



WORLD ALLERGY WEEK

4–10 April 2016

POLLEN ALLERGIES Adapting to a Changing Climate

How are you managing pollen allergies in a changing global climate?



WORLD ALLERGY ORGANIZATION

A World Federation of Allergy, Asthma
& Clinical Immunology Societies



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Welcome to World Allergy Week 2016



Mario Sánchez-Borges, MD

President, World Allergy Organization

The World Allergy Organization welcomes all of the member societies, educators, healthcare practitioners, policymakers, parents, patients, advocates and medical professionals around the world who will mark the fifth consecutive year of World Allergy Week by organizing and participating in activities that bring attention to understanding and managing pollen allergies.



Paul Greenberger, MD

Chair, Communications Committee

In keeping with the World Allergy Week tradition of bringing attention to a specific allergic disease each year, the World Allergy Organization has selected **Pollen Allergies – Adapting to a Changing Climate**. Experts will emphasize the need for more information about aeroallergen exposures, and the importance of the allergy/immunology specialist in accurately diagnosing allergies and planning effective treatment strategies and environmental controls for improved quality of life.



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World Allergy Week 2016 Chairpersons

Paul Greenberger, MD and Mimi Tang, MD, PhD

WAO COMMUNICATIONS COMMITTEE 2016-2017

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What is pollen allergy (hay fever)?

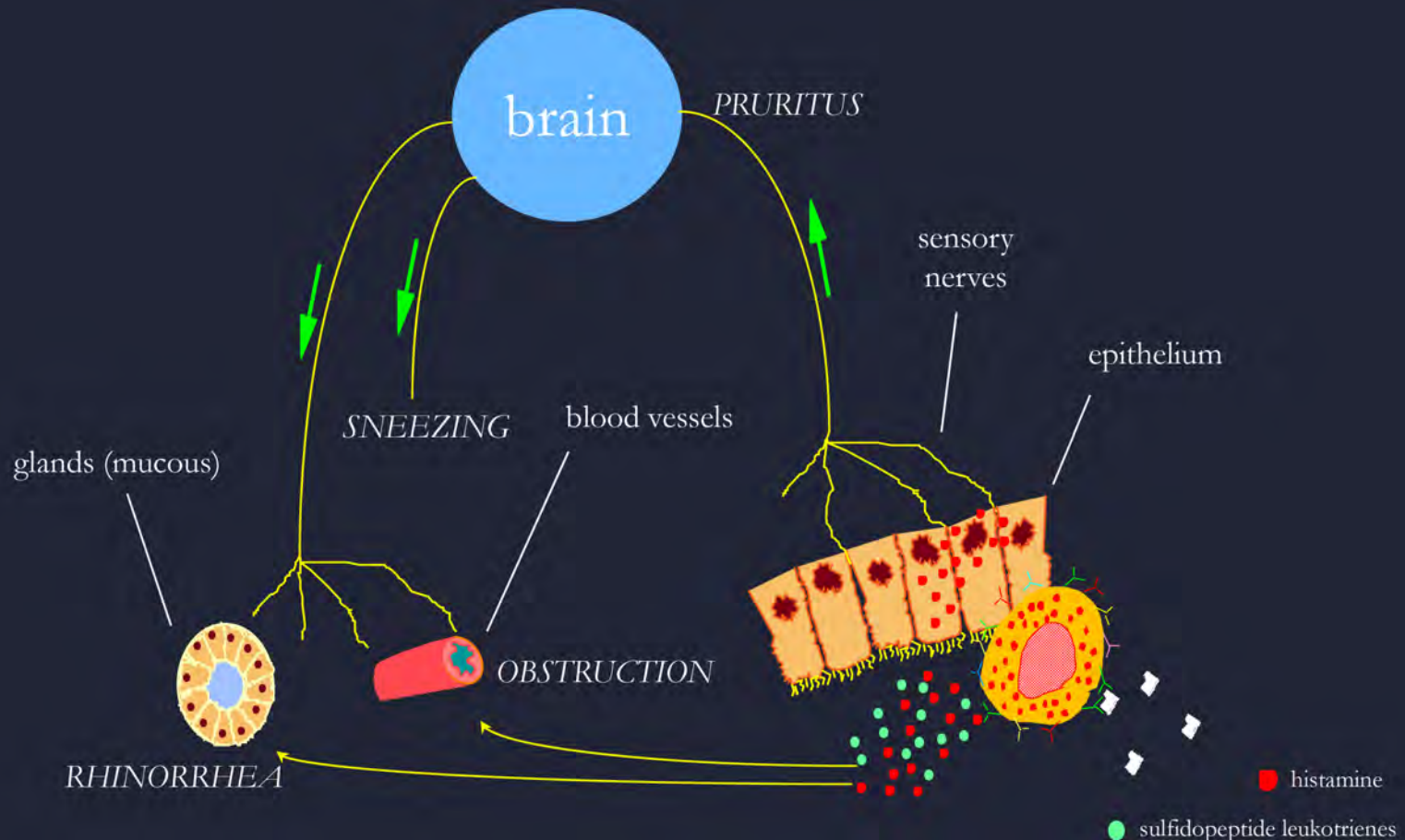
Pollen allergy is an allergic condition affecting the mucous membranes of the nose and the eyes etc., usually characterized by nasal discharge, nasal congestion, and itchy and watery eyes, itchy nose, inner ears and roof of the mouth, that are caused by a hypersensitivity to airborne pollen, such as the pollen of trees, grasses, and weeds.

When the allergen comes in contact with cell-bound immunoglobulin E (IgE) in the tissues of the conjunctiva and nasal mucosa, the tissues release mediators such as histamine or leukotrienes and induce annoying allergic symptoms.



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The immediate (early phase) allergic reaction in the nose



Prevalence of pollen allergy (hay fever) -global and regional-

Centre	Hay fever (over the last 15 years)	
	%	Change per year (%)
Africa (English speaking)	29.5	0.39
Africa (French speaking)	21.4	- 0.26
Asia-Pacific	23.9	0.24
Eastern Mediterranean	20.1	0.66
Indian sub-continent	15.8	0.74
Latin America	23.7	1.03
North America	33.3	- 1.12
Northern & Eastern Europe	12.3	0.19
Oceania	39.8	0.48
Western Europe	21.2	0.31
Global total	22.1	0.3

Reported hay fever in 13- to 14-yr-old children for each centre by region participating both in ISAAC Phase I and Phase III.

Björkstén B, Clayton T, Ellwood P, Stewart A, and Strachan D. Worldwide time trends for symptoms of rhinitis and conjunctivitis: Phase III of the International Study of Asthma and Allergies in Childhood. *Pediatric Allergy and Immunology* 2008; 19(2): 110-124. (doi:10.1111/j.1399-3038.2007.00601.x)



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WAO World Atlas of AeroAllergens

WAO World Atlas of AeroAllergens

This is the first phase of the WAO World Atlas of Aeroallergens with available data from various sources. The Atlas will continue to be updated as data are received from the WAO Aeroallergens Committee. This Atlas has been currently divided into 5 regions. Data from other countries, when received, will be added within these 5 regions, and the regions may be renamed as North America, South America, Middle East and Africa, Europe, and Asia & Pacific, respectively.

Though much emphasis has been given on outdoor aeroallergen data in the Atlas at the moment, nevertheless data on indoor aeroallergens have been included from the Middle East, Thailand, Australia, and New Zealand.

All data presented are not in a standardized format, but efforts are being made to standardize the data in one format for easy reading and understanding.

If you would like to submit information to be included on the website please contact info@worldallergy.org

Region A includes data from Canada (data from the United States are pending); Region B includes South America data (including Argentina); Region C includes Middle East and Africa; Region D includes European data and Region E includes data from India, Thailand, Australia, and New Zealand.

Wherever possible the data follow this format: The symbols +, ++, +++ provide a relative frequency of their recording either in cubic meter or other determination/calculations. Allergens frequency (quantitative) in these are added as ++++,+++. A relative frequency for each country, such as 30, 20, 10 pollen respectively are represented as +++, ++, +. Likewise, 60,40,20 spores are given +++,++,+ respectively. Since different countries have different pollen, the data providers have changed or arranged the rows of allergens according to their prevalence and frequency. There have been few changes for indoor allergens from country to country.



www.worldallergy.org/aeroallergens

Diagnosis of pollen allergy (hay fever)

- Detailed personal and family allergic history (season, circumstances, etc.)
- Intranasal examination – anterior rhinoscopy
- Symptoms of other allergic diseases
- Allergy skin tests and/or
- *In vitro* specific IgE tests
- The allergist has the specialized expertise to help diagnose and treat people with allergies

Effect of climate change on migration of pollens

- Weather variables, mainly air temperature, sunlight and rainfall together with carbon dioxide (CO₂) are among the main factors affecting phenology (the times of the appearance of first leaves, first flowers, autumn leaf coloration, and so on) and pollen production by plant.
- The effects of climate change on aeroallergens, in particular pollen, include impacts on pollen production and atmospheric pollen concentration, pollen season, plant and pollen spatial distribution, pollen allergenicity.

D'Amato G, Rottem M, Dahl R, Blaiss MS, Ridolo E et al. Climate Change, Migration, and Allergic Respiratory Diseases: An Update for the Allergist. *World Allergy Organization Journal* 2011; 4: 121-125. (doi: 10.1097/WOX.0b013e3182260a57)

Cecchi L, D'Amato G, Ayres JG, Galan C, Forastiere F. Projections of the effects of climate change on allergic asthma: the contribution of aerobiology. *Allergy* 2010; 65(9): 1073-1081. (doi:10.1111/j.1398-9995.2010.02423.x)

Clinical impact of climate change on migration of pollens

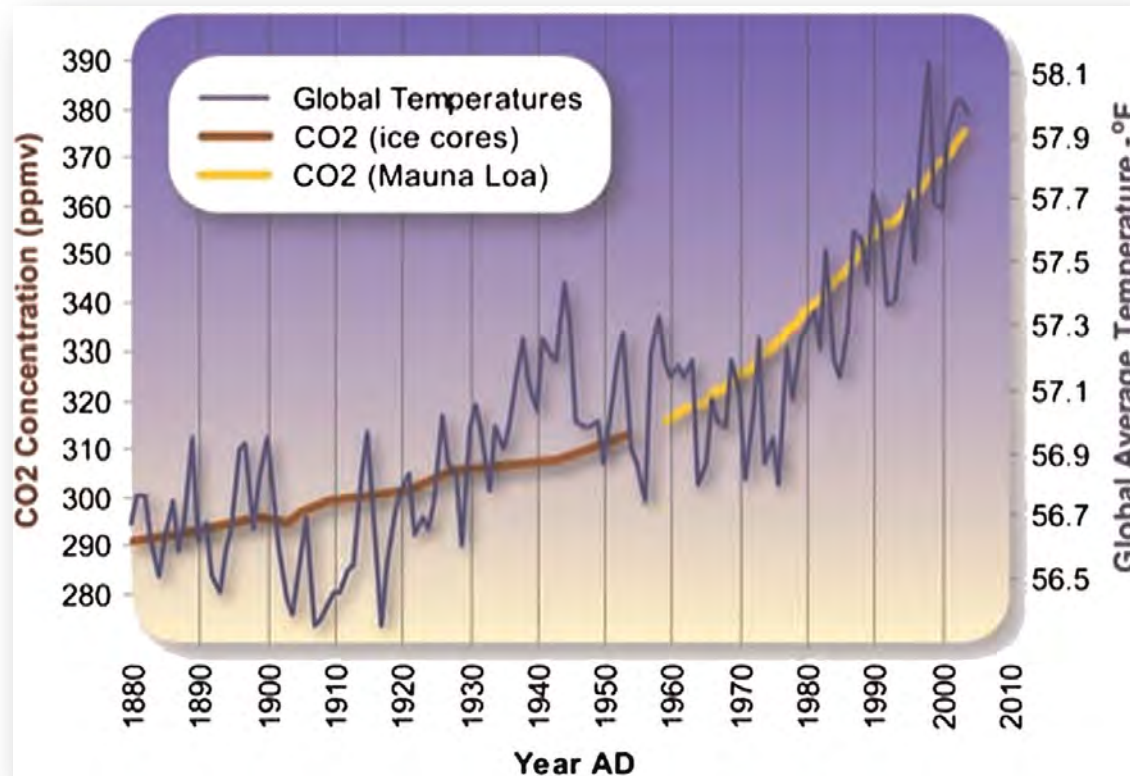
- Increases in temperature lead to:
 - Earlier onset of and longer pollination seasons
 - Migration of stinging and biting insects into new environments, and increased population of existing insect species
 - Changes to crop patterns, with the potential to introduce new allergenic pollens into the atmosphere
 - New food proteins in the local diet, and
- Increases in humidity associated with higher temperatures will lead to increased numbers of cockroaches, house dust mites, and molds, and, thus, “allergen load”.
- New pollen and mold sensitizations lead to increased prevalence and attacks of allergic rhinoconjunctivitis and asthma; longer pollen seasons lead to increased duration of symptoms.

Lombardi C, Penagos M, Senna G, Canonica GW, Passalacqua G. The Clinical Characteristics of Respiratory Allergy in Immigrants in Northern Italy. *International Archives of Allergy and Immunology* 2008; 147(3): 231-234. (doi:10.1159/000142046)



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Global average temperature and carbon dioxide concentrations, 1880–2004



Woods Hole Research Center. Understanding Climate Change: A Primer; Retrieved from <http://www.whrc.org/publications-data/understanding-climate-change-a-primer/>

D'Amato G, Rottem M, Dahl R, Blaiss MS, Ridolo E et al. Climate Change, Migration, and Allergic Respiratory Diseases: An Update for the Allergist. *World Allergy Organization Journal* 2011; 4: 121-125. (doi: 10.1097/WOX.0b013e3182260a57)

Increasing of the pollen season (season becoming longer)

- Duration of the pollen season has extended, especially in summer and in late flowering species.
- Increasing carbon dioxide (CO₂) and temperature seem to substantially increase pollen production from ragweed.
- An earlier start of the season was confirmed in studies focused on allergenic plants, as birch, mugwort (Urticaceae, grass and Japanese cedar).
- 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.

Pawankar R, Canonica GW, Holgate ST, Lockey RF, M. Blaiss. Section 3.5 in *WAO White Book on Allergy Update 2013*, Editors D'Amato G, Rottem M. (World Allergy Organization, 2013), pp 95-100.

Cecchi L, D'Amato G, Ayres JG, Galan C, Forastiere F. Projections of the effects of climate change on allergic asthma: the contribution of aerobiology. *Allergy* 2010; 65(9): 1073-1081. (doi:10.1111/j.1398-9995.2010.02423.x)



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Increasing of the pollen seasons (seasons becoming longer)

Location	Latitude	Years of data	Start	End	Start	End	Change
			1995		2009		
Georgetown, TX	30.63°N	17	198 ± 7	320 ± 7	195 ± 7	313 ± 7	−4 d
Oklahoma City, OK	35.47°N	19	212 ± 7	300 ± 10	227 ± 9	316 ± 15	+1 d
Rogers, AR	36.33°N	15	231 ± 7	295 ± 8	227 ± 6	296 ± 8	−3 d
Papillion, NE	41.15°N	21	212 ± 3	281 ± 6	208 ± 4	288 ± 10	+11 d
Madison, WI	43.00°N	27	208 ± 2	272 ± 4	205 ± 3	281 ± 6	+12 d
LaCrosse, WI	43.80°N	22	213 ± 3	271 ± 3	205 ± 5	276 ± 5	+13 d*
Minneapolis, MN	45.00°N	19	208 ± 5	270 ± 6	206 ± 7	284 ± 7	+16 d*
Fargo, ND	46.88°N	15	216 ± 4	252 ± 8	217 ± 4	269 ± 8	+16 d*
Winnipeg, MB, Canada	50.07°N	16	207 ± 7	264 ± 6	197 ± 7	279 ± 7	+25 d*
Saskatoon, SK, Canada	52.07°N	16	206 ± 12	250 ± 6	197 ± 13	268 ± 7	+27 d*

Change in length (day of year, days) of ragweed pollen season as a function of latitude for National Allergy Bureau and Aerobiology Research Laboratories sites along a south–north latitudinal gradient

Years represent the number of years for which pollen data were available. Regression analysis was used to determine the “best-fit” line for all years for a given location. This analysis was then used to

determine the start and end day of each year ($\pm 95\%$ confidence interval) for the duration of the ragweed pollen season in 1995 and again in 2009.

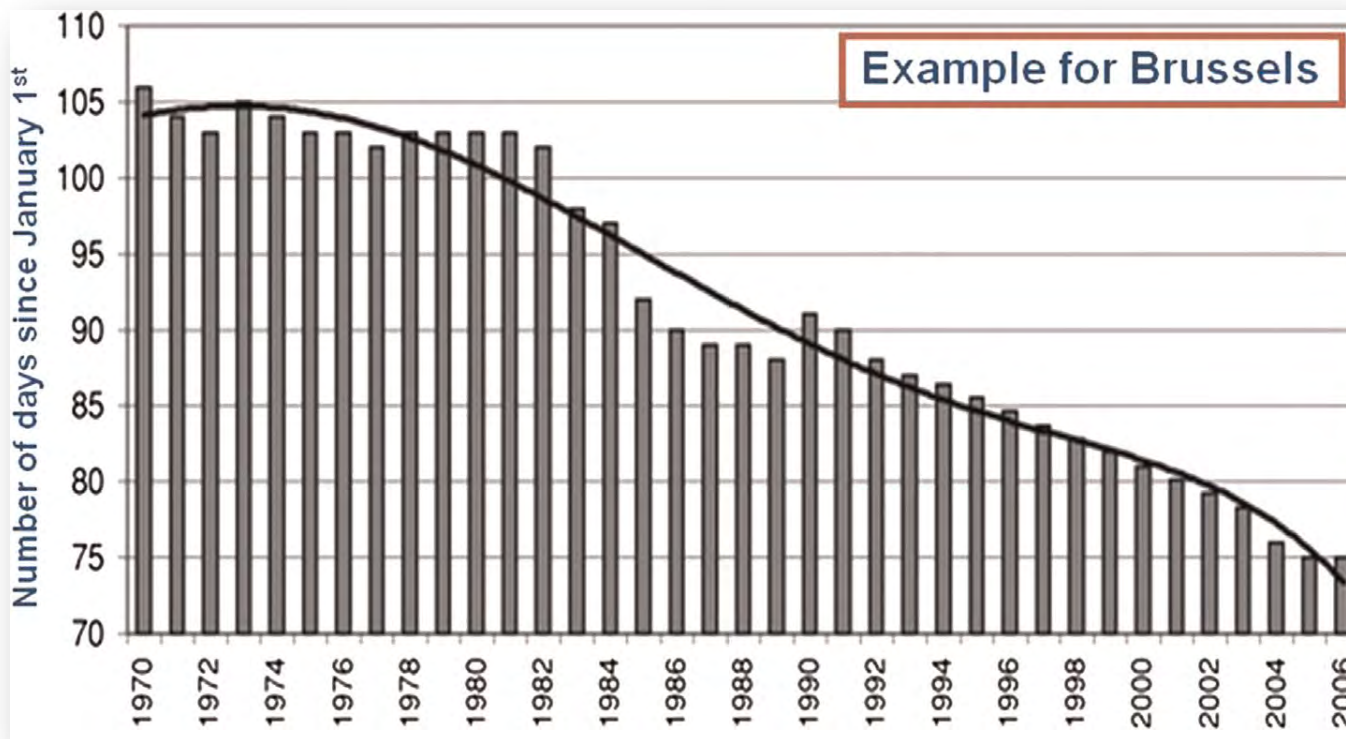
*Significant increase in the length (days) of the ragweed pollen season.

Ziska L, Knowlton K, Rogers C, Dalan D, Tierney N et al. *Proceedings of the National Academy of Sciences* 2011; 108(10):4248–4251. (doi:10.1073/pnas.1014107108)



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An earlier start and peak of the pollen season is more pronounced in species that start flowering early in the year



D'Amato G, Rottem M, Dahl R, Blaiss MS, Ridolo E et al. Climate Change, Migration, and Allergic Respiratory Diseases: An Update for the Allergist. *World Allergy Organization Journal* 2011; 4: 121-125. (doi: 10.1097/VOX.0b013e3182260a57)



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Fungus (“mold”) allergy is affected by warming

- Increased rainfall, heavier downpours, and flooding will increase indoor wetness that supports growth of fungi.
- Increased outdoor temperature can lead to increased use of air conditioning and insufficient deconditioning of indoor air, leading to added moisture in buildings or homes.
- Home dampness is a predictor of exacerbations of asthma.



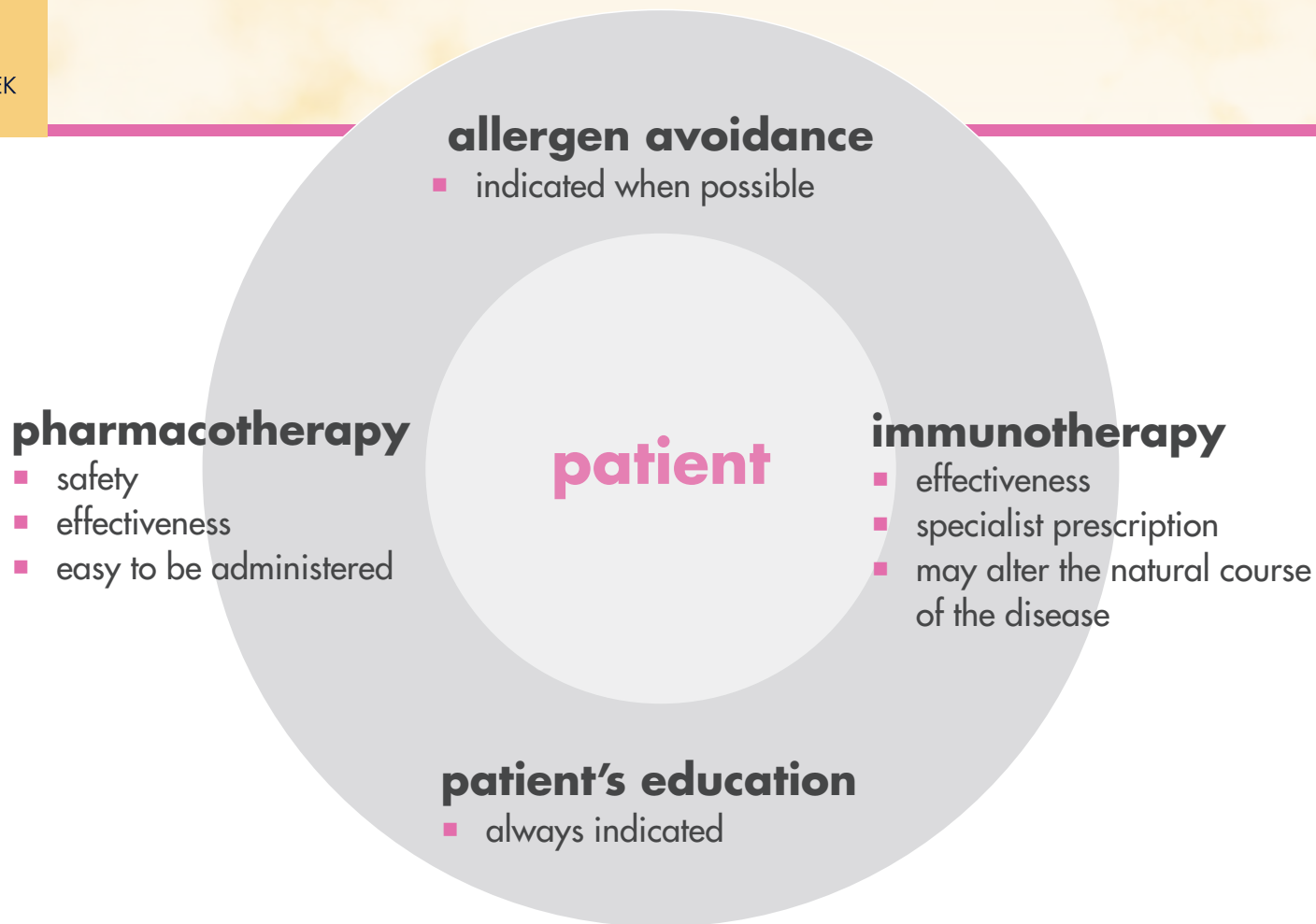
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Exposure to fungi is worldwide

- Exposure to fungi is inevitable every day, outdoors and indoors.
- Indoor recoveries of fungi should be similar to outdoors UNLESS there is amplification indoors.
- Fungi are present indoors in the air and in dust from floors, mattresses, and chairs.
- Contaminated heating-cooling air-conditioning systems can be sources of indoor fungi.



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Modified from: Allergic rhinitis and its impact on asthma (ARIA) (2008); Retrieved from
<http://www.whiar.org/Documents&Resources.php>



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Allergen avoidance

Pollen

- Remain indoors with windows closed at peak pollen times.
- Wear sunglasses.
- Use air-conditioning, where possible.
- Install car pollen filter.

Molds

- Ensure dry indoor conditions.
- Use ammonia to remove mold from bathrooms and other wet spaces.



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Allergen immunotherapy can modify the natural history of allergy

- Allergen immunotherapy is the only treatment that can modify the natural history of allergic disease.
- Subcutaneous immunotherapy (SCIT) and sublingual immunotherapy (SLIT) can prevent the onset of new sensitizations.
- When subcutaneous immunotherapy (SCIT) and sublingual immunotherapy (SLIT) (swallow) are administered for several years (3 to 5 years) efficacy is maintained for up to 3 or more years after discontinuation.
- SCIT could prevent the onset of asthma in children with allergic rhinitis.



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Pollen allergies in children

- The prevalence of seasonal allergic rhinitis is higher in children and adolescents than in adults.
- There is a significant correlation between asthma and allergic rhinitis in school children.
- Co-morbidities may include conjunctivitis, otitis media, Eustachian tube obstruction, and gastro-esophageal reflux.
- Mainstays of treatment for those above 4 years old are similar to adults.



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Take home messages

- Pollen allergy is a high prevalence worldwide condition that is impacted by climate change.
- Anticipate earlier onset of and longer duration of seasons for pollen allergies.
- Diagnose allergic rhinitis and its co-morbidities (cough that could be asthma, Eustachian tube dysfunction, etc).
- Allergen immunotherapy remains the only immunomodulator to improve the natural history of pollen allergies.



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To learn more about pollen allergies

WORLD ALLERGY ORGANIZATION RESOURCES

www.worldallergy.org/physician-resources/world-allergy/world-allergy-week-2016/patient-advocacy-2016

PATIENT ADVOCACY:

Allergy and Anaphylaxis Australia

Pollen Allergy

<http://www.allergy.org.au/patients/allergic-rhinitis-hay-fever-and-sinusitis/pollen-allergy>

Asthma and Allergy Foundation of America

Pollen Allergy

<http://www.aafa.org/page/pollen-allergy.aspx>

Extreme Allergies and Climate Change

<http://www.aafa.org/page/extreme-allergies-and-climate-change.aspx>

Asthma Society of Canada

Outdoor Triggers

<http://www.asthma.ca/adults/lifestyle/outdoor.php>

European Federation of Allergy and Airways Diseases Patients Associations (EFA)

Pollen

<http://www.efanet.org/air-quality/pollen>



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About the World Allergy Organization

The World Allergy Organization is an international alliance of 97 regional and national allergy, asthma and immunology societies. Through collaboration with its Member Societies WAO provides a wide range of educational and outreach programs, symposia and lectureships to allergists/immunologists around the world and conducts initiatives related to clinical practice, service provision, and physical training in order to better understand and address the challenges facing allergists/immunologists worldwide.

www.worldallergy.org

Upcoming World Allergy Organization Meeting:



Member Societies of the World Allergy Organization

ASIA AND PACIFIC REGION

Allergy & Immunology Society of Sri Lanka
Allergy and Clinical Immunology Society (Singapore)
Allergy and Immunology Society of Thailand
Australasian Society of Clinical Immunology and Allergy
Bangladesh Society of Allergy and Immunology
Chinese Society of Allergology
Hong Kong Institute of Allergy
Indian Academy of Allergy
Indian College of Allergy, Asthma and Clinical Immunology
Indonesian Society of Allergy and Immunology
Japanese Society of Allergology
Korean Academy of Asthma, Allergy and Clinical Immunology
Malaysian Society of Allergy and Immunology
Mongolian Society of Allergology
Philippine Society of Allergy, Asthma and Immunology
Taiwan Academy of Pediatric Allergy Asthma Immunology
Vietnam Association of Allergy, Asthma and Clinical Immunology

LATIN AMERICA REGION

Argentine Association of Allergy and Immunology
Argentine Society of Allergy and Immunology
Brazilian Society of Allergy and Immunology
Chilean Society of Allergy and Immunology
Colombian Allergy, Asthma and Immunology Association
Cuban Society of Allergology
Ecuadorian Society of Allergy, Asthma, and Immunology
Guatemalan Allergy, Asthma, and Clinical Immunology Association
Honduran Society of Allergy and Clinical Immunology
Mexican College of Allergy and Clinical Immunology (CMICA)
Mexican College of Pediatricians Specialized in Allergy and Clinical Immunology

Panamanian Association of Allergology and Clinical Immunology
Paraguayan Society of Allergy, Asthma, and Immunology
Peruvian Society of Allergy and Immunology
Uruguayan Society of Allergology
Venezuelan Society of Allergy, Asthma and Immunology

JOINT REGION (AFRICA, MIDDLE EAST, CIS)

Allergy Society of Kenya
Allergy Society of South Africa
Armenian Association of Immunology and Allergy
Azerbaijan Society for Asthma, Allergy and Clinical Immunology
Belarus Association of Allergology & Clinical Immunology
Egyptian Society of Allergy and Clinical Immunology
Egyptian Society of Pediatric Allergy and Immunology
Georgian Association of Allergology and Clinical Immunology
Iranian Society of Asthma and Allergy
Israel Association of Allergy and Clinical Immunology
Jordanian Society for Allergy and Clinical Immunology
Kuwait Society of Allergy & Clinical Immunology
Lebanese Society of Allergy and Immunology
Moldavian Society of Allergology & Immunology
Moroccan Society of Allergology and Clinical Immunology
National Association for Private Algerian Allergists
Russian Association of Allergology and Clinical Immunology
Tunisian Society of Respiratory Diseases and Allergology
Turkish National Society of Allergy and Clinical Immunology
Ukrainian Allergists Association
Ukrainian Association of Allergologists and Clinical Immunologists
Zimbabwe Allergy Society

... continued

Member Societies of the World Allergy Organization

EUROPE REGION

Albanian Society of Allergology and Clinical Immunology
Austrian Society of Allergology and Immunology
Belgian Society of Allergy and Clinical Immunology
British Society of Allergy and Clinical Immunology
Bulgarian National Society of Allergology
Croatian Society of Allergology and Clinical Immunology
Czech Society of Allergology and Clinical Immunology
Danish Society for Allergology
Dutch Society of Allergology
Finnish Society of Allergology and Clinical Immunology
French Society of Allergology and Clinical Immunology
German Society for Allergology and Clinical Immunology
Hellenic Society of Allergology and Clinical Immunology
Hungarian Society of Allergology and Clinical Immunology
Icelandic Society of Allergy and Clinical Immunology
Italian Association of Territorial and Hospital Allergists
Italian Society of Allergology and Clinical Immunology
Latvian Association of Allergists
Norwegian Society of Allergology and Immunopathology
Polish Society of Allergology
Portuguese Society of Allergology and Clinical Immunology
Romanian Society of Allergology and Clinical Immunology
Serbian Association of Allergologists and Clinical Immunologists
Slovenian Association for Allergology & Clinical Immunology
Spanish Society of Allergology and Clinical Immunology
Swedish Association for Allergology
Swiss Society of Allergology and Immunology

NORTH AMERICA REGION

American Academy of Allergy, Asthma and Immunology
American College of Allergy, Asthma and Immunology
Canadian Society of Allergy and Clinical Immunology

REGIONAL ORGANIZATIONS

Asia Pacific Association of Allergy, Asthma, and Clinical Immunology
Asia Pacific Association of Pediatric Allergy, Respiratory and Immunology
Commonwealth of Independent States Society of Allergology and Immunology
European Academy of Allergy and Clinical Immunology
Latin American Society of Allergy and Immunology

ASSOCIATE MEMBERS

Dominican Society of Allergy, Asthma, and Immunology
Haitian Society of Allergy and Immunology

AFFILIATE ORGANIZATIONS

British Society for Immunology
Global Allergy and Asthma European Network (GA2LEN)
International Association of Asthmology (INTERASMA)
International Primary Care Respiratory Group (IPCRG)
Southern European Allergy Societies (SEAS)

How are you managing pollen allergies in a changing global climate?



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Tell us about your activities for World Allergy Week 2016.

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Twitter: [@worldallergy](https://twitter.com/worldallergy)

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