of Causative Allergens

- Confirmation of allergy and identification of causative allergens are crucial to correctly manage allergic diseases.
- Precise diagnosis allows the implementation of therapies oriented to the etiologic factors of allergic diseases, such as environmental measures and immunotherapy.
- Diagnosis begins with a detailed medical history and physical examination.
- The identification of a temporal association between symptoms and allergen exposure constitutes the basis for further testing.
- Clinical suspicion is confirmed by means of investigation of IgE antibodies *in vivo* (skin tests) or *in vitro*.
- Skin tests should include relevant allergens and the use of standardized allergen extracts.
- *In vitro* testing is especially useful when skin test results do not correlate with the history or cannot be performed.
- *In vitro* tests can be applied to "probability of disease" prediction in food allergy.

- There is a need for increased accessibility to allergy diagnosis and therapies and improved diagnostic methodologies that can substitute *in vivo* provocation tests for drug and food allergy.
- The use of unproven tests increases the unnecessary costs of allergy diagnosis.

Pharmacotherapy of Allergic Diseases

- Subjects from all countries, ethnic and socioeconomic groups, and ages suffer from allergies.
- Asthma and allergic rhinitis are common health problems that cause major illnesses and disability worldwide.
- The strategy to treat allergic diseases is based on: (i) patient education, (ii) environmental control and allergen avoidance, (iii) pharmacotherapy, and (iv) immunotherapy.
- Pharmacotherapy is the mainstay of treatment for allergic diseases because it not only controls symptoms but improves the quality of life.
- Primary care physicians play an important role in first line management of allergies. They have to make the initial clinical diagnosis, begin treatment, and monitor the patient.
- Allergy specialists are trained to make a specific diagnosis and treat patients with allergies, particularly those with moderate/severe disease.
- The chronic nature of allergies makes it essential to propose and explain long-term management strategies to patients, health care policy makers, and government authorities.
- In recent decades, a substantial improvement has been made in the efficacy and safety of allergy pharmacotherapy.
- Disease management using evidenced-based practice guidelines has been shown to yield better patient outcomes.

Allergen Specific Immunotherapy

- Allergen specific immunotherapy is recognized as an effective treatment for respiratory allergy and Hymenoptera venom allergy.
- Subcutaneous Immunotherapy (SCIT) represents the standard modality of treatment. Sublingual Immunotherapy (SLIT) which is now accepted as an alternative to injection immunotherapy, has recently been introduced into clinical practice.

- The additional effects of allergen specific immunotherapy, that are lacking with pharmacological treatment, are the long-lasting clinical effects and the alteration of the natural course of the disease. This prevents the new onset of asthma in patients with allergic rhinitis and prevents the onset of new sensitizations.
- The mechanisms of action of specific immunotherapy are multiple and complex, and result in a modification of the immunological responses to allergens, with subsequent reduction of the allergic inflammatory reaction. The mechanisms of action of SCIT and SLIT are similar.
- SCIT maintains its beneficial effects for years after it has been discontinued. This long-term or carry over effect also occurs with SLIT.
- SCIT indications, contraindications, limits and practical aspects are defined in numerous guidelines.
- SLIT is considered a viable alternative to SCIT and is used in clinical practice in many countries. A 2009 World Allergy Organization Position Paper further details the indications, contraindications, and methodology of using SLIT.
- New forms of immunotherapy, allergen products, and approaches to food allergy and atopic eczema are under investigation.

Biological Agents

- Research in allergy and immunology has led to a variety of novel therapeutic approaches; some agents are already utilized in clinical practice and more are in clinical trials.
- New therapeutic approaches include toll-like receptor agonists, cytokine blockers, specific cytokine receptor antagonists and transcription factor modulators targeting syk kinase, peroxisome proliferator-activated receptor gamma, and nuclear factor kappa B.
- The anti-IgE mAb omalizumab is effective to treat allergic asthma, but the criteria to select patients for this type of therapy are not well-defined.

Allergy Education for Patients and Families

- The provision of appropriate training and education for patients and families is fundamental to the management of allergic disease.
- The evidence base for the efficacy of education and training is relatively weak but it is effective in asthma and, to a lesser extent, eczema and anaphylaxis.
- Different age and ethnicity populations require different educational approaches.
- Modern information technology is valuable, especially to educate younger subjects.
- Education and training programs should contain a written self management action plan.

Allergen Avoidance

- Effective allergen avoidance leads to an improvement of symptoms in allergic patients.
- Several studies of comprehensive environmental interventions in asthmatic children report benefits.
- There is little evidence to support the use of a simple single intervention, e.g., only covering bedding, to control dust mite allergen levels.
- Similarly, in mite allergic patients with rhinitis, single mite avoidance measures are not beneficial.
- The following is a guide for a pragmatic approach to allergen avoidance:
 - Use a comprehensive environmental intervention to achieve the greatest possible reduction in allergen exposure;
 - Tailor the intervention to the patient's allergen sensitization and exposure status;
 - If unable to assess the level of allergen exposure, use the level of allergen-specific IgE antibodies or the size of skin test wheal as an indicator;
 - Start the intervention as early as possible in the natural course of the disease;
 - Primary prevention strategies aimed at eliminating or reducing exposure to potentially sensitizing agents should be developed and evaluated.

5. PREVENTION OF ALLERGIC DISEASES

- The rise in prevalence of allergic diseases has continued in the industrialized world for more than 50 years.
- Sensitization rates to one or more common allergens among school children are currently approaching 40%-50%.
- Strategies used to tackle these problems are thus far ineffective.
- Primary prevention is difficult because the reasons for increased sensitization rates are unknown. Also, the mechanisms involved in the progression of sensitization in increasing numbers of individuals resulting in allergic diseases are incompletely understood. Asthma and allergies may have their origin early in life, even *in-utero*.
- Reliable early markers of IgE-mediated diseases are unavailable.
- Novel research indicates that tolerance is the key to prevention. More research about the mechanisms involved in the development of tolerance should be encouraged. Inadequate or lack of tolerance in allergic individuals appears to link with immune regulatory network deficiencies.
- National asthma and allergy plans (e.g. The Finnish Asthma Programme 1994-2004) have concluded that the burden of these community health problems can be reduced. The change for the better is achieved as governments, communities, physicians and other health care professionals, and patient organizations commit to an educational plan to implement best practices for prevention and treatment of allergic diseases.

6. HEALTH ECONOMICS, MEDICAL EDUCATION AND COST-EFFECTIVE HEALTH CARE IN ALLERGY

Health Care Delivery and Health Economics in Allergy

- Asthma and allergic diseases are significant causes of morbidity on a global scale.
- Asthma disproportionately affects minorities and people from lower socioeconomic groups.
- The total global cost of care for people with asthma and allergic disorders is disproportionately high despite the relatively low cost per person mainly due to the high prevalence of these disorders.
- The most effective management for these disorders is to teach patients self-management skills.
- Education should focus on training physicians to promote and foster self-management skills in their patients.

Medical Education in Allergy

The intended outcomes for clinician and healthcare professionals training in allergy are to:

- Produce graduates equipped to further their careers in healthcare and in particular to enhance the number of individuals trained in the mechanisms and management of allergic diseases.
- Develop an understanding of the processes involved in improving the management of patients with allergic disease.
- Develop new areas of teaching in response to the advance of scholarship and the needs of vocational training.
- Provide a training in research skills.
- Develop skills and understanding of the more complex components of allergic disease encountered in specific areas of practice.

The Cost-Effectiveness of Consulting an Allergist

- Allergic diseases are chronic conditions with systemic involvement that can affect multiple organs and systems throughout the lifespan of atopic (allergic) subjects.
- In assessing the economic burden of allergic diseases, the costs of several organ-specific diseases need to be aggregated, including the nose (allergic rhinitis), sinuses (rhinosinusitis); lungs (asthma); skin (atopic eczema); and others.
- Cost-effective analyses (CEA) assess the comparative effects of one health care intervention over another, under the premise that there is a need to maximize the effectiveness relative to its cost.
- A cost-effective intervention could, if incorrectly used, generate unnecessary costs, provide no benefit and even cause harm.
- The allergist is an expert in tailoring therapy to the individual patient and adjusting treatment dosages in more severe or complex cases. The main defining characteristics of allergists are their appreciation of the importance of external triggers in causing diverse diseases; their expertise in both the diagnosis and treatments of multiple system disorders, including the use of allergen avoidance and the selection of appropriate drug and/or immunological therapies; and their knowledge of allergen specific immunotherapy practices.
- Misinterpretation of the results of diagnostic tests by non-specialists can lead to over-diagnosis and inappropriate management which can be harmful for the patient. It may lead to over-prescription of therapy and costly and unnecessary allergen avoidance measures, including exclusion diets that can lead to nutritional deficiency and secondary morbidity. Conversely, the under-appreciation of the severity of asthma can lead to life-endangering under-treatment or the lack of potentially life-altering immunotherapy.
- The cost-effectiveness of allergist consultation will be demonstrated by improved patient outcomes and experiences together with a reduction in unnecessary expenditure by payer, society or patient/family.

Declaration of the World Allergy Organization

DECLARATION

In its role as an umbrella organization of national and regional allergy, asthma and clinical immunology societies worldwide, the World Allergy Organization invited all 84 of its member societies to contribute to the White Book by participating in an online survey on the current status and needs of the specialty in their respective country or region. The responses from the Member Societies along with the scientific reviews which are included in the White Book form the basis of the World Allergy Organization Declaration.

I. Epidemiological Studies Of Allergic Diseases

Identified Need:

In several parts of the world, there is a paucity of published epidemiological information about the overall prevalence of allergic diseases and, in particular, about specific diseases. For example, there is little or no information about severe asthma; anaphylaxis; food allergy; insect allergy; drug allergy; and complex cases of multi-organ allergic disease. Data concerning some of these disorders are available in a few countries, but only for certain age groups.

Recommendation:

Every country should undertake epidemiological studies to establish the true burden of allergic diseases; asthma; and primary and secondary immunodeficiency diseases. This is the first essential step in ensuring the provision of adequate physician and healthcare professional services to meet both current and future needs.

II. Allergens And Environmental Pollutants

Identified Need:

Evidence-based information about the major indoor and outdoor allergens and pollutants responsible for causing or exacerbating allergic diseases and asthma is either lacking or, when available, is not always universally accessible.

Recommendation:

Local indoor and outdoor allergens and pollutants which cause and exacerbate allergic diseases should be identified and, where possible, mapped and quantified. Appropriate environmental and occupational preventative measures should be implemented where none exist or as necessary. Strategies proven to be effective in disease prevention should also be implemented.

III. Availability Of Allergy, Asthma And Clinical Immunology Services (Allergists) And Appropriate Medications

Identified Need:

There is an increasing need for more allergy specialists and for the existence of local and regional allergy diagnostic and treatment centers in order to facilitate timely referrals for patients with complex allergic diseases. Accessibility to affordable and cost-effective therapy and to novel therapies is needed. For example, adrenaline auto-injectors for patients at risk of anaphylaxis; new and more effective medications to treat severe asthma; and access to allergen immunotherapy are lacking in some parts of the world.

Recommendation:

Public health officials should provide for adequate allergy/clinical immunology services, including access to specialists and diagnostic and treatment centers. Allergists should be able to prescribe the most cost-effective medication to manage a patient's disease. Examples include adrenaline auto-injectors to treat anaphylaxis; anti-IgE for severe asthma; a variety of very effective medications to treat chronic urticaria and angioedema, hereditary angioedema, rhinitis, conjunctivitis and asthma.

Allergen-specific immunotherapy is effective in preventing the onset of asthma and is the only available treatment to prevent anaphylaxis and death from bee, wasp, yellow jacket, hornet and ant induced anaphylaxis. Consultations with allergists, timely diagnosis and treatment are necessary to improve long-term patient outcomes and quality of life and to reduce the unnecessary direct and indirect costs to the patient, payer and society.

IV. Undergraduate And Postgraduate Education For Primary Care Physicians And Pediatricians

Identified Need:

There is a need for undergraduate and postgraduate training in allergy, asthma and clinical immunology for general practitioners and pediatricians such that primary care physicians and pediatricians may appropriately assist patients with allergic diseases.

Recommendation:

Allergic diseases are a major cause of morbidity and mortality. Suitable undergraduate and postgraduate training for medical students, physicians, pediatricians and other healthcare professionals will prepare them to recognize allergy as the underlying cause of many common diseases. It will also enable them to manage mild, uncomplicated allergic disorders by targeting the underlying inflammatory mechanisms associated with these diseases. They will learn when and how to refer the more complicated cases for a specialist consultation. Such education at the general practice level is of paramount importance since the vast majority of patients with allergic diseases are cared for by primary care physicians and pediatricians. These clinicians will also be required to co-manage such patients with an allergy specialist and should be aware of the role of the allergist/clinical immunologist in investigating, managing and caring for patients with complex allergic problems.

V. Recognition Of The Specialty And Training Programs

Identified Need:

Globally, medical education providers need to recognize allergy / clinical immunology as a specialty or sub-specialty, resulting in adequate training programs for optimal patient care.

Recommendation:

Expertise in allergy and clinical immunology should be an integral part of the care provided by all specialty clinics. Where allergy/clinical immunology training is not presently available or recognized as a specialty, training and national accreditation programs should be instituted to enable selected physicians to receive formal training and the qualifications required to become certified allergists/clinical immunologists. Such programs will also enable general practitioners, including pediatricians, to enhance their capacity to provide for the routine care for patients with allergic diseases.

VI. Public Awareness Of Allergy, Asthma And Clinical Immunology

Identified Need:

In most populations around the world, there is a lack of adequate education about, and awareness of, the morbidity and mortality associated with allergic diseases; the often chronic nature of these diseases; the importance of consulting a physician trained in allergy, asthma and clinical immunology; and the medications and treatments available to appropriately treat and prevent these diseases.

Recommendation:

Public health authorities should target allergic diseases as a major cause of morbidity and potential mortality. They should collaborate with national allergy, asthma and clinical immunology societies and patient support groups to publicize the necessity for general awareness and appropriate care for these diseases.

Conclusion

The World Allergy Organization is a global federation of 84 national and regional allergy, asthma and clinical immunology societies. These regional and national societies are an excellent resource for knowledge and expertise. It is strongly recommended that public health and government officials, medical school leaders and patient groups collaborate with these societies to promote excellence in care for patients with allergic diseases.

As members of the World Allergy Organization, the regional and national allergy, asthma and clinical immunology societies contribute to the work of the WAO Councils and are available to assist with enquiries about how best to implement these recommendations. Information is available on the WAO website www.worldallergy.org and enquiries may be directed to info@worldallergy.org.





WORLD ALLERGY ORGANIZATION

A World Federation of Allergy, Asthma
& Clinical Immunology Societies