IAP ALLERGY AND APPLIED IMMUNOLOGY CHAPTER

a knowledge initiative

ALLERGY BULLETIN

JANUARY-MARCH 2026: SPRING EDITION

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Dr. Sowmya Nagarajan
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ALLERGY BULLETIN
IAP Allergy and Applied Immunology Chapter

~:EDITORIAL TEAM:~

Chairperson's Address

January-March 2026 Allergy Bulletin — IAP Allergy & Applied Immunology Chapter

Dr. Uppin Narayan Reddy
Chairperson, IAP Allergy & Applied Immunology Chapter 2026

Dear Esteemed Colleagues and Members,

It is with immense pride, deep gratitude, and a profound sense of responsibility that I assume the chairpersonship of the IAP Allergy and Applied Immunology Chapter for 2026. This is not merely a position of honour — it is a sacred commitment to our patients, our peers, and to the future of allergy medicine in India. I extend my heartfelt welcome to each member of our new team and look forward to a year of meaningful collaboration, innovation, and impact.

A Legacy Built on Dedication

I am deeply grateful to the distinguished former chairpersons who have shaped the very foundation of this chapter — Dr. H. Paramesh, Dr. T.U. Sukumaran, Dr. Jose Ouseph, Dr. Krishna Mohan R, and Dr. Neeraj Gupta. Their unwavering commitment, visionary leadership, and tireless efforts have elevated the stature of allergy practice across the country. I am honoured to build upon their extraordinary legacy.

I also pay my deepest tribute to my revered mentor and teacher, the late Dr. (Maj) K. Nagaraju — a titan of allergy medicine whose guidance, wisdom, and compassion shaped not only my career but my very outlook on medicine. It is his spirit of selfless service that I carry forward with every step I take in this role. With his blessings, I am committed to honouring his legacy through action and excellence.

Our Vision: No Child Should Die of Allergic Disease

Allergic diseases are rising at an alarming pace worldwide — yet they remain widely misunderstood, misdiagnosed, and undertreated. Millions of patients continue to suffer needlessly due to myths, stigma, and a profound lack of awareness. As allergy specialists, we bear a collective responsibility: to counsel patients with empathy, to educate the public with evidence, and to debunk misconceptions with courage.

My vision is clear and unwavering: "No child should die of allergic diseases" — and beyond that, to meaningfully improve the quality of life for every patient, child or adult, who walks through our doors seeking relief and hope.

Our Agenda for 2026: Ambitious, Actionable, Impactful

Building on the excellent work of my immediate predecessor, Dr. Neeraj Gupta, and our entire chapter family, I am committed to a robust and forward-looking agenda for this year. We will continue and expand our flagship initiatives: our monthly educational webinars that bring cutting-edge knowledge to every corner of the country; the allergy bulletin that serves as a trusted resource for practitioners; stimulating monthly case discussions that sharpen clinical thinking; and high-impact community outreach services that take our expertise to those who need it most.

In addition, we will invest in landmark Allergy Day celebrations to amplify public awareness at a national scale, forge new research collaborations, and create stronger mentorship pathways to nurture the next generation of allergy specialists. Our chapter will also prioritise digital outreach, patient advocacy, and engagement with policymakers to ensure that allergy care receives the attention it deserves in India's healthcare agenda.

A Call to Collective Action

None of this is possible without you. The strength of this chapter lies in its people — in your passion, your expertise, and your dedication to making a difference in patients' lives every single day. I urge each and every member to engage actively, contribute boldly, and join hands in making 2026 a landmark year for allergy medicine in India.

Together, we have the knowledge, the will, and the network to transform how allergic diseases are perceived, prevented, and treated in our country. Let us move forward with unity, purpose, and an unshakeable commitment to our patients.

With warm regards and deep respect,

Dr. Uppin Narayan Reddy

Chairperson, IAP Allergy & Applied Immunology Chapter 2026

Secretary's Desk

Allergy Bulletin
January-March 2026: Spring Edition

Dr Sowmya Arudi Nagarajan

*As we enter 2026, I am honoured to address you as the newly appointed Honorary Secretary of the IAP Allergy and Applied Immunology Chapter. The new team of office bearers formally assumed office in **February 2026**, and we begin our tenure with a strong commitment to academic continuity, national collaboration, and policy-relevant advancement in allergy care.*

*We gratefully acknowledge the remarkable work of **Team 2025**, whose efforts have strengthened academic foundations and national engagement. Our focus will be to build upon this momentum while expanding the Chapter's academic and strategic outreach.*

Continuation of Academic Excellence

The **Allergy Monthly Friday Webinars**, conducted on the last Friday of every month, will continue as our flagship academic initiative. These sessions have become a valuable national platform for evidence-based discussions, expert interaction, and capacity building across India. Sustaining this academic continuity remains a priority.

Launch of "Allergy India Dialogues"

In 2026, we are pleased to introduce a new collaborative initiative — **Allergy India Dialogues,** to be conducted on the 3rd Tuesday of every month.

This program aims to actively involve various IAP State Chapters in structured academic discussions focusing on specific allergic diseases. By decentralising expertise and promoting inter-state academic exchange, we seek to:

- Strengthen uniform standards of allergy practice
- Encourage regional leadership in academic discussions
- Enhance nationwide clinical alignment

This initiative reflects our commitment to strengthening allergy care through structured national collaboration.

Landmark Publication

Food Allergy in India — IAP Delphi Consensus

Published in Clinical and Experimental Allergy, this India-specific consensus provides standardised, contextually relevant recommendations for the diagnosis and management of food allergy. The publication underscores our Chapter's role in shaping evidence-based, policy-relevant guidance tailored to Indian realities.

The Way Forward

Allergic diseases are rising in prevalence, influenced by environmental change, urbanisation, and evolving lifestyles. Addressing this growing burden requires not only academic engagement but also advocacy, research, and system-level preparedness.

Our priorities for 2026 include:

- Strengthening allergy education at all levels of pediatric practice
- Promoting India-centric research and guideline development
- Encouraging state chapter participation and academic integration
- Advancing environmentally informed approaches to allergy prevention

With renewed leadership and a clear strategic direction, we remain committed to advancing pediatric allergy care across the country. Together, through collaboration, scholarship, and shared responsibility, we can contribute meaningfully to improving allergy outcomes for children in India.

With regards,

Dr Sowmya Arudi Nagarajan
Honorary Secretary, 2026–2027
IAP Allergy and Applied Immunology Chapter

Annual Report of the IAP Allergy and Applied Immunology Chapter – 2025

Dr Neeraj Gupta, Chairperson (for the year 2025)

1. Introduction: A Transformational Year for Pediatric Allergy in India

The year 2025 was a landmark year for the Indian Academy of Pediatrics (IAP) Allergy and Applied Immunology Chapter, marking a phase of structured growth, academic consolidation, and national and international visibility. Allergic diseases are emerging as a major non-communicable disease burden in children and adolescents in India, and the Chapter undertook a strategic mission to strengthen pediatric allergy education, advocacy, research, and clinical practice.

As Chairperson, my vision was to establish the Chapter as a **national thought leader in pediatric allergy**, bridging gaps between evidence-based science and real-world clinical practice in India. The focus areas included structured educational programs, guideline development, community outreach, international collaborations, and capacity building for pediatricians and allergists.

It is with great pride that we share that the IAP Allergy and Applied Immunology Chapter received the **Second Prize for Best Chapter Activities from the Indian Academy of Pediatrics during PEDICON 2026 at Kolkata**, among all subspecialty chapters. Additionally, I was humbled to receive the ***FIAP Award*** during the same event. These recognitions reflect the collective efforts, passion, and dedication of the entire Chapter team.

2. Leadership, Governance, and Team Structure

The success of the Chapter in 2025 was driven by a highly motivated leadership team and committed Executive Board members and National Coordinators.

Leadership Team (Office Bearers)		
Dr Neeraj Gupta *(Chairperson)*	Dr Uppin Narayan Reddy *(Secretary)*	Dr Dhanesh Volvoikar *(Treasurer)*

Executive Board Members	
Dr Naresh Grover	Dr Mohit Poddar
Dr Nayan Mani Deka	Dr Sanjukta De
Dr Rama Rajyam	Dr Kagithapu Surender
Dr Narmada S	Dr Sinchana Bhat
Dr Dipti Pujari	Dr Mitesh Kakkad

National Coordinators		
Dr Vikram Patra	Dr Sowmya Nagarajan	Dr Soundarya M

Their tireless contributions ensured seamless execution of academic programs, outreach initiatives, publications, and governance activities. I sincerely acknowledge their dedication, leadership, and collaborative spirit.

3. Academic and Educational Platforms

3.1 Allergy Bulletin

The Allergy Bulletin, released on the first day of every month, served as the flagship academic and educational publication of the Chapter. With the tireless dedication and wonderful contributions from Dr Nayan Mani Deka and Dr Rama Rajyam, the Bulletin provided:

- Simplified patient education material
- Clinical updates and expert opinions
- Research highlights and summaries
- Chapter activities and announcements

The Bulletin evolved into a key knowledge translation platform for pediatricians, allergists, trainees, and allied professionals across India. All previous editions of Allergy Bulletin can be accessed at https://iapaai.com/allergy-bulletin/.

3.2 Webinars and Interactive Academic Forums

The Chapter conducted structured educational webinars throughout the year, including:

- **Friday Webinars (dIAP platform) –** addressing clinical and translational allergy topics, these are available at https://iapaai.com/webinar/
- **Allergy Forum Series –** held monthly on the second Tuesday, facilitating interactive discussions and case-based learning (available at *https://www.youtube.com/@PAAI-IAP*)

These platforms ensured continuous learning and engagement among pediatricians nationwide, including those in remote and resource-limited settings.

4. Structured Academic Modules and Knowledge Dissemination

The Chapter developed multiple structured modules to standardize learning and clinical practice.

4.1 Allergic Rhinitis Module

A national Allergic Rhinitis educational module was developed and implemented across multiple centers in India. This module aimed to standardize diagnosis, management, and long-term care strategies for allergic rhinitis in children.

4.2 Component-Resolved Diagnostics (CRD) Webinar Series (available at https://www.youtube.com/@PAAI-IAP)

A structured webinar series on Component-Resolved Diagnostics was conducted to enhance understanding of molecular allergy diagnostics, emphasizing rational testing and interpretation in clinical practice.

4.3 Sensitive Skin Conditions Module (to be released soon)

A module focusing on pediatric dermatologic allergic conditions was conceptualized and implemented, addressing common and emerging pediatric skin allergy disorders. This module was prepared in collaboration with Boston University, USA.

These structured modules ensured uniform dissemination of evidence-based knowledge and strengthened pediatric allergy practice across India.

5. Guidelines, Practice Parameters, and Consensus Statements

5.1 Food Allergy Delphi Consensus Statement

One of the most significant academic milestones of 2025 was the **Food Allergy Delphi Consensus Statement**, which was conceptualized, initiated, and completed in 2025 and published in Clinical and Experimental Allergy (CEA). The article is available athttps://onlinelibrary.wiley.com/doi/10.1111/cea.70246. This consensus addressed India-specific challenges in food allergy diagnosis, management, prevention, and immunotherapy, and represented a collaborative effort of national and international experts.

This publication represents one of the first structured Delphi-based allergy consensus documents led by the IAP Allergy and Applied Immunology Chapter, and it sets a benchmark for future guideline development.

5.2 Practice Parameter on Rational Allergy Practice (currently under peer-review)

The Chapter, in collaboration with Indian Academy of Pediatrics (IAP), initiated and completed the **Practice Parameter on Rational Allergy Practice in India**, focusing on appropriate indications for allergy testing, interpretation of results, avoidance of overdiagnosis, and evidence-based treatment pathways. This document, developed through a structured and collaborative process, is scheduled for publication and aims to guide pediatricians and allergists in India toward rational and ethical allergy practice.

5.3 Practice Parameters on common Allergic Disorders

In addition to the Practice Parameter on Rational Allergy Practice, the IAP Allergy and Applied Immunology Chapter successfully developed and released **12 comprehensive Practice Parameters in 2025**, representing a landmark initiative toward standardizing pediatric allergy care in India. These parameters covered key clinical domains including allergic rhinitis, urticaria and angioedema, atopic dermatitis, food allergy in children, cow's milk protein allergy, anaphylaxis management in outpatient settings, contact dermatitis, drug allergy, insect venom hypersensitivity, rational use of allergy testing, allergen immunotherapy, and primary and secondary immunodeficiencies (https://iapaai.com/practice-parameters/). These documents were developed through expert consensus and structured review processes and are intended to provide evidence-based, India-specific guidance for pediatricians and allergists. Collectively, these practice parameters aim to reduce variability in clinical practice, promote rational diagnostic and therapeutic approaches, and improve the quality of allergy care across diverse healthcare settings in India. All these practice parameters were released during PedAllercon 2025.

These above documents together represent a foundational step toward standardizing pediatric allergy practice in India.

6. Community Outreach and Public Health Initiatives

6.1 School and Community Health Camps

The Chapter conducted multiple community outreach programs, including:

- School Allergy Awareness and Health Check-up Camp at Sir Ganga Ram Hospital, Delhi
- Health Check-up Camp at Kid'z Garden School, Delhi
- Health Check-up Camp at Usmanpur School, Delhi
- Public Awareness Session on Anaphylaxis at GMC, Surat
- College Seminar on Plant Allergens at Janki Devi Memorial College, Delhi

These programs enhanced awareness among students, teachers, parents, and community members about allergy prevention, recognition, and management.

6.2 Public Awareness Webinars and Educational Flyers

Public-facing webinars (https://www.youtube.com/@PAAI-IAP) addressed:

- Food Handlers Awareness
- Anaphylaxis Awareness
- Allergy Smart Schools

Educational flyers (https://iapaai.com/awareness-flyers/) were released on:

Food Allergy	Anaphylaxis
Allergy Safety in Pregnancy	Eye Allergy
Urticaria	Allergy Smart School Safety

These resources were widely disseminated through digital platforms and schools, promoting allergy literacy in the community.

7. Allergy Awareness Days and Thematic Academic Campaigns

A comprehensive calendar of awareness activities was implemented throughout the year, including:	
1. World Allergy Day	2. Primary Immunodeficiency Day
3. Global CRSwNP Awareness Day	4. World Asthma Day
5. Food Allergy Awareness Week	6. Anaphylaxis Awareness Week
7. World Allergy Week	8. Allergen Immunotherapy Awareness Week
9. Eye Allergy Awareness	10. World Urticaria Day
11. Applied Immunology Series	12. Investigations in Allergy Practice Series
13. Clinical Aerobiology Series	14. First 1000 Days and Allergy Prevention

These programs brought together national and international faculty and strengthened thematic education for clinicians and the public. All of these webinars are available at (https://www.youtube.com/@PAAI-IAP).

8. Conferences and Major Scientific Events

8.1 Mid-term PedAllercon

First edition of Mid PedAllercon was organised by PAAI Orissa team, ably led by Dr Narayan Prasad Modi, in June 2025 at Bhubaneshwar. The event was attended was nearly 250 enthusiastic participants demarcating clear need for more such events in the country.

8.2 PedAllercon 2025 – From Mites to Milestones: A Global Summit in Pediatric Allergy

The 13th edition of PedAllercon – The Global Summit on Pediatric Allergy, Asthma, and Immunology was successfully held from 10–12 October 2025 in New Delhi, organized by the IAP Allergy and Applied Immunology Chapter in collaboration with the Pediatric Allergy Association (PAA) Delhi and in academic partnership with the Centre for Food Allergy and Asthma Research (CFAAR), Northwestern University, USA. With the theme **"From Mites to Milestones,"** the conference brought together over 1,000 delegates and more than 150 national and international faculty from ten countries, making it one of the largest pediatric allergy conferences ever conducted in India.

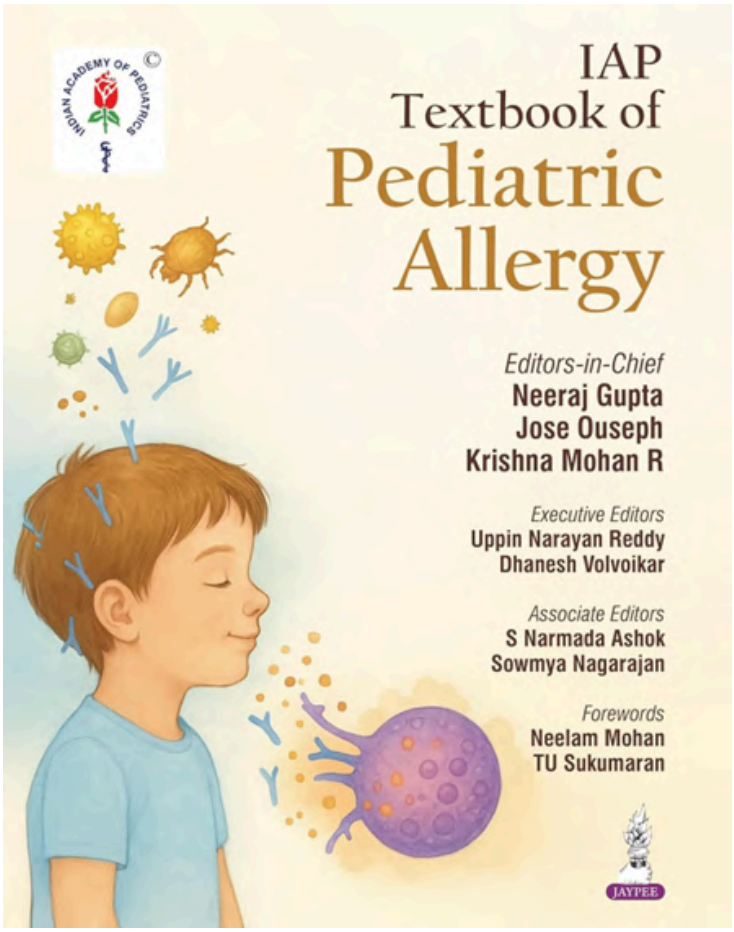
PedAllercon 2025 featured a comprehensive scientific program including plenary lectures, symposia, panel discussions, hands-on workshops, and trainee-focused sessions, covering the entire spectrum of pediatric allergy and applied immunology. Key themes included precision medicine, biologics in allergic diseases, environmental and climate influences on allergy, advances in food allergy prevention and immunotherapy, and integrated airway disease management.

The inaugural ceremony coincided with **National Allergy Day (11 October 2025)** and witnessed the launch of the **STAMP Out Allergy national campaign,** 12 Practice Parameters on Rational Allergy Care, public awareness flyers, and the pioneering **Allergy Smart School Initiative**. Landmark academic resources such as **Allergopedia** and the announcement of the **IAP–EAACI dual membership program** were also unveiled. PedAllercon 2025 served as a milestone platform for scientific exchange, advocacy, and global collaboration, reinforcing India's leadership in pediatric allergy education and research.

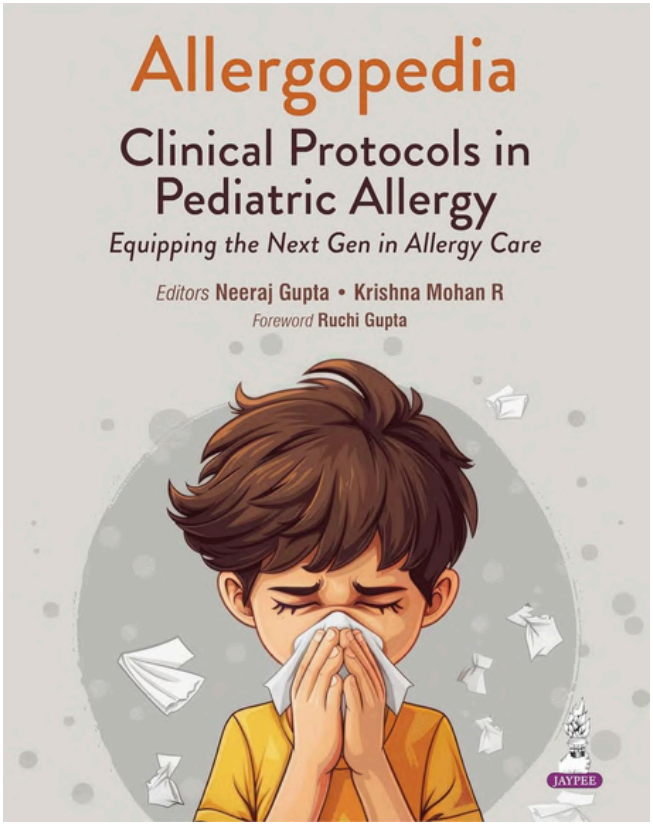
9. Publications and Academic Resources

9.1 IAP Textbook of Pediatric Allergy

The **IAP Textbook of Pediatric Allergy, the first comprehensive pediatric allergy textbook published under the aegis of the Indian Academy of Pediatrics,** was formally released during **PEDICON 2026 in Kolkata**, marking a historic milestone for pediatric subspecialty education in India. Edited by **Dr Neeraj Gupta, Dr Jose Ouseph, and Dr Krishna Mohan R**, the textbook represents a collective national academic effort to provide structured, evidence-based, and India-centric guidance on the diagnosis, investigation, and management of allergic diseases in children. The book integrates clinical protocols, practice parameters, and contemporary advances in allergy science, and is envisioned as a foundational reference for pediatricians, trainees, allergists, and educators, shaping the future of pediatric allergy training and clinical practice in India.



9.2 Allergopedia and Educational Book Chapters



Two landmark educational resources were also launched to strengthen structured allergy practice and training in India. **"Allergopedia – Clinical Protocols in Pediatric Allergy,"** released during PedAllercon 2025, was conceptualized as a practical, clinician-friendly guide providing stepwise diagnostic and therapeutic algorithms tailored to the Indian context. The book aims to bridge the gap between guidelines and real-world practice, serving as a ready reference for busy pediatricians and allergists.

In addition, the Allergy Section comprising 13 dedicated chapters in the IAP 360-Degree Protocol Book, released in January 2026, represents a comprehensive integration of allergy protocols into mainstream pediatric practice. This initiative ensures that evidence-based allergy care becomes an integral component of routine pediatric clinical decision-making across India.

These publications will serve as long-term academic resources for pediatricians, trainees, and allergists.

10. Digital Platforms and Aerobiology Initiatives

10.1 Website and YouTube Channel

The Chapter strengthened its digital presence through regular updates on the website (https://iapaai.com/) and YouTube channel, disseminating educational content, recorded webinars, and patient education materials.

10.2 Pollen Calendar

Seasonal pollen calendars were developed and updated, providing region-specific aerobiology information for clinicians and patients. These are available at https://iapaai.com/pollen-calendar/ as well as in respective Allergy Bulletin edition.

These initiatives enhanced digital learning and personalized allergy management.

11. Chapter Expansion and Organizational Development

11.1 Installation of State Allergy Chapters

Multiple state chapters were installed, including Delhi, West Bengal, Haryana, Tamil Nadu, North-East, Kerala, Gujarat, Karnataka, Odisha, Punjab, and Telangana. This expansion strengthened regional representation and decentralized allergy education.

11.2 Governance and Administrative Initiatives

Efforts were undertaken toward:

- Society Darpan registration
- Financial governance and structural planning
- Discussions on national registries for food allergy, drug allergy, and anaphylaxis

These steps reflect the Chapter's commitment to transparency, governance, and long-term sustainability.

12. Special Academic and Patient Engagement Programs

12.1 Allergy Legends and Allergy Footprints

Innovative initiatives such as:

- Allergy Legends: In Conversation (https://iapaai.com/allergy-legends/)
- Allergy Footprints: Beyond Clinics

were launched to highlight pioneers, innovations, and the broader impact of allergy practice.

12.2 Patient Support Activities

Patient engagement programs, including awareness sessions on hereditary angioedema and allergy patient support initiatives, were conducted to strengthen patient-centered care.

13. EAACI Dual Membership Initiative and Chapter Membership Expansion

A major milestone in international academic collaboration was the launch of the **IAP Allergy and Applied Immunology Chapter–EAACI NAIS Dual Membership Program** during PedAllercon 2025. This pioneering initiative enables Indian pediatricians and allergists to access the educational resources, scientific networks, and global platforms of the **European Academy of Allergy and Clinical Immunology (EAACI)**, fostering cross-border learning and research collaboration. The program symbolizes India's growing integration into the global allergy community and strengthens international academic partnerships.

Reflecting the expanding interest and recognition of pediatric allergy in India, **IAP-AAI Chapter membership witnessed a remarkable growth from approximately 600 to nearly 1,350 members in 2025 alone,** highlighting the chapter's increasing relevance, visibility, and leadership in advancing allergy education and practice nationwide.

14. International Outreach and Global Engagement

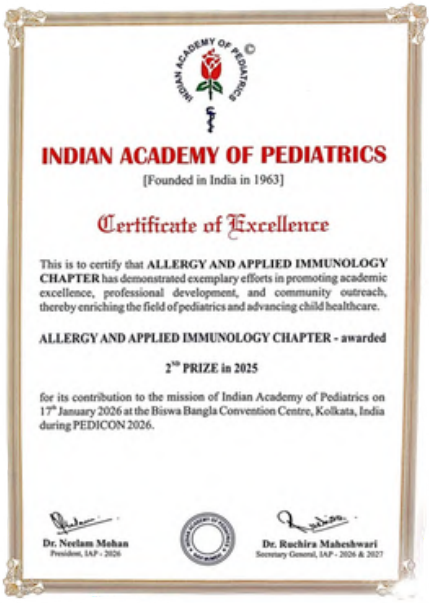
The Chapter engaged in international academic collaborations and outreach programs with Sri Lanka and discussions with Maldives, Bangladesh, and Caribbean nations. In addition, Dr Neeraj Gupta represented IAP Allergy Chapter as invited Speaker at APAPARI annual conference held at Bali, Indonesia. These initiatives enhanced global visibility of Indian pediatric allergy and facilitated knowledge exchange.

15. National Media Advocacy: First Representation on Doordarshan

In 2025, the IAP Allergy and Applied Immunology Chapter marked a historic milestone in public advocacy with its **first national representation on Doordarshan**, where **Dr Neeraj Gupta was invited to discuss pediatric allergies and their rising public health burden.** This engagement symbolized the Chapter's entry into national health discourse, advancing allergy awareness, policy dialogue, and community education across India.

16. Recognition and Awards

The Chapter was honored with the **Second Best Chapter Award by the Indian Academy of Pediatrics for 2025,** recognizing the breadth, depth, and impact of its academic and outreach activities.



INDIAN ACADEMY OF PEDIATRICS

[Founded in India in 1963]

Certificate of Excellence

This is to certify that **ALLERGY AND APPLIED IMMUNOLOGY CHAPTER** has demonstrated exemplary efforts in promoting academic excellence, professional development, and community outreach, thereby enriching the field of pediatrics and advancing child healthcare.

ALLERGY AND APPLIED IMMUNOLOGY CHAPTER - awarded

2ND PRIZE in 2025

for its contribution to the mission of Indian Academy of Pediatrics on 17th January 2026 at the Biswa Bangla Convention Centre, Kolkata, India during PEDICON 2026.

Dr. Neelam Mohan
President, IAP - 2026

Dr. Ruchira Maheshwari
Secretary General, IAP - 2026 & 2027

These recognitions underscore the collaborative efforts and academic excellence of the Chapter.

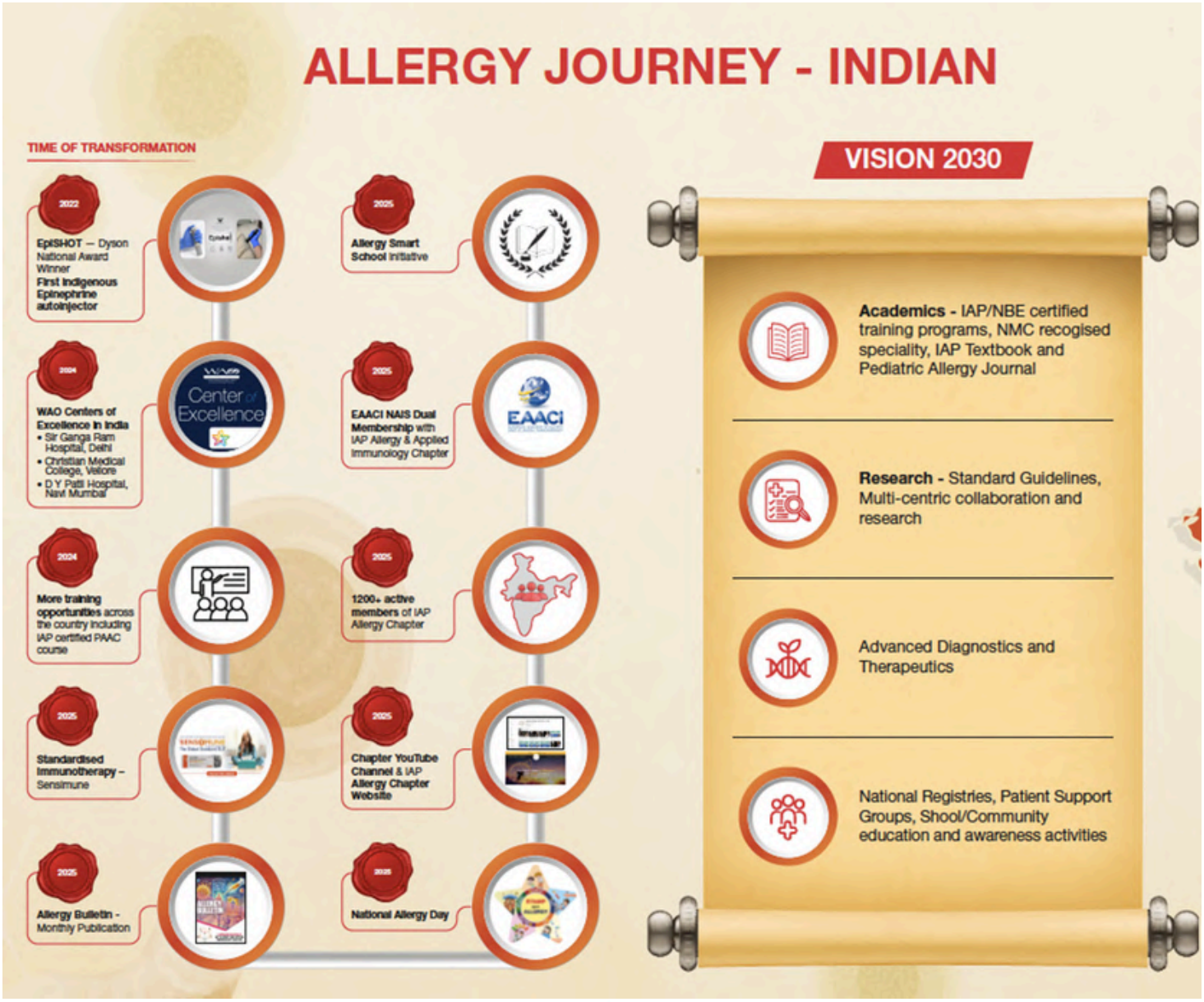
The Chairperson received the **FIAP Award**, recognizing contributions to pediatric allergy education, leadership, and research.

16. Future Directions and Strategic Vision

Building on the momentum of 2025, the Chapter aims to:

- Strengthen structured training programs and certification courses
- Expand school and community allergy programs nationally
- Establish national allergy registries
- Develop India-specific clinical guidelines and consensus documents
- Advocate for formal recognition of Allergy as a subspecialty in India
- Strengthen international collaborations and research networks
- Promote rational, ethical, and evidence-based allergy practice

The overarching vision is to ensure **equitable, evidence-based, and high-quality allergy care for every child in India.**



17. Acknowledgements

I extend my heartfelt gratitude to the Office Bearers, Executive Board Members, National Coordinators, faculty, volunteers, partner organizations, and the leadership of IAP and CIAP. Their unwavering commitment and teamwork made 2025 a defining year for pediatric allergy in India.

Special thanks to:

- Dr Uppin Narayan Reddy and Dr Dhanesh Volvoikar for exceptional administrative leadership
- Executive Board Members for academic and outreach leadership
- National Coordinators for national academic program execution
- Faculty and speakers who contributed to webinars, conferences, and guideline development

Conclusion

The year 2025 will be remembered as a pivotal year in the journey of the IAP Allergy and Applied Immunology Chapter. With structured educational programs, landmark consensus and guideline initiatives, extensive public outreach, and national and international collaborations, the Chapter has laid the foundation for the future of pediatric allergy in India.

The Second Best Chapter Award and the FIAP Award are not merely accolades but milestones that inspire us to continue advancing pediatric allergy care, education, and research. The Chapter remains committed to shaping the future of allergy practice in India and ensuring better health outcomes for children with allergic diseases.

Maternal Isoflavone Intake During Pregnancy & Risk of Childhood Food Allergy

Evidence from The Japan Environment and Children's Study (JECS)

Dr Rama Rajyam

Journal	Pediatric Allergy and Immunology (2026)
Authors	Yang G et al.
Study Type	Nationwide Prospective Birth Cohort
Country	Japan
DOI	10.1111/pai.70303

86,012	75,307	6.60%	12.10%
Mother-Child Pairs (≤1yr)	Mother-Child Pairs (1-3yr)	FA Prevalence ≤1yr	FA Prevalence 1-3yr

BACKGROUND & RATIONALE

Food allergy (FA) has increased substantially over recent decades. Early immune programming during fetal life plays a crucial role in allergic disease development.

WHAT ARE ISOFLAVONES?

- Phytoestrogens structurally similar to estrogen, found mainly in soy-based foods
- Major forms: Genistein and Daidzein
- Known for estrogen receptor activity, anti-inflammatory properties, and immunomodulatory effects
- Potential influence on gut microbiota

Animal and mechanistic studies suggest isoflavones may influence TH1/TH2 immune balance, IgE production, and skin barrier integrity. However, human evidence regarding maternal isoflavone intake and childhood food allergy has been limited and inconsistent.

OBJECTIVE

To investigate whether maternal dietary isoflavone consumption during pregnancy is associated with:

- Food allergy in children at ≤1 year
- Food allergy in children at 1–3 years
- Sex-specific differences
- Influence of parental allergy history

STUDY DESIGN & METHODS

Exposure Assessment

- Maternal isoflavone intake measured using validated Food Frequency Questionnaire (FFQ)
- Intake calculated based on genistein + daidzein
- Categorized into quartiles (Q1–Q4)

Outcome

Physician-diagnosed food allergy (caregiver-reported questionnaire)

Statistical Analysis

Multivariable logistic regression adjusting for maternal age, education, smoking, pre-pregnancy BMI, parental allergy history, blood folic acid levels, total energy intake, and infant feeding method (≤4 months).

KEY FINDINGS

Association at ≤1 Year — Higher intake associated with reduced FA risk:

Quartile	Adjusted OR	95% Confidence Interval
Q1 (Reference)	1	—
Q2	0.95	0.87 – 1.02
Q3	0.91	0.84 – 0.99
Q4 (Highest)	0.86	0.79 – 0.93 ★ 14% Risk Reduction

Association at 1–3 Years — Protective effect persisted into early childhood:

Quartile	Adjusted OR	95% Confidence Interval
Q1 (Reference)	1	—
Q2	0.96	0.91 – 1.02
Q3	0.93	0.88 – 0.99
Q4 (Highest)	0.88	0.83 – 0.95 ★

SEX-SPECIFIC DIFFERENCES

One of the most important findings of this study: sex-associated immune programming appears to influence response to prenatal phytoestrogen exposure.

≤1 Year

- Significant protective association seen mainly in female children
- No strong association observed in males

1–3 Years

- Protective effect observed in both sexes at highest intake levels
- Stronger and more consistent in females

PROPOSED BIOLOGICAL MECHANISMS

1. Immune Modulation

Isoflavones influence TH2-mediated allergic inflammation and may reduce IgE-mediated sensitization

2. Skin Barrier Enhancement

Estrogen-like activity may improve epidermal barrier function, reducing allergen penetration and lowering sensitization risk

3. Gut Microbiota Modulation

Isoflavones affect maternal gut microbiome, which in turn influences fetal immune development

4. Estrogen Receptor Interaction

Isoflavones bind to estrogen receptors in immune cells and may alter cytokine expression patterns

CONCLUSIONS

✓ Reduced risk of food allergy up to 3 years of age
✓ Stronger protective effect in female offspring
✓ Dose-response relationship observed
✓ Protective association independent of parental allergy history

However, randomized trials are required before recommending specific intake levels.

CLINICAL IMPLICATIONS

- Moderate soy-based food consumption during pregnancy appears safe
- May have a protective association against childhood food allergy
- Current evidence does not justify high-dose isoflavone supplementation
- Balanced maternal nutrition remains key

LIMITATIONS

- Observational study — causality cannot be established
- Dietary intake assessed via FFQ (recall bias possible)
- No detailed postnatal dietary data for children
- Mechanisms not directly measured
- Population with relatively high soy intake (Japan) — may limit generalizability

Dr. Saibal Moitra
MD, PhD
Consultant Allergist & Immunologist. Internationally recognized researcher in pollen allergen epitope mapping, molecular allergology, and precision immunotherapy design.

Epitope Mapping

The study of pollen allergen epitope mapping represents the intersection of structural biology, immunology, and clinical medicine. It is a field dedicated to identifying the specific molecular "zip codes" on the surface of pollen proteins that are recognized by the human immune system — most notably by Immunoglobulin E (IgE) antibodies. Understanding these sites is the key to moving beyond general allergy management toward "precision allergology."

In the context of pollen, allergens are typically proteins or glycoproteins. An epitope is the specific portion of that allergen to which an antibody binds. These are generally classified into two categories:

1. Linear (Continuous) Epitopes:

A sequential string of amino acids (e.g., residues 15–25). These are often identified using peptide microarrays.

2. Conformational (Discontinuous) Epitopes:

Atoms brought together by the folding of the protein. These are far more common in respiratory allergies, as the IgE antibodies usually recognize the allergen in its native, 3D state.

Mapping these sites is a technical challenge because of the complexity of protein surfaces. Modern researchers use a "multi-omics" approach:

Computational Prediction (In Silico)

Before hitting the wet lab, researchers use algorithms to predict surface accessibility and hydrophobicity. With the advent of AlphaFold, we can now model the 3D structures of rare pollen proteins with high accuracy, allowing software like DiscoTope to predict where an antibody is most likely to dock.

High-Resolution Structural Biology
The "gold standard" remains X-ray Crystallography and Nuclear Magnetic Resonance (NMR). By co-crystallizing a pollen allergen (like the birch pollen Bet v 1) with a Fab fragment of a human IgE antibody, researchers can see the exact hydrogen bonds and van der Waals forces at play.

Mass Spectrometry (HDX-MS)
Hydrogen-Deuterium Exchange Mass Spectrometry is a powerful tool for mapping epitopes in solution. It measures which parts of the protein are "shielded" from the solvent when an antibody is bound, pinpointing the interface without needing a crystal.

Clinical Significance of Epitope Mapping

The clinical significance of pollen allergen epitope mapping is three-fold:

1. Component-Resolved Diagnostics (CRD):
Traditional skin prick tests tell you that you are allergic to "Grass." Epitope mapping allows for tests that tell you exactly which protein (e.g., Phl p 1 vs. Phl p 5) you react to. This distinguishes between a true primary allergy and cross-reactivity.

2. Understanding Pollen-Food Syndrome:
Many patients with birch pollen allergies experience an itchy mouth when eating apples or hazelnuts. This happens because the epitope on the birch pollen protein is structurally nearly identical to the protein in the fruit. Mapping allows us to visualize this "molecular mimicry."

3. Engineering Hypoallergens:
Perhaps the most exciting application is the design of Next-Generation Immunotherapy. By identifying the IgE-binding epitope, scientists can use site-directed mutagenesis to change a few key amino acids.

Key Goal: Hypoallergen Design
The goal is to create a "hypoallergen": a protein that no longer binds IgE (reducing the risk of anaphylaxis during treatment) but still activates T-cells to "train" the immune system toward tolerance.

If we take a look at the discovery trend of various epitopes in the past 10 years, we will find a tremendous rise in the discovery of both linear and conformational epitopes in the last 5 years. This calls for setting up a database of all these allergens to aid diagnosis and treatment and lead the path for the formation of the Allergome platform.

Allergome Database

The Allergome database is a comprehensive, web-based platform designed to organize and provide detailed information on allergenic molecules (allergens) and their sources. Launched in 2003, it has grown into one of the most critical repositories for researchers, clinicians, and bioinformaticians working in the field of immunology and allergy.

Unlike some databases that only list "officially recognized" allergens, Allergome includes a vast array of molecules documented in scientific literature, even those not yet officially named by the WHO/IUIS (International Union of Immunological Societies).

The primary goal of Allergome is to provide a unified platform for all IgE-binding compounds. It bridges the gap between basic molecular research and clinical allergy diagnosis. For a long time, allergy data was scattered across thousands of individual journals. Allergome centralizes this, providing a "monograph" for each molecule that includes:

- Native and Recombinant forms of the protein.
- Biochemical properties (molecular weight, function).
- Clinical data (prevalence of sensitization in different countries).
- External links to UniProt, GenBank, and PDB (Protein Data Bank).

Scope and Coverage

Allergome database mainly encompasses: Breadth of Data covering allergens from all sources (plants, animals, fungi, bacteria) and all exposure routes (inhalation, ingestion, contact, injection). Inclusion Criteria includes molecules causing IgE-mediated diseases such as asthma, rhinitis, urticaria, and anaphylaxis. It is mainly addressed to the scientific community, including clinicians needing data on sensitization prevalence and researchers looking for sequence homology or cross-reactivity.

Platform Modules

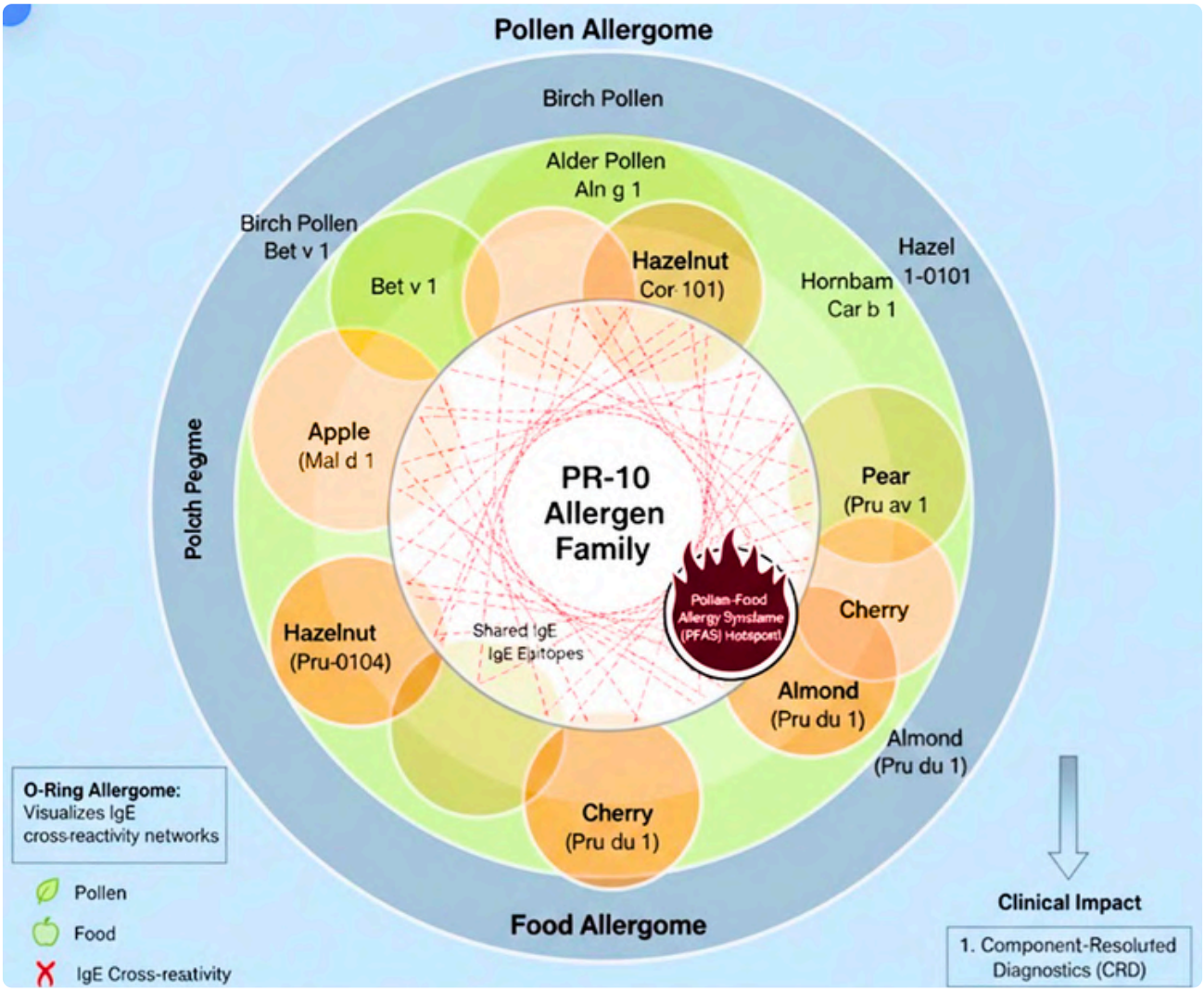
This platform is composed of several specialized modules that allow for "Real-Time" monitoring and data integration:

Module	Description
ReTiME	Real-Time Monitoring of IgE Sensitization: Acquires and stores real-time clinical data on how patients are reacting to specific allergens globally.
AllFam	A cross-linked resource that classifies allergens into protein families based on their structural domains.
RefArray	A reference archive containing thousands of processed papers from scientific literature linked to specific allergens.
AllergomeBlaster	A tool for sequence similarity searches, allowing users to compare new proteins against the known allergen database.
InterAll	An electronic clinical record system that can interface with the database to help manage patient-specific allergy data.

The "O-ring" and Connectivity

One of the most unique visualization tools in Allergome is the Allergome O-ring. This is a dynamically generated graph that shows the sequence homology between different allergenic molecules, and documented instances where an individual allergic to one substance (e.g., birch pollen) reacts to another (e.g., apple) because the proteins are structurally similar.

The diagram below depicts an O-ring of PR-10 protein:



Conclusion

Pollen allergen epitope mapping and the Allergome database are transitioning from a descriptive science to a prescriptive one. As our maps of these molecular surfaces become more detailed, the potential for personalized vaccines increases.

The Future of Allergy Treatment

In the near future, an allergy shot may not be a crude extract of Timothy grass, but a precision-engineered protein designed to target the specific epitopes relevant to an individual's immune profile.

Case Report

Recurrent Urticaria and Asthma in a 5-Year-Old Boy

Dr Sanjukta De
Executive Board Member – East Zone
IAP Allergy and Applied Immunology Chapter
Allergy Bulletin | March 2026

A Comprehensive Approach to Diagnosis and Management

ABSTRACT

We report a case of a 5-year-old boy presenting with recurrent urticaria and concurrent asthma, two of the most common atopic conditions in childhood, representing a diagnostic and therapeutic challenge. This case highlights the importance of a systematic allergy workup, the role of laboratory investigations in guiding management, and an integrated, stepwise treatment approach. The co-existence of these conditions underscores the concept of the "atopic march" and the need for holistic allergy care in pediatric patients. Key laboratory findings, allergen sensitisation patterns, and a structured management plan are discussed.

Keywords: *Urticaria, Asthma, Atopy, Pediatric allergy, IgE, Allergen immunotherapy, Omalizumab*

1. Introduction

Urticaria (hives) and asthma are among the most prevalent allergic conditions in childhood, each individually posing significant morbidity. Their co-occurrence, however, presents a complex clinical scenario that demands a thorough diagnostic evaluation and a well-coordinated, multidisciplinary management strategy. The prevalence of asthma in children with chronic urticaria ranges from 20 to 30%, significantly higher than in the general pediatric population, reflecting shared atopic pathophysiology.

Recurrent urticaria in a preschool-aged child demands careful evaluation to distinguish between acute allergic triggers, chronic spontaneous urticaria (CSU), physical urticarias, and urticaria as a manifestation of underlying systemic disease. Similarly, asthma in a young child requires stepwise assessment of severity, trigger identification, and adherence to GINA (Global Initiative for Asthma) guidelines.

2. Case Presentation

2.1 Chief Complaints

A 5-year-old male child, Master Arjun S., was brought by his parents to the Pediatric Allergy Clinic with a 14-month history of recurrent episodes of hives (urticaria) and wheeze. His parents described itchy red welts appearing on his body multiple times per month, often accompanied by episodes of nighttime cough and breathlessness.

2.2 History of Present Illness

Urticaria: Episodes began at age 3 years and 10 months. Welts were raised, erythematous, and intensely pruritic, varying in size from 1 cm to palm-sized lesions. They appeared on the trunk, limbs, and face, resolving spontaneously within 24 hours. He experienced approximately 4-6 episodes per month. No angioedema was noted. Episodes appeared to worsen after certain foods, physical activity, and during upper respiratory infections.

Asthma: Intermittent wheeze and cough for 12 months, predominantly nocturnal. Episodes triggered by exercise, cold air, dust, and viral respiratory infections. Two prior emergency department visits with nebulisation required. No prior diagnosis or controller therapy had been initiated.

2.3 Past History

Eczema (mild) during infancy (age 6-18 months). No prior hospitalisation for respiratory illness. Fully immunised as per national schedule. No history of recurrent infections or failure to thrive.

2.4 Family History

Mother: Allergic rhinitis and mild asthma. Maternal uncle: Eczema. Father: Non-atopic. No family history of immunodeficiency or autoimmune disease.

2.5 Dietary and Environmental History

Family resides in a ground-floor apartment with visible moisture. One pet cat at home. Child consumes cow's milk, eggs, peanuts, wheat, and tree nuts regularly. Parents noted episodes clustering after eating eggs, peanuts, or exposure to the cat. No consistent relationship with any one food was confirmed.

2.6 Physical Examination

Parameter	Findings
Weight / Height	18 kg / 110 cm (50th centile)
Temperature	Afebrile (37.0°C)
Respiratory Rate	24 breaths/min (no distress at presentation)
SpO2	98% on room air
Skin	Multiple urticarial wheals on trunk and arms at presentation; dermographism positive
Respiratory	Mild bilateral expiratory wheeze; no crepitations; hyperresonant percussion note
ENT	Pale nasal mucosa with clear discharge; no polyps
Eyes	Mild bilateral conjunctival injection; Dennie-Morgan lines
Lymph nodes	No lymphadenopathy
Abdomen	No organomegaly

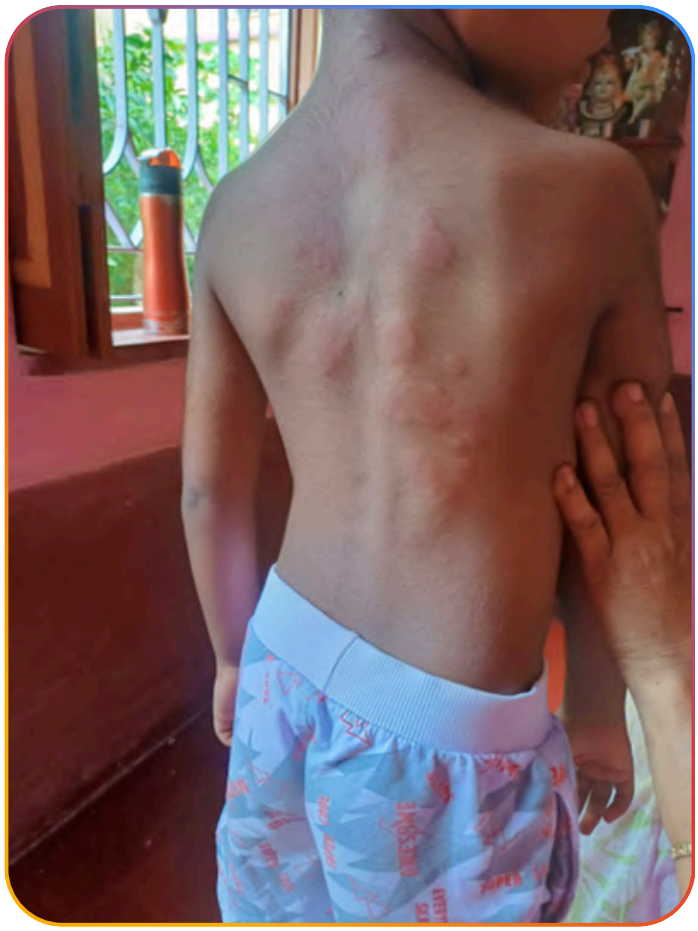


Figure 1: *Urticarial wheals (hives) on the back of the index patient - raised, erythematous, pruritic lesions characteristic of urticaria*

3. Differential Diagnosis

Prior to embarking on investigation, a broad differential was constructed:

For Recurrent Urticaria:

- Acute allergic urticaria (IgE-mediated food or environmental allergen)
- Chronic spontaneous urticaria (CSU)
- Physical urticaria (dermographism, cholinergic, cold-induced)
- Urticaria as part of systemic mastocytosis
- Urticaria secondary to infection (viral, parasitic)
- Urticaria with autoimmune aetiology (anti-FcepsilonRI or anti-IgE antibodies)

For Recurrent Wheeze / Asthma:

- Allergic asthma (atopic)
- Viral-induced wheeze / preschool wheeze
- Anatomic causes (tracheomalacia, vascular ring) - less likely at this age
- Foreign body aspiration
- Bronchiectasis / primary ciliary dyskinesia

4. Laboratory Investigations and Their Role

A structured laboratory workup was undertaken to confirm atopic status, identify specific sensitisations, assess disease severity, and exclude secondary or systemic causes.

4.1 Complete Blood Count with Differential

Test	Result	Significance
Haemoglobin	11.8 g/dL	Mild iron deficiency - common in atopic children
Total WBC Count	9,200/mm3	Within normal limits
Absolute Eosinophil Count (AEC)	820/mm3 (8.9%)	Elevated; supports atopic aetiology; also warrants ruling out parasitic infection
Platelets	2,80,000/mm3	Normal
ESR	18 mm/hr	Normal; systemic inflammation unlikely

Role: Eosinophilia (AEC >500/mm3) is a hallmark of atopic disease. It supports allergic aetiology but parasitic infections (e.g., ascariasis, toxocariasis) must be excluded, particularly when AEC exceeds 1000/mm3.

4.2 Total Serum IgE

Result: Total IgE = 1,240 IU/mL (age-adjusted normal: <200 IU/mL)

Role: Markedly elevated total IgE strongly supports an atopic constitution. Extreme elevations (>2000 IU/mL) may suggest hyper-IgE syndrome or parasitic infestation. Total IgE also guides eligibility for omalizumab therapy (must be between 30-1500 IU/mL for dosing). Serial monitoring of total IgE is useful to track disease activity.

4.3 Specific IgE (Allergen Sensitisation Panel)

Specific IgE (sIgE) testing using ImmunoCAP (serum-based RAST) was performed to identify clinically relevant allergen sensitisations.

Allergen	sIgE (kU/L)	Class	Interpretation
Egg white	8.4	Class 3	Significant sensitisation
Cow's milk	2.1	Class 2	Moderate sensitisation
Peanut	5.7	Class 3	Significant sensitisation
Cat dander (Fel d 1)	12.6	Class 4	High sensitisation
House dust mite (Der p 1)	18.2	Class 4	High sensitisation
Cockroach	3.4	Class 2	Moderate sensitisation
Wheat	0.8	Class 1	Low/equivocal
Tree nut mix	1.2	Class 1	Low/equivocal

Role: Specific IgE testing identifies IgE-mediated sensitisations guiding avoidance advice and allergen immunotherapy (AIT) candidacy. However, sensitisation does not equal clinical allergy - correlation with history is mandatory. Component-resolved diagnostics (CRD) may be used for peanut (Ara h 2) to assess true anaphylaxis risk.

4.4 Skin Prick Test (SPT)

Skin prick testing was performed with a standardised panel of allergens. Results correlated strongly with sIgE findings: positive for house dust mite (HDM), cat dander, egg, and peanut. Dermographism was accounted for using a saline negative control.

Role: SPT is the gold standard for identifying IgE-mediated sensitisations. It is preferred over serum sIgE as a first-line test in many centres due to its immediacy and cost-effectiveness. It is contraindicated during acute urticaria or within 72 hours of antihistamine use.

4.5 Spirometry and Lung Function Tests

Spirometry (pre- and post-bronchodilator): FEV1/FVC ratio 72% (borderline obstructive pattern). Post-bronchodilator improvement in FEV1 of 18% (significant bronchodilator reversibility, confirming asthma diagnosis).

Peak expiratory flow rate (PEFR): Variability >20% over 2-week diary - consistent with asthma.

Role: Spirometry confirms the diagnosis of asthma, assesses severity, and monitors response to therapy. In children under 5 years who cannot reliably perform spirometry, clinical criteria and trial of therapy are used. PEFR diaries help identify triggers and circadian patterns.

4.6 Fractional Exhaled Nitric Oxide (FeNO)

Result: FeNO = 42 ppb (elevated; normal <25 ppb in children)

Role: Elevated FeNO is a biomarker of eosinophilic airway inflammation and T2 (Th2-driven) asthma. It predicts steroid responsiveness and helps in selecting biologic therapy. Serial FeNO monitoring guides inhaled corticosteroid (ICS) dose adjustments.

4.7 Additional Investigations

Test	Result	Role / Comment
Antinuclear Antibody (ANA)	Negative	Excludes autoimmune urticaria / SLE
Anti-thyroid peroxidase (Anti-TPO)	Negative	Excludes autoimmune thyroiditis-associated urticaria
Complement C3/C4	Normal	Rules out hereditary angioedema / complement pathway defect
Stool for ova and parasites	Negative	Excludes parasitic infestation causing eosinophilia and urticaria
Serum tryptase	4.2 ng/mL (normal)	Rules out systemic mastocytosis (elevated if >20 ng/mL at baseline)
Chest X-ray	Mild hyperinflation, no infiltrates	Consistent with asthma; rules out structural pathology
Liver / Renal Function	Normal	Baseline before pharmacotherapy; rules out systemic disease
IgG, IgA, IgM levels	Normal	Rules out immunodeficiency (important if recurrent infections present)

5. Final Diagnosis

1. Chronic Spontaneous Urticaria (CSU) with IgE-mediated food sensitisation (egg, peanut) - contributory triggers
2. Moderate Persistent Allergic Asthma - sensitised to HDM and cat dander (primary aero-allergen drivers)
3. Concomitant Allergic Rhinoconjunctivitis

The overall picture is consistent with the atopic march - sequential or concurrent development of atopic dermatitis, food allergy, allergic rhinitis, and asthma - driven by IgE-mediated, Th2-skewed immune dysregulation.

6. Management

6.1 Environmental Control and Allergen Avoidance

- House dust mite reduction: Allergen-impermeable covers for mattress and pillows; weekly washing of bedding in hot water (>55 degrees C); HEPA air purifiers in bedroom.
- Cat removal from home: Parents counselled on cat rehoming given high-level cat dander sensitisation. Temporary measures: HEPA filtration, restricting cat from bedroom, thorough cleaning of soft furnishings.
- Food avoidance: Strict avoidance of egg and peanut. Dietitian referral for nutritional counselling and label reading education. Auto-injectable epinephrine (adrenaline) prescription given for peanut sensitisation given risk of anaphylaxis.
- Cockroach control: Sealing entry points, appropriate pest management, avoiding moisture accumulation.

6.2 Pharmacological Management of Urticaria

Management follows EAACI/WAO/BSACI guidelines for chronic urticaria in children:

Step	Treatment	Dose	Comment
Step 1	Cetirizine (2nd generation H1 antihistamine)	5 mg once daily (wt-based)	First-line; non-sedating; safe for long-term use
Step 2	Up-dosing cetirizine (up to 4x standard dose)	Titrated under supervision	Guideline-approved for inadequate response
Step 3	Omalizumab (anti-IgE biologic)	150-300 mg SC q4 weeks	Approved for CSU in patients 12 years+; off-label use considered in younger children; also dual benefit for asthma
Rescue	Short course oral prednisolone	1 mg/kg/day x 5-7 days	For acute severe flares only; not for long-term use

6.3 Pharmacological Management of Asthma

Asthma management follows GINA 2024 stepwise approach. At diagnosis, child had moderate persistent asthma (Step 3):

- Short-acting beta-2 agonist (SABA): Salbutamol via metered-dose inhaler (MDI) + spacer, 2-4 puffs PRN for acute symptoms.
- Inhaled Corticosteroid (ICS): Fluticasone propionate 100 mcg BD via MDI + spacer - controller therapy.
- Leukotriene receptor antagonist (LTRA): Montelukast 4 mg once daily at night - added given allergic rhinitis and urticaria (triple benefit in all three conditions).
- Inhaler technique and spacer training: Conducted in clinic with written instructions.
- Written Asthma Action Plan (WAAP): Provided to parents with green/amber/red zone instructions.
- Trigger avoidance: Emphasis on HDM and cat allergen reduction, avoidance of cold air exposure, early treatment of viral respiratory infections.

6.4 Management of Allergic Rhinoconjunctivitis

- Intranasal corticosteroid spray (mometasone furoate 50 mcg per nostril once daily).
- Topical antihistamine eye drops for conjunctival symptoms PRN.
- Saline nasal irrigation once or twice daily.

6.5 Allergen Immunotherapy (AIT)

Given high-level HDM sensitisation as the primary driver of both asthma and rhinitis, the child was considered a candidate for allergen immunotherapy (AIT) after 6-12 months of pharmacotherapy optimisation. AIT may be delivered via subcutaneous immunotherapy (SCIT) or sublingual immunotherapy (SLIT). SLIT is available in two formulations: sublingual drops (allergen extract in liquid form placed under the tongue), which are suitable for younger children including those under 5 years of age and are generally easier to administer; and sublingual tablets (lyophilised allergen in a fast-dissolving tablet format), which are typically reserved for older children and adults. The choice of formulation is guided by the child's age, allergen availability, compliance, and local regulatory approvals. AIT offers potential disease modification, reducing allergen threshold, decreasing medication burden, and potentially preventing new sensitisations.

- Decision deferred pending assessment of adherence to environmental controls and pharmacotherapy over next 6 months.
- If asthma remains partially controlled or escalates to Step 4, HDM sublingual immunotherapy drops (for younger children) or sublingual tablets (for older children/adults) or SCIT (where available for paediatrics) to be initiated based on age and local availability.
- Peanut oral immunotherapy (OIT) discussed as a future option given Ara h 2-positive peanut sensitisation; referred to a specialised OIT programme.

6.6 Omalizumab Consideration

Given the dual diagnosis of CSU and moderate-severe allergic asthma with inadequate antihistamine response, omalizumab (anti-IgE monoclonal antibody) was discussed. Its dual indication makes it particularly attractive in this phenotype. Formal eligibility assessment (weight-based IgE dosing chart) confirmed suitability for body weight 18 kg and IgE 1,240 IU/mL. Initiation was planned at 6-month review if Step 3 asthma therapy and Step 2 urticaria therapy proved inadequate.

6.7 Patient and Family Education

- Allergen avoidance strategies, anaphylaxis action plan, and auto-injectable adrenaline training.
- Importance of daily controller therapy versus rescue therapy explained using the "preventer vs reliever" analogy.
- Eczema skin care (emollients) reinforced to manage residual dry skin.
- School notification letter prepared; nurse-administered salbutamol plan coordinated with school.

7. Follow-up Plan and Monitoring

Timepoint	Assessment
4 weeks	Urticaria diary review; assess antihistamine response; review inhaler technique
3 months	Spirometry; asthma control test (C-ACT score); urticaria activity score (UAS7); FeNO repeat
6 months	Comprehensive review; step-up or step-down therapy; AIT candidacy re-assessment; total IgE repeat; consider omalizumab if criteria met
12 months	Full allergy review; assess for tolerance development (egg bake challenge if sIgE declining); growth and nutrition assessment
Ongoing	Trigger diary; environmental control review; school liaison; psychosocial impact assessment; transition planning

8. Discussion

This case exemplifies the concept of the atopic march - the natural progression or co-existence of atopic conditions - in a child with a strong family history of atopy. The fundamental underlying pathology is dysregulation of the Th2 immune response, leading to elevated IgE, eosinophilia, and mast cell activation across multiple organ systems.

Recurrent urticaria in childhood is challenging to classify. While acute urticaria (<6 weeks) is most often IgE-mediated and food-triggered, chronic urticaria (>6 weeks) in children is more often spontaneous than truly allergic. In this case, the episodic nature, correlation with egg and peanut ingestion, and elevated specific IgE to these foods suggested food allergen as a contributory (though not sole) trigger superimposed on a background of CSU. This distinction has important therapeutic implications: food avoidance addresses one trigger layer, while antihistamine therapy addresses the underlying spontaneous component.

The role of aero-allergens (HDM, cat dander) in asthma and rhinitis cannot be overstated. In a home environment with both a cat and moisture, reduction of these exposures forms the foundation of management. Pharmacotherapy alone, without environmental control, yields suboptimal outcomes.

Montelukast occupies a valuable role in this case as a single agent with demonstrated benefit across three conditions: asthma (bronchospasm prevention), allergic rhinitis (nasal congestion, sneezing), and urticaria (through CysLT1 receptor antagonism on mast cells). Its once-daily dosing and good safety profile in children make it an appealing adjunct. However, prescribers must be aware of the FDA black-box warning regarding neuropsychiatric effects (behavioral changes, nightmares, suicidal ideation) and counsel families accordingly.

FeNO as a biomarker guided the choice of ICS therapy and confirmed eosinophilic airway inflammation. Serial FeNO monitoring will inform future step-up or step-down decisions, reducing both under-treatment and over-treatment. This personalized biomarker-guided approach represents the modern standard of asthma care.

Omalizumab (anti-IgE) represents the most elegant therapeutic option for this phenotype given its mechanism of action: binding free IgE, downregulating FcepsilonRI expression on mast cells and basophils, and thereby blunting both the early and late phase allergic responses. Its regulatory approval for CSU (12 years+) and moderate-severe allergic asthma (6 years+) makes it a compelling dual-indication biologic in this case. The IgE level (1,240 IU/mL) falls within the approved dosing range for asthma.

Allergen immunotherapy, through subcutaneous or sublingual routes, remains the only treatment capable of modifying the underlying disease process. By inducing allergen tolerance, AIT can reduce asthma symptom burden, decrease medication requirements, and potentially prevent sensitisation to new allergens. Current guidelines recommend HDM-AIT in children with documented HDM-driven allergic rhinitis and/or asthma when symptoms are inadequately controlled by pharmacotherapy.

9. Key Learning Points

- Recurrent urticaria and asthma frequently co-exist as manifestations of the atopic march and share common Th2/IgE-mediated pathophysiology.
- A structured allergy workup including total IgE, specific IgE, skin prick testing, FeNO, and spirometry is essential to guide diagnosis and management.
- Eosinophilia must prompt exclusion of parasitic infestation before attributing it solely to atopy.
- Chronic spontaneous urticaria is managed stepwise with non-sedating H1 antihistamines as first-line therapy; food allergen avoidance addresses only one component.
- Asthma management must be stepwise, biomarker-guided (FeNO), and accompanied by a written action plan.
- Montelukast offers triple benefit in urticaria, asthma, and allergic rhinitis but requires neuropsychiatric risk counselling.
- Omalizumab is a highly appropriate biologic in patients with overlapping CSU and allergic asthma with elevated IgE.
- Allergen immunotherapy is the only disease-modifying treatment and should be considered in all patients with significant aero-allergen sensitisation driving both asthma and rhinitis.
- Environmental control - particularly HDM and pet allergen reduction - forms the non-negotiable foundation of all management strategies.
- Education of family, school, and caregivers is as critical as pharmacotherapy in achieving long-term outcomes.

10. Conclusion

This case of a 5-year-old boy with recurrent urticaria and moderate persistent allergic asthma demonstrates the complexity and interconnectedness of atopic diseases in childhood. A systematic, evidence-based approach - combining thorough history-taking, targeted laboratory investigations, structured pharmacotherapy, allergen avoidance, and a pathway towards disease-modifying allergen immunotherapy - is essential to achieve optimal outcomes. The role of biological therapy (omalizumab) offers exciting prospects for children with overlapping atopic phenotypes who are inadequately controlled on standard therapy. Early, holistic allergy care in childhood may alter the trajectory of atopic disease and improve long-term quality of life.

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Nasal Sprays

A Clinical Overview

Drugs when used topically are more efficacious and with fewer side effects. Nasal sprays are used for rhinitis — Allergic rhinitis or Nonallergic rhinitis.

Dr Mitesh Kakkar

Pharmacotherapeutic Drugs Available as Nasal Spray

1. Saline Nasal Spray

It is isotonicsaline (sodium chloride0.74% w/v) used to wash away excess mucus, irritants, and allergen particles in the nasal cavity. It improves mucociliary clearance of the nasal mucosa.

- Enhances the effectiveness of INS.
- Safe for use in children >2 years.

2. Intranasal Steroids (INS)

Intranasal corticosteroids are the mainstay of treatment for persistent and intermittent moderate-severe allergic rhinitis. They are effective against both early and late phase mediators and also inhibit influx of basophils and eosinophils. They cause down-regulation of inflammatory mediators and leukotrienes IL-4, IL-5, IL-13.

- Action starts within hours, with maximum action in 2 weeks.
- Least systemic bioavailability — safe for long-term use.
- Also effective for treatment of nonallergic rhinitis.

Different INS Available in India

Drug	Age	Dose
Mometasone furoate 50 mcg/spray	2–12 years >12 years	One spray OD Two sprays OD
Fluticasone furoate 27.5 mcg/spray	2–12 years >12 years	One spray OD Two sprays OD
Fluticasone Propionate 50 mcg/spray	4–12 years >12 years	One spray OD Two sprays OD

Technique
Proper nasal spraytechnique is essential for optimal drug delivery and to minimizecomplications. Patients should be counselled on correct administration to ensure efficacy and safety.

Complications / Side Effects
- Local irritation is experienced in 10% of patients.
- Septal perforation and epistaxis are rare complications associated with wrong technique.

3. Intranasal Antihistaminics
Azelastine and Olopatadine are the two antihistamines available in combination with INS. They have a very rapid onset of action within 15–20 minutes and are to be used when symptoms are severe or on demand.
- Intranasal azelastine: for children >6 years.
- Olopatadine is not available in India.

Side Effect: Azelastinehas a bitter taste and causes drynessof nasal mucosa;should not be used long-term.

4. Anticholinergic Nasal Spray
Useful only when rhinorrhea is the prominent symptom, mainly gustatory rhinorrhea or due to cold exposure. Ipratropium bromide is used without causing systemic side effects.

5. Nasal Decongestants
Oxymetazoline or xylometazoline relieves nasal congestion quickly but has no effecton other symptoms. Should be used for acute severenasal blockage in viral rhinitisand a few patients of allergic rhinitis. Should not be used for >7 days — risk of rhinitis medicamentosa.

6. Mast Cell Stabilizer
Intranasal cromolyn sodium 4% is used as a mast cell stabilizer. Best used before onset of symptoms, to be used 4–6 hourly (poor compliance). Helps relieve sneezing but has no effect on other symptoms.
- Safe for children and pregnant women.

Comparative Efficacy of Nasal Spray Drugs

Drug Class	Sneezing	Itching	Congestion	Rhinorrhoea	Eye Symptoms
Corticosteroids	+++	+++	+++	+++	++
Antihistaminics	++	++	+	++	-
Decongestants	-	-	+++	-	-
Mast cell stabilizer	+	+	+	+	-
Anticholinergic agents	-	-	-	++	-

Patient Information Leaflet for Holi

Holi is a festival of joy and colors, but safety should always come first—especially for children. Synthetic colors may contain harmful chemicals that can irritate the skin, eyes, and respiratory system.

Dr Kaushik Chakraborty

General Safety Tips

- Use natural or herbal colors whenever possible.
- Dress children in full-sleeve cotton clothes and protective sunglasses.
- Apply coconut oil or moisturizer on skin and hair before playing.
- Encourage adequate hydration and avoid street food.
- Do not allow children to throw colors directly at the face.

For Children with Asthma

Color dust and Holika smoke can trigger wheezing or cough. Ensure regular controller medications are continued. Keep the rescue inhaler accessible. Avoid crowded and smoky areas.

For Children with Allergic Rhinitis

Synthetic colors may cause sneezing, nasal blockage, and itching. Using a mask outdoors and saline nasal wash after returning home can help reduce symptoms.

For Children with Eczema

Apply a thick moisturizer before playing. Wash gently with lukewarm water afterward and reapply moisturizer immediately. Avoid harsh soaps and vigorous scrubbing.

For Children with Urticaria

Heat and chemicals may trigger hives. Stop exposure if itching or swelling appears. Give prescribed antihistamines if advised by your doctor.

For Children with Food Allergy

Avoid unknown sweets or snacks. Always check ingredients carefully. Carry prescribed emergency medicines when attending gatherings.

⚠️ **Seek medical help urgently if your child develops breathing difficulty, severe rash, eye injury, or facial swelling.**

With simple precautions, Holi can remain colorful, safe, and enjoyable for every child.

Webinar Update

Each months webinar will focus on one of the state chapters : This months focus was on the WB chapter
Topic: Allergy Facts vs Myths
Presented below are the key points of the webinar summarised
For the full webinar visit www.youtube.com/@PAAI-IAP

Dr Bholanath Aich
Consultant Pediatrician & Pediatric Allergologist
Assistant Professor, Department of Pediatrics, Murshidabad Medical College & Hospitals

1. MYTH: Allergy, hypersensitivity and atopy are the same things
Verdict: FALSE

- Allergy is the clinical manifestation of abnormal/excessive response to an allergen in susceptible individuals at doses harmless to normal people.
- Hypersensitivity involves reproducible signs/symptoms from exposure to a defined stimulus tolerated by normal individuals — can be immunologically or non-immunologically mediated.
- Atopy is a personal or familial tendency to produce IgE antibodies in response to low-dose allergens and develop typical allergic symptoms.

2. MYTH: All allergy is IgE mediated
Verdict: PARTIALLY TRUE

- Immune reactions may be IgE mediated (Type 1) or non-IgE mediated (Types 2–4 and eosinophilic diseases).
- Non-IgE and mixed IgE reactions are typically T-cell mediated and occur 4–48 hours after allergen exposure.
- IgE-mediated conditions include allergic rhinitis, asthma, and urticaria — amenable to SPT, specific IgE, immunotherapy, and biologics.
- Non-IgE mediated examples include FPIES and FPIAP; mixed IgE examples include eosinophilic esophagitis.

3. MYTH: Elevated total serum IgE is a must for diagnosing allergy
Verdict: FALSE

- A raised total IgE does not diagnose an allergic disorder and should never be used in isolation for specialist referral.
- Elevated total IgE is common but not diagnostic — atopy can be confirmed from history alone.

- Very high IgE (>1000) is common in eczema; high levels also occur in Hyper IgE Syndrome, HIV, lymphoma, parasitosis, and even tuberculosis.
- A normal total IgE does not exclude an allergic disorder. Total IgE adds little to clinical history in most settings.
- Total IgE is important in: ABPA, allergic fungal sinusitis, Hyper IgE Syndrome, and clonal IgE disorders.

4. MYTH: Absolute eosinophil counts (AEC) are a must in allergy diagnosis
Verdict: PARTIALLY TRUE

- Peripheral blood eosinophilia (>500/μL) can be caused by allergic, infectious, inflammatory, or neoplastic disorders.
- Combined elevation of total serum IgE AND AEC is a dependable marker for allergy.
- Raised AEC can serve as a prognostic marker for determining duration of therapy in allergic rhinitis.

5. MYTH: We should do an allergy profile immediately
Verdict: ABSOLUTELY NOT

- An allergy profile detects sensitization — it is not a standalone diagnostic tool.
- Most commercially available ELISA-based assays are now considered obsolete.
- History is paramount: identify allergens that match the history, are reproducible, and correlate clinically.
- Tests should only be ordered based on a strong clinical suspicion, and history should be re-evaluated once results are available.

6. MYTH: We need to stop all foods that can cause allergy after urticaria
Verdict: FALSE

- No food is universally allergenic. IgE-mediated food urticaria typically occurs within 30 minutes to 4 hours of ingestion.
- Keep an event or food diary to identify triggers. Food colours, taste enhancers, and preservatives may be the real culprits.
- Stop suspected foods for 2–4 weeks, then perform SPT, specific IgE assay, or an oral food challenge in an allergist's clinic.

7. MYTH: Any bad reaction to a drug is allergy
Verdict: FALSE

- Most adverse drug reactions are non-immunological. True drug allergy (immune-mediated) accounts for only 5–10%.
- A true allergic reaction involves immune responses such as hives, itchy rash, or anaphylaxis.
- Most allergic drug reactions occur within hours to two weeks after re-exposure (sensitization phase).
- Colouring agents, preservatives, and impurities in suspensions/syrups can also cause adverse reactions.
- Allergy to a specific drug (e.g., paracetamol) is not inherited — only the tendency to develop allergy is familial.

8. MYTH: Epinephrine is dangerous — give antihistamines instead in anaphylaxis
Verdict: FALSE
Intramuscular epinephrine is the first-line drug in anaphylaxis — it is safe, life-saving, and highly effective.
It is often underused due to fear or failure to recognize severe symptoms.
Antihistamines only help with skin conditions (hives) and should never delay the use of epinephrine.

9. MYTH: If you are allergic to a cat, you can keep a dog — it is hypoallergenic
Verdict: PARTIALLY TRUE
No dog is truly 100% hypoallergenic.
Cat allergen (Fel d 1) is different from dog allergen (Can f 1) — you may be allergic to one but not the other.
However, cat allergens may cross-react with some dog antigens (Rfel d 2, Rfel d 4, Rfel d 7).
Recommended steps: Get tested, have a trial exposure, and consider 'hypoallergenic' breeds.

10. MYTH: Food allergy: once allergic, always allergic
Verdict: FALSE
Most children outgrow allergy to milk, wheat, soy, and egg — 80–90% resolve by age 5–6 and up to 95% by age 16.
Peanut, tree nut, fish, and shellfish allergies are less likely to resolve — only ~20–25% of peanut allergies disappear by age 8.
Decrease in specific IgE levels (monitored by an allergist) suggests an allergy may be resolving.
Always confirm resolution via an Oral Food Challenge (OFC) with a certified allergist — never test at home.

11. MYTH: Restricting allergenic foods during pregnancy prevents allergy in the baby
Verdict: FALSE
No evidence supports maternal dietary restriction during pregnancy or lactation for preventing food allergies.
A diverse, balanced maternal diet may promote immune tolerance in the fetus.
Maternal peanut consumption has shown a potential protective effect against peanut allergy development.
Restriction of specific allergenic foods in pregnancy/lactation does not confer protection (doi.org/10.1111/pai.13496).

12. MYTH: A small amount of an allergenic food won't hurt
Verdict: FALSE
Even trace amounts of a food allergen can trigger severe anaphylaxis in some individuals.
The allergenic food must be completely removed from the diet.
Cross-contact (accidental touching of safe and allergenic foods) is just as dangerous as direct ingestion.

13. MYTH: A positive allergy test means you have a food allergy
Verdict: FALSE

- Positive skin prick or blood test results are not always accurate and can produce false positives.
- An Oral Food Challenge (OFC) is the gold standard and should be conducted by a board-certified allergist.
- OFC involves supervised consumption of the suspected allergen in a controlled clinical setting.

14. MYTH: No reaction within 30 minutes means you won't react at all
Verdict: FALSE

- Symptoms can start within seconds but may take up to 2 hours to appear.
- Biphasic reactions can occur 1–48 hours after initial symptoms resolve — even without re-exposure and after treatment.

15. MYTH: My child never ate shrimp, so how can he test positive for shrimp?
Verdict: EXPLAINED

- Inhaled house dust mite (HDM) allergens can act as the primary sensitizer — triggering cross-reactive responses to shrimp.
- The shared protein, tropomyosin, is a major allergen in both HDM and shrimp; IgE against mite tropomyosin can cross-react with shrimp tropomyosin.
- Cross-sensitization (positive test) is common but does not always mean a clinical reaction will occur — risk is higher in humid climates.

16. MYTH: Eating banana causes allergy and cold
Verdict: FALSE

- Banana contains diamine oxidase which may cause histamine intolerance symptoms — but this is uncommon and does not warrant banana avoidance.
- True banana allergy occurs in only 0.1–1.2% of allergic patients.
- Some patients with birch allergy may develop oral pollen-food allergy syndrome after eating banana.

17. MYTH: Delay egg, fish, and peanut in complementary feeding to reduce food allergy
Verdict: FALSE

- The LEAP study showed only 3% of infants who regularly consumed peanut products developed allergy by age 5, vs 17% in the avoidance group.
- LEAP-On confirmed this tolerance persisted even after 12 months of subsequent peanut avoidance.
- The STAR study and EAT, STEP, BEAT, and PETIT trials all support early introduction of allergenic foods.
- Early introduction is particularly beneficial for high-risk infants with severe eczema or egg allergy.

18. MYTH: If allergic to cow's milk, goat's milk or soy milk is safe
Verdict: FALSE

- Monoclonal antibodies against cow's milk proteins cross-react with most mammalian milk proteins.
- Only mare's and donkey's milk show weak cross-reactivity.
- A major soy allergen (Gly m Bd 30k/P34) cross-reacts with bovine casein — approximately 10% of cow's milk allergic patients are also allergic to soy.
- Most substitutes are also not nutritionally adequate.

19. MYTH: Short courses of oral corticosteroids (OCS) are safe to give frequently
Verdict: FALSE

- Individuals prescribed 4 or more courses of OCS are at significantly higher risk (OR 1.29) of adverse events in the first year.
- Risks include osteoporosis, hypertension, obesity, type 2 diabetes, and GI bleed/ulcers — with additive effects on further courses.

20. MYTH: Nebulisation is more effective than inhaler therapy
Verdict: FALSE

- MDIs with a spacer are as effective as or better than nebulizers for treating children with acute asthma/wheezing.
- MDIs with spacers are more portable, lower cost, faster to administer, and reduce side effects and heart rates.
- They also decrease emergency department stay times.
- The main advantage of a nebulizer is drug delivery without requiring the child's active cooperation.

21. MYTH: Skin Prick Test (SPT) is painful and risky
Verdict: FALSE

- SPT carries a very low anaphylaxis risk (<0.02%) and is very safe in trained hands using a 1mm lancet.
- A positive SPT has ~50% reliability; a negative SPT has ~95% predictive value.
- Local itch or reactions are easily managed with oral antihistamines. SPT is the investigation of choice for most allergic conditions.

22. MYTH: Allergen immunotherapy is quackery
Verdict: FALSE

- Allergen Immunotherapy (AIT) is highly effective — 80–90% of patients experience noticeable benefit.
- It is the only long-term, disease-modifying treatment for allergic rhinitis, asthma, and insect venom allergy.
- AIT can prevent development of new allergies and asthma, and benefits often last years after treatment stops.
- Treatment generally requires 3–5 years of consistent commitment. Most effective for pollen, dust mites, and venom.

Each month's webinar will focus on one if the state chapters. This month's webinar was on Allergy Facts vs Myths. Presented below are the key points of the webinar. For the full webinar, visit http://www.youtube.com/@PAAI-IAP

History and Evolution of Allergen Immunotherapy

From Empiricism to Precision Immune Vaccination

Dr Neeraj Gupta
Chairperson, IAP Allergy and Applied Immunology Chapter (2025)

Allergy Vaccination—A Century-Old Concept with a Future Yet to Be Realized

Allergen Immunotherapy (AIT) stands as one of the most remarkable translational success stories in clinical immunology. Long before monoclonal antibodies, biologics, and precision medicine entered the therapeutic lexicon, allergen immunotherapy offered a bold concept: **treating disease by retraining the immune system rather than suppressing it.** More than a century later, AIT remains the **only disease-modifying therapy for allergic diseases,** capable of inducing sustained clinical remission and altering the natural history of allergy.

Yet, despite this legacy, AIT is paradoxically underutilized, misunderstood, and unevenly accessible—especially in low- and middle-income countries (LMICs). Understanding its historical evolution is essential not merely as a retrospective academic exercise, but as a compass for the future of precision immune modulation in allergy and beyond.

Introduction of Allergen Immunotherapy: The Visionary Legacy of Noon and Freeman (Early 20th century – History in making)

From empirical desensitization to the dawn of immune tolerance
how two pioneers reshaped the destiny of allergic diseases

A Century-Old Experiment That Changed Allergy Forever

At the dawn of the 20th century, allergic diseases were poorly understood, often dismissed as trivial seasonal ailments, and largely untreatable beyond symptomatic relief. In this scientific vacuum, two visionary British physicians—**Leonard Noon and John Freeman**—laid the foundation for what would become **allergen immunotherapy (AIT)**, one of the most transformative interventions in clinical immunology.

Their pioneering work in 1911 marked the **birth of immunotherapy in allergy**, predating the discovery of IgE, cytokines, T cells, and modern immunology by decades. What began as a bold clinical experiment has now evolved into a scientifically validated, disease-modifying, and potentially preventive therapy.

Leonard Noon: The Pioneer Who Asked the Right Question

Leonard Noon, a physician and bacteriologist at St. Mary's Hospital in London, was intrigued by the seasonal misery experienced by patients with hay fever. At a time when vaccines for infectious diseases were emerging, Noon hypothesized that **allergy might be modulated by controlled exposure to the offending allergen**, similar to how vaccines induced immunity to pathogens.

In 1911, Noon published a landmark paper titled *"Prophylactic Inoculation Against Hay Fever"* in The Lancet. In this paper, he described the **subcutaneous administration of grass pollen extracts in gradually increasing doses** to patients with hay fever. His results demonstrated a reduction in symptoms and improved tolerance to pollen exposure.

This was the **first recorded systematic attempt to modify allergic disease using antigen-specific immune modulation.**

Noon's work was revolutionary for several reasons:

- He conceptualized allergy as an immunologically modifiable condition.
- He introduced graded allergen exposure as a therapeutic strategy.
- He laid the foundation for antigen-specific immune tolerance decades before immunological mechanisms were understood.

Tragically, Leonard Noon died prematurely from tuberculosis, cutting short what could have been an even more prolific scientific career. Yet, his visionary hypothesis lived on.

John Freeman: The Clinician Who Translated Vision into Practice

John Freeman, a close colleague of Noon, carried forward and expanded this pioneering work. Freeman refined the methodology, standardized pollen extracts, and conducted extensive clinical studies on allergen inoculation.

Freeman's contributions were crucial in transforming Noon's experimental concept into a **reproducible clinical therapy**. He introduced:

- Systematic dosing schedules
- Maintenance therapy protocols
- Clinical outcome assessments
- Long-term follow-up observations

Freeman also recognized the importance of **extract standardization**, an issue that remains central to immunotherapy practice even today.

Together, Noon and Freeman created what is now known as **subcutaneous allergen immunotherapy (SCIT)—**a therapy that has withstood scientific scrutiny for over a century.

From Empiricism to Immunology: Understanding What Noon and Freeman Could Not

When Noon and Freeman conducted their experiments, the immune system was a black box. The discovery of IgE would not occur until 1967, and the concepts of T cells, cytokines, and immune tolerance were unknown.

Yet, their clinical observations were remarkably prescient.

Modern immunology has revealed that AIT works by:

- Inducing allergen-specific IgG4 "blocking antibodies"
- Suppressing Th2-driven allergic inflammation
- Inducing regulatory T cells (Tregs) that promote immune tolerance
- Modifying dendritic cell function and allergen presentation
- Creating long-lasting immune memory through epigenetic reprogramming

In essence, Noon and Freeman had unknowingly initiated **the first therapeutic immune reprogramming strategy in medicine.**

This was followed by Clowes' ragweed pollen vaccination experiments and early observations that serum from immunized individuals could suppress allergic reactions—hinting at the concept of "blocking antibodies." By the 1930s, alum-adsorbed allergen extracts were introduced to enhance immunogenicity, foreshadowing the modern concept of vaccine adjuvants.

These early decades were characterized by **clinical empiricism.** Investigators observed clinical benefit without understanding immunological mechanisms. Yet, these experiments represented one of the earliest attempts in medicine to deliberately induce immune tolerance—a concept that modern immunotherapy and cancer immunology would later embrace.

The Immunological Era: Discovery of IgE and Mechanistic Insights (1950s–1980s)

The mid-20th century marked a turning point with the discovery of IgE antibodies by Ishizakas and Johansson & Bennich in the 1960s. This discovery transformed allergy from a mysterious hypersensitivity reaction into a defined immunological pathway.

Subsequent decades witnessed pivotal milestones:

- The first double-blind placebo-controlled immunotherapy trial in 1954.
- Demonstration of allergen-specific IgG "blocking antibodies."
- Long-term studies showing reduction in asthma development and sustained benefit after discontinuation of therapy.

These studies firmly established AIT as a **disease-modifying immune intervention,** not merely symptomatic therapy.

These studies firmly established AIT as a **disease-modifying immune intervention**, not merely symptomatic therapy.

Importantly, pediatric studies demonstrated that immunotherapy could prevent the progression of allergic rhinitis to asthma, introducing the concept of **secondary prevention in allergic disease**—a paradigm that remains highly relevant today.

The Hygiene Hypothesis and the Rationale for Immune Re-education

Parallel to the evolution of AIT, the late 20th century witnessed the emergence of the **hygiene hypothesis**, suggesting that reduced microbial exposure in early life may predispose individuals to allergic diseases. The hypothesis proposed that microbial exposures shape immune maturation and that early-life exposures could protect against allergy development.

Subsequent epidemiological studies demonstrated that farm exposure, endotoxin-rich environments, and diverse microbiota were associated with lower allergy prevalence.

This concept profoundly influenced the philosophical foundation of AIT. If allergy is a failure of immune tolerance, then AIT represents **artificially engineered microbial exposure—an immune education strategy designed by clinicians**.

Thus, AIT can be viewed as a **therapeutic surrogate for nature's lost immunological training**, bridging the gap created by modern urban lifestyles.

Early Innovations in Delivery and Formulations

By the 1980s and 1990s, researchers explored alternative routes of administration to improve safety and adherence. Sublingual immunotherapy (SLIT) emerged as a promising modality, followed by oral immunotherapy (OIT) for food allergies.

These developments reflected a shift toward **patient-centric immunotherapy**, aiming to improve safety, compliance, and real-world feasibility.

Simultaneously, modified allergen extracts (allergoids), peptide immunotherapy, and DNA vaccines were explored, signaling the transition from crude extracts to molecularly defined immunotherapeutics.

Table 1. Key Historical Milestones in Allergen Immunotherapy

Year	Milestone
1911	First pollen desensitization (Leonard Noon)
1954	First double-blind placebo-controlled AIT trial
1966–67	Discovery of IgE antibodies
1999	Long-term benefit demonstrated after stopping AIT
2002	Prevention of allergic rhinitis progression to asthma
2004–2018	Recombinant allergens, DNA vaccines, and peptide immunotherapy
2012	Intralymphatic immunotherapy (ILIT) introduced
2020s	Nanoparticles, adjuvants, and precision molecular AIT

Mechanistic Evolution – Understanding How Immunotherapy Works

From Desensitization to Immune Tolerance

For decades, allergen immunotherapy (AIT) was viewed as a mere process of **gradual desensitization**—a pharmacological phenomenon where increasing allergen doses reduced clinical symptoms. However, with advances in immunology, AIT is now recognized as **the only disease-modifying therapy in allergy**, capable of inducing **long-term immune tolerance**.

The mechanistic evolution of AIT understanding has followed three major phases:

1. The IgE-Centric Era (1900s–1970s)
Early allergy science revolved around IgE, mast cells, and histamine release. AIT was thought to simply reduce mast cell reactivity and allergen-specific IgE levels.

2. The Regulatory T Cell Revolution (1980s–2000s)
The discovery of **regulatory T cells (Tregs)** transformed AIT biology. Studies demonstrated that AIT induces:

- IL-10 and TGF-β producing Tregs
- Shift from Th2 to Th1 immune response
- Suppression of allergen-specific IgE
- Increase in allergen-specific IgG4 "blocking antibodies"

3. The Immune Network Era (2000s–present)

Modern research shows that AIT induces a **systems-level immune reprogramming,** affecting:

- Innate immune cells (dendritic cells, ILC2s)
- Epigenetic immune memory
- Microbiome interactions
- Neuro-immune pathways

This explains why AIT benefits persist years after discontinuation—something no pharmacotherapy can achieve.

Table 2. Immunological Changes Induced by Allergen Immunotherapy

Immune Component	Effect of AIT	Clinical Relevance
Allergen-specific IgE	Initial rise then decline	Reduced hypersensitivity
Allergen-specific IgG4	Significant increase	Blocking antibody effect
Regulatory T cells	Increased IL-10, TGF-β	Immune tolerance
Th2 cytokines (IL-4, IL-5, IL-13)	Decrease	Reduced eosinophilia
Th1 cytokines (IFN-γ)	Increase	Immune deviation
Mast cells & basophils	Reduced activation	Symptom reduction

Evolution of Routes: From Needles to Drops and Beyond

Subcutaneous Immunotherapy (SCIT): The Gold Standard

SCIT has remained the cornerstone of AIT for over a century. It has the strongest evidence for:

- Allergic rhinitis
- Allergic asthma
- Venom allergy
- Selected food allergies

However, its limitations include:

- Risk of systemic reactions
- Need for medical supervision
- Long treatment duration

Sublingual Immunotherapy (SLIT): The Patient-Centered Revolution

SLIT emerged in the 1980s and 1990s as a **safer and patient-friendly alternative**. Administered as drops or tablets, SLIT is now widely used in Europe and increasingly in Asia.

Advantages include:

- Superior safety profile
- Home-based administration
- Improved adherence

However, efficacy in asthma and polysensitized patients remains an evolving field.

Novel Routes Under Exploration

Modern immunotherapy research is exploring **next-generation delivery platforms:**

- **Intralymphatic immunotherapy (ILIT)** – Ultra-short course targeting lymph nodes
- **Epicutaneous immunotherapy (EPIT)** – Patch-based delivery for food allergy
- **Inhaled immunotherapy –** Targeting airway immune cells
- **Oral immunotherapy (OIT)** – For food allergy (desensitization paradigm)

These represent the shift from empirical therapy to **precision-targeted immune education.**

Table 3. Evolution of Allergen Immunotherapy Modalities

Era	Modality	Key Characteristics
1900s	SCIT	Whole extract injections
1980s	SLIT	Oral mucosal immune induction
2000s	OIT/EPIT	Food allergy desensitization
2010s	ILIT	Ultra-short course
2020s+	Recombinant/peptide vaccines	Precision immunotherapy

Precision Immunotherapy – The Future is Already Here

Component-Resolved Diagnostics (CRD): Matching Therapy to Molecules
The 21st century has seen the rise of molecular allergology. Instead of treating with crude extracts, clinicians can now identify:

- Primary sensitization vs cross-reactivity
- High-risk components (e.g., Ara h 2 in peanut, Der p 23 in mites)
- Polysensitization patterns

This has profound implications for **tailored immunotherapy selection.**

Recombinant and Hypoallergenic Vaccines
Traditional extracts suffer from variability and batch-to-batch inconsistency. Recombinant allergen vaccines aim to provide:

- Standardized dosing
- Reduced allergenicity with preserved immunogenicity
- Enhanced safety

Several peptide-based and DNA vaccines are in clinical trials, heralding **a new vaccine-like era for allergy.**

Biologics-Enhanced Immunotherapy
Monoclonal antibodies (e.g., anti-IgE, anti-IL-5, anti-IL-4Rα) are transforming severe allergic disease management. Their integration with AIT is an exciting frontier:

- ·Anti-IgE pretreatment improves SCIT safety
- ·Combination therapy may shorten AIT duration
- ·Potential to treat high-risk asthma patients

This convergence of immunotherapy and biologics represents **precision immune engineering.**

India-Centric Reflections: The Unfinished Journey

The Burden of Allergy in India
India faces a rapidly rising burden of allergic diseases due to:

- Urbanization and pollution
- Climate change and altered pollen patterns
- Westernized lifestyle and microbiome shifts
- Massive population of children with asthma and allergic rhinitis

Despite this, **AIT remains grossly underutilized** in India and most LMICs.

Table 4 – Barriers to Immunotherapy Adoption in India

Barrier	Reality in India	Impact
Lack of trained allergists	Very limited formal training programs	Misuse or underuse of AIT
Regulatory gaps	No standardized national AIT framework	Variable quality of extracts
Cost and accessibility	Limited insurance coverage	Poor patient adherence
Awareness	Low among physicians and public	Under-referral
Infrastructure	Few allergy clinics	Geographic inequity

The Mission of IAP Allergy & Applied Immunology Chapter

The Indian Academy of Pediatrics Allergy Chapter has taken a leadership role in:

- Developing national practice parameters
- Training pediatricians in rational allergy care
- Promoting evidence-based AIT
- Advocating for Allergy as a recognized super-specialty
- Building indigenous pollen calendars and diagnostic frameworks

Our mission is clear: **to democratize access to precision allergy care for every Indian child.**

Immunotherapy 2035 – Rewriting the Allergy Narrative

Imagine a future
where a child diagnosed with allergic rhinitis receives a molecular allergy profile at diagnosis, followed by a three-dose intralymphatic immunotherapy vaccine tailored to their genetic and microbiome signature: preventing asthma and food allergy development.

In this future, allergy clinics function like immunization centers, and allergen vaccines are part of national preventive health programs.

Allergy will no longer be managed—it will be prevented.

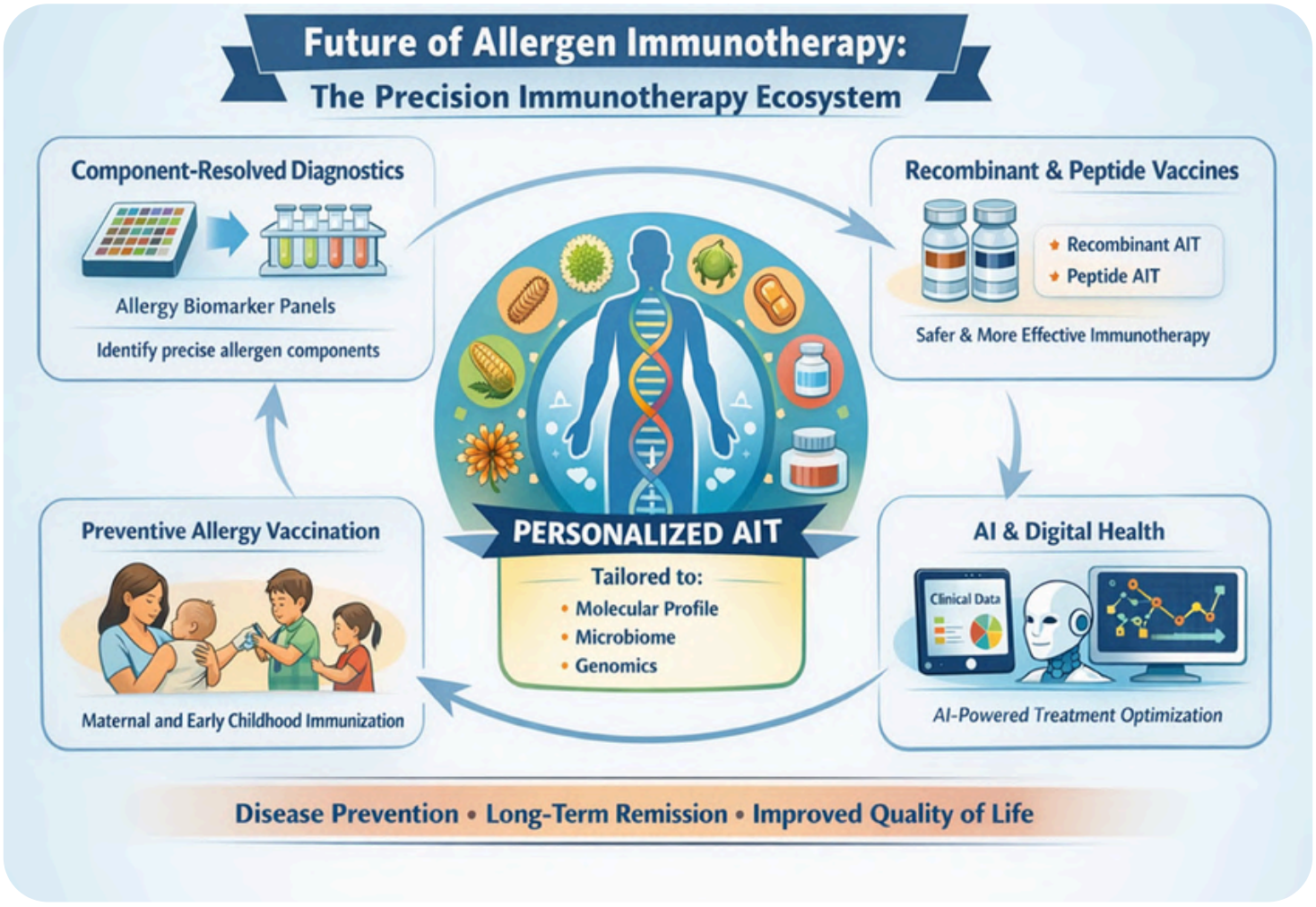
Policy Call-to-Action for India and LMICs

1. Recognize Allergy as a Super-Specialty
National medical councils must formally recognize Allergy and Clinical Immunology as a super-specialty, enabling structured training programs.

2. National Immunotherapy Framework
Develop a National AIT Policy to standardize:

- Allergen extract quality
- Indications and contraindications
- Training requirements
- Safety monitoring and registries

3. Integrate AIT into Universal Health Coverage
Insurance and government schemes must cover AIT, especially for children with asthma and allergic rhinitis.



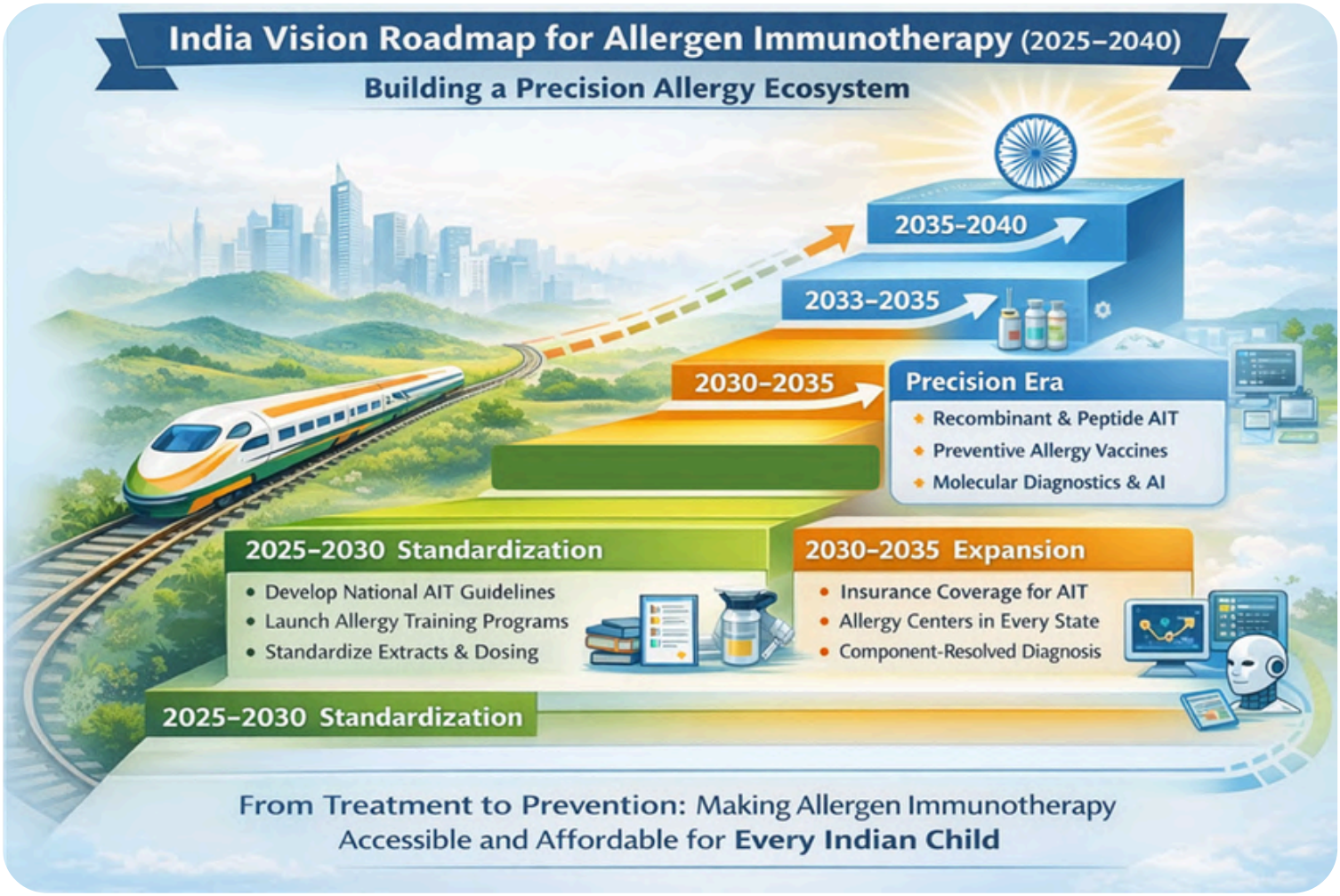
5. Invest in Indigenous Research and Manufacturing
India should develop:

- Indigenous allergen extracts
- Molecular diagnostics
- Recombinant vaccines
- Pollen and fungal surveillance systems

LMICs have a unique opportunity to leapfrog traditional allergy care models and adopt precision immunotherapy directly.

Table 5. Vision Roadmap for AIT in India (2025–2040)

Phase	Goal	Key Actions
2025–2030	Standardization	National guidelines, training programs
2030–2035	Expansion	Insurance coverage, regional centers
2035–2040	Precision Era	Molecular AIT, preventive vaccines



My Reflection: A Century-Old Dream, A Future Yet to Be Written

From a modest experiment in London in 1911 to a global cornerstone of allergy management, allergen immunotherapy represents one of the most remarkable translational success stories in medicine. Allergen immunotherapy began as a bold experiment by visionary physicians who dared to challenge the dogma that allergy was untreatable.

Noon asked a bold question. Freeman transformed it into a therapy. A century later, their vision continues to guide us toward a future where allergic diseases are not merely treated—but prevented. Over 115 years, it has evolved into the **only true disease-modifying therapy in allergy medicine.**

Today, we stand at the cusp of a transformative era—where immunotherapy intersects with genomics, artificial intelligence, microbiome science, and vaccine technology. For India and other LMICs, this is not just a scientific opportunity but a moral imperative.

As pediatricians and allergists, our responsibility extends beyond symptom control. We must reshape the allergic trajectory of future generations, ensuring that children do not merely survive with allergy —but thrive free from its burden.

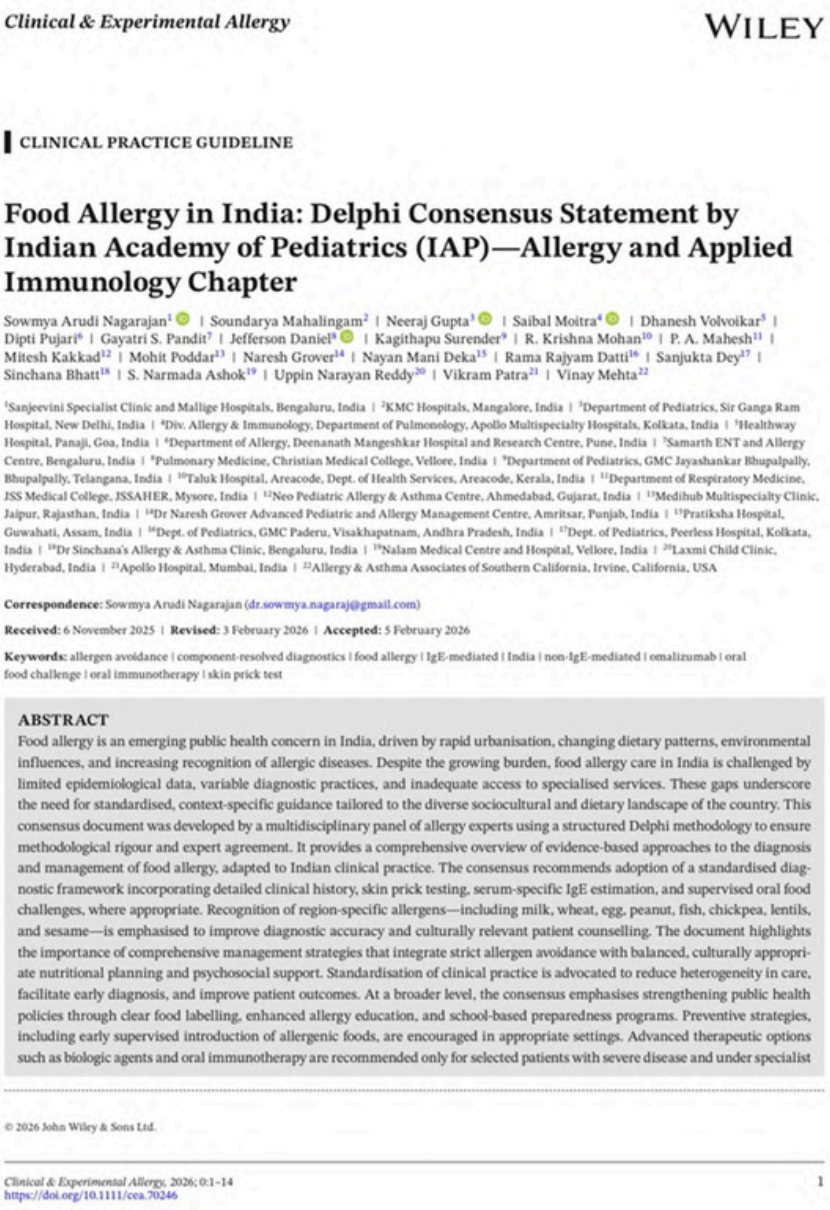
The next century of immunotherapy should not just treat allergy

it should eliminate it as a major global disease

A Significant Milestone

MARCH 2026 | SPECIAL ANNOUNCEMENT

The Allergy & Applied Immunology Chapter is proud to announce a landmark achievement:
Our consensus statement on Food Allergy in India has been published in
Clinical and Experimental Allergy
Impact Factor 6.5 | WILEY



Clinical & Experimental Allergy WILEY

CLINICAL PRACTICE GUIDELINE

Food Allergy in India: Delphi Consensus Statement by Indian Academy of Pediatrics (IAP)—Allergy and Applied Immunology Chapter

Sowmya Arudi Nagarajan[1] | Soundarya Mahalingam[2] | Neeraj Gupta[3] | Saibal Moitra[4] | Dhanesh Volvoikar[5] | Dipti Pujari[6] | Gayatri S. Pandit[7] | Jefferson Daniel[8] | Kagithapu Surender[9] | R. Krishna Mohan[10] | P. A. Mahesh[11] | Mitesh Kakkad[12] | Mohit Poddar[13] | Naresh Grover[14] | Nayan Mani Deka[15] | Rama Rajyam Datti[16] | Sanjukta Dey[17] | Sinchana Bhatt[18] | S. Narmada Ashok[19] | Uppin Narayan Reddy[20] | Vikram Patra[21] | Vinay Mehta[22]

[1]Sanjeevini Specialist Clinic and Mallige Hospitals, Bengaluru, India | [2]KMC Hospitals, Mangalore, India | [3]Department of Pediatrics, Sir Ganga Ram Hospital, New Delhi, India | [4]Div. Allergy & Immunology, Department of Pulmonology, Apollo Multispecialty Hospitals, Kolkata, India | [5]Healthway Hospital, Panaji, Goa, India | [6]Department of Allergy, Deenanath Mangeshkar Hospital and Research Centre, Pune, India | [7]Samarth ENT and Allergy Centre, Bengaluru, India | [8]Pulmonary Medicine, Christian Medical College, Vellore, India | [9]Department of Pediatrics, GMC Jayashankar Bhupalpally, Bhupalpally, Telangana, India | [10]Taluk Hospital, Areacode, Dept. of Health Services, Areacode, Kerala, India | [11]Department of Respiratory Medicine, JSS Medical College, JSSAHER, Mysore, India | [12]Neo Pediatric Allergy & Asthma Centre, Ahmedabad, Gujarat, India | [13]Medihub Multispecialty Clinic, Jaipur, Rajasthan, India | [14]Dr Naresh Grover Advanced Pediatric and Allergy Management Centre, Amritsar, Punjab, India | [15]Pratiksha Hospital, Guwahati, Assam, India | [16]Dept. of Pediatrics, GMC Paderu, Visakhapatnam, Andhra Pradesh, India | [17]Dept. of Pediatrics, Peerless Hospital, Kolkata, India | [18]Dr Sinchana's Allergy & Asthma Clinic, Bengaluru, India | [19]Nalam Medical Centre and Hospital, Vellore, India | [20]Laxmi Child Clinic, Hyderabad, India | [21]Apollo Hospital, Mumbai, India | [22]Allergy & Asthma Associates of Southern California, Irvine, California, USA

Correspondence: Sowmya Arudi Nagarajan (dr.sowmya.nagaraj@gmail.com)

Received: 6 November 2025 | **Revised:** 3 February 2026 | **Accepted:** 5 February 2026

Keywords: allergen avoidance | component-resolved diagnostics | food allergy | IgE-mediated | India | non-IgE-mediated | omalizumab | oral food challenge | oral immunotherapy | skin prick test

ABSTRACT

Food allergy is an emerging public health concern in India, driven by rapid urbanisation, changing dietary patterns, environmental influences, and increasing recognition of allergic diseases. Despite the growing burden, food allergy care in India is challenged by limited epidemiological data, variable diagnostic practices, and inadequate access to specialised services. These gaps underscore the need for standardised, context-specific guidance tailored to the diverse sociocultural and dietary landscape of the country. This consensus document was developed by a multidisciplinary panel of allergy experts using a structured Delphi methodology to ensure methodological rigour and expert agreement. It provides a comprehensive overview of evidence-based approaches to the diagnosis and management of food allergy, adapted to Indian clinical practice. The consensus recommends adoption of a standardised diagnostic framework incorporating detailed clinical history, skin prick testing, serum-specific IgE estimation, and supervised oral food challenges, where appropriate. Recognition of region-specific allergens—including milk, wheat, egg, peanut, fish, chickpea, lentils, and sesame—is emphasised to improve diagnostic accuracy and culturally relevant patient counselling. The document highlights the importance of comprehensive management strategies that integrate strict allergen avoidance with balanced, culturally appropriate nutritional planning and psychosocial support. Standardisation of clinical practice is advocated to reduce heterogeneity in care, facilitate early diagnosis, and improve patient outcomes. At a broader level, the consensus emphasises strengthening public health policies through clear food labelling, enhanced allergy education, and school-based preparedness programs. Preventive strategies, including early supervised introduction of allergenic foods, are encouraged in appropriate settings. Advanced therapeutic options such as biologic agents and oral immunotherapy are recommended only for selected patients with severe disease and under specialist

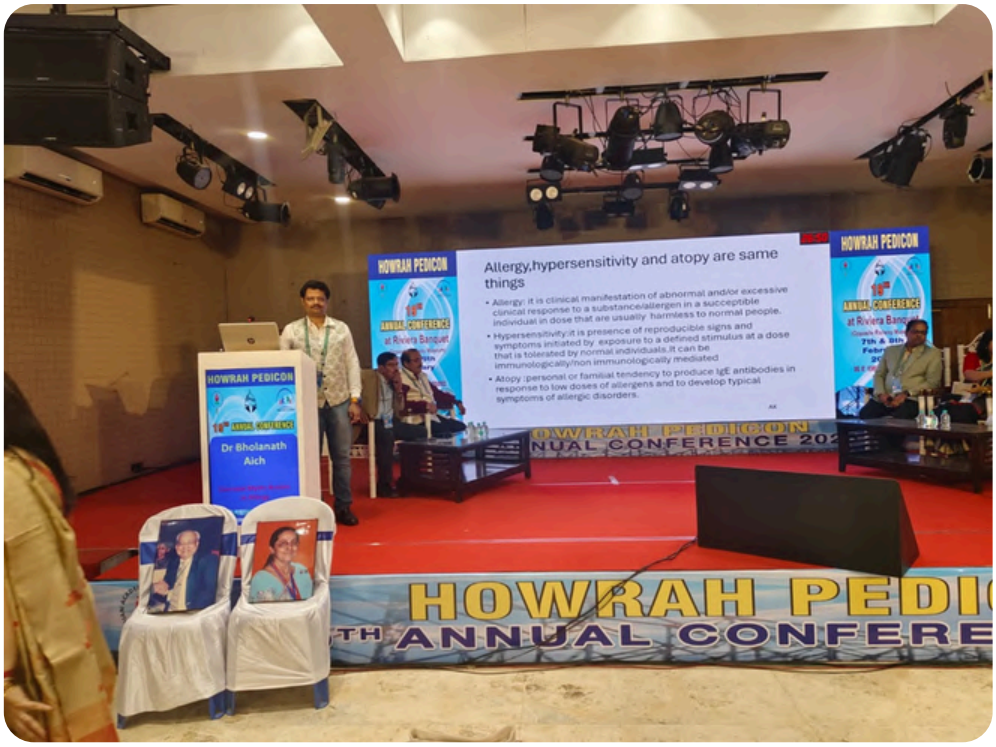
Clinical & Experimental Allergy, 2026 · DOI: 10.1111/cea.70246

Titled "Food Allergy in India: Delphi Consensus Statement by the Indian Academy of Pediatrics (IAP) — Allergy and Applied Immunology Chapter", this document was developed by a multidisciplinary panel of allergy experts using a structured Delphi methodology. It provides comprehensive, evidence-based guidance tailored to Indian clinical practice and will serve as an essential reference for practitioners across the country.

This publication is a testament to the dedication and collaborative spirit of our Chapter members and a proud moment for the IAP Allergy & Applied Immunology Chapter.

Allergy Chapter Activities

Allergy Chapter Activity in the First Quarter



Howrah Pedicon 2026 – Allergy Panel moderated by Dr Bholanath Aich

The Howrah Pedicon 2026 Annual Conference featured an Allergy Panel moderated by Dr Bholanath Aich. The session presented a thought-provoking slide titled "Allergy, hypersensitivity and atopy are same things" — a deliberately provocative heading used to highlight key clinical distinctions between three commonly confused terms:

Allergy: The clinical manifestation of abnormal and/or excessive clinical response to a substance/allergen in a susceptible individual in doses that are usually harmless to normal people.

Hypersensitivity: The presence of reproducible signs and symptoms initiated by exposure to a defined stimulus at a dose tolerated by normal individuals. It can be immunologically or non-immunologically mediated.

Atopy: Personal or familial tendency to produce IgE antibodies in response to low doses of allergens and to develop typical symptoms of allergic disorders.

These three terms are often used interchangeably in clinical practice, but the session highlighted their distinct definitions — an important teaching point for pediatricians attending this PEDICON conference.

Spring Allergy Colloquium 2026

The Spring Allergy Colloquium was a successful affair with sessions on drug allergy and case-based discussions that were very relevant to daily practice. The event was hosted by the Allergy & Asthma Research Centre.

Attendees at the Spring Allergy Colloquium 2026

Award presentation at the Spring Allergy Colloquium 2026

RAGCON 2026

Our Chapter was well represented in RAGCON 2026 with Dr Sowmya Nagarajan, our Secretary, moderating a panel and Dr Nandana Bala leading a panel with case-based discussions.

Dr. Sowmya Nagarajan moderating a panel at RAGCON 2026

Dr. Nandana Bala leading a case-based discussion panel at RAGCON 2026

✦ Pedicon Diaries ✦

PEDI□ON 2026 · 63rd Annual Conference, IAP · Kolkata

16th – 20th January 2026 · Biswa Bangla Convention Centre

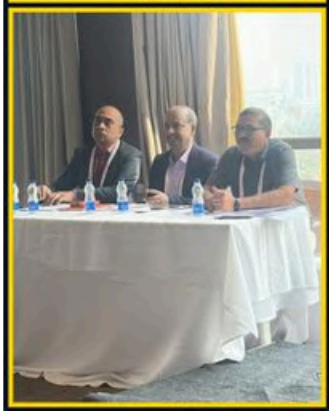
A Grand 5-Day Academic Feast

HIGHLIGHTS

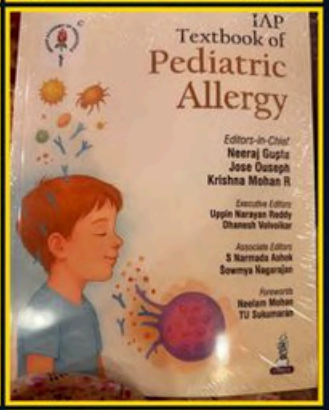
- ★ Workshop: Rational Approach to Allergy Practice
- ★ Release of IAP Textbook of Pediatric Allergy
- ★ Chapter receiving 2nd Prize – Best Chapter Award
- ★ Dr. Neeraj Gupta receiving the FIAP











West Bengal Academy of Pediatrics · Indian Academy of Pediatrics · Kolkata 2026

Allergy Chapter Activity – Part 2

Dr Mitesh Kakkad

Treasurer, Allergy Chapter

AR Module – Anjar, Gujarat | 1st February 2026

Dr Mitesh Kakkad conducted an AR (Allergy & Rhinitis) Module session in Anjar, Gujarat on 1st February 2026. The module provided a structured educational framework for practitioners to enhance their understanding and clinical management of allergic conditions.

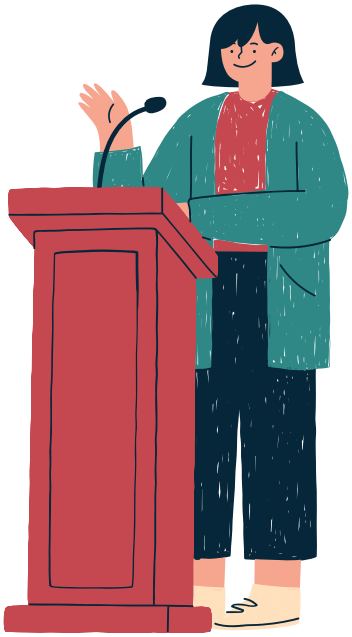
Faculty – Gujarat National Rheumatology & Allergy Conference | 8th February 2026

Dr Mitesh Kakkad served as faculty at the Gujarat National Rheumatology Allergy Conference held in Jamnagar on 8th February 2026. He participated in the Training of Trainers (TOT) – ACT Allergy module, contributing to the capacity building of allergy educators across the region.

Bankura Pedicon

	Chairpersons: Dr. Rakesh Kumar Mandal, Dr. Indu Surana
9:50-10:25am:	Approach to Under 5 Wheezers Moderator - Dr. Bholanath Aich Panelists- Dr. Chaitali Patra, Dr. Chinmoy Lath, Dr.A Chinta Mandal, Dr. Mehbub Alam Chaipersons- Dr. Sangita De, Dr. Abhishek Maji

This was the topic discussed by WB Allergy team members at recently concluded Bankura Pedicon hosted by IAP ....



Academy Of Paediatrics South Delhi

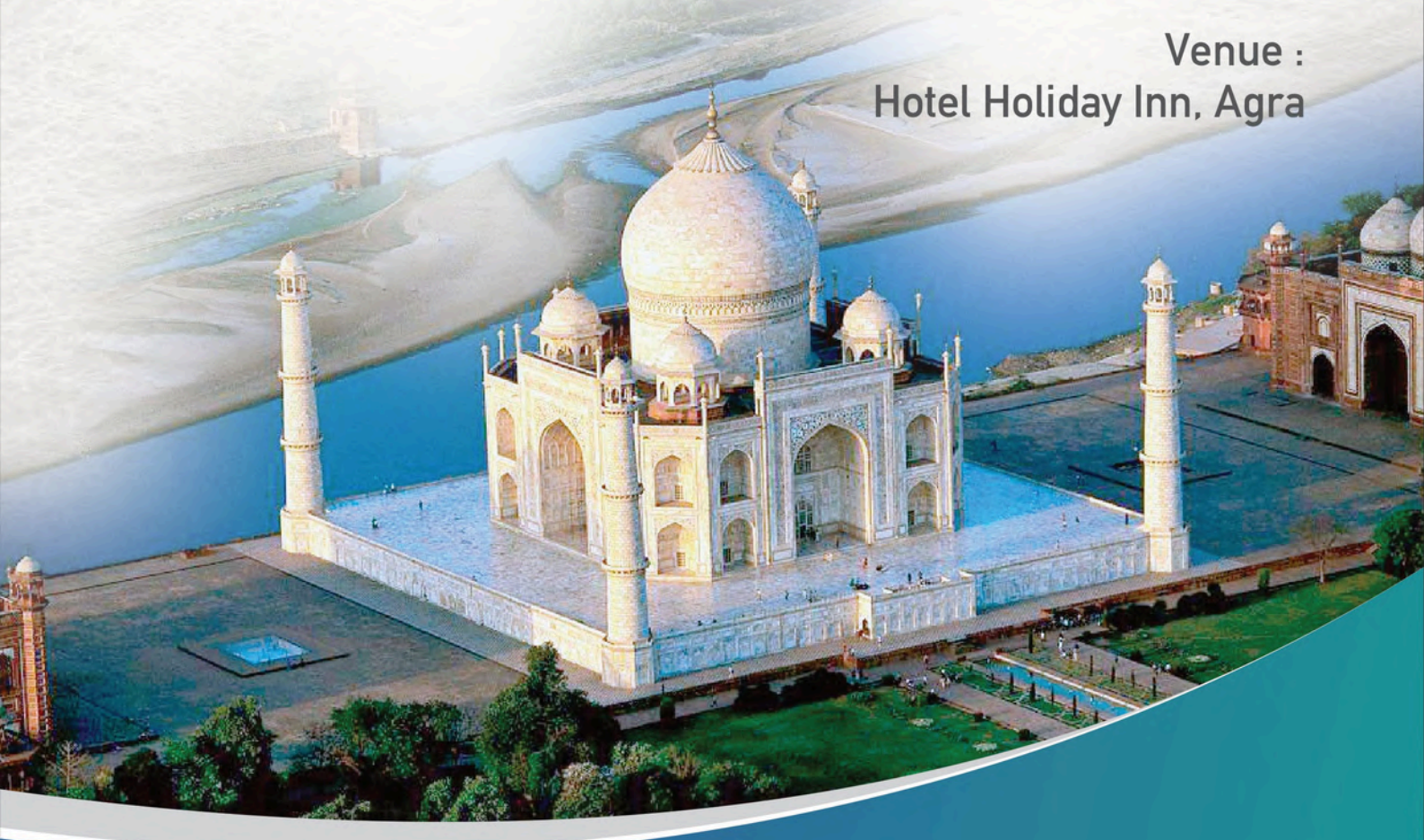
Dr Neeraj Gupta
Delivering a talk on Allergic Rhinitis at Academy Of Paediatrics South Delhi

2nd Midterm

Ped ALLERCON 2026

09th - 10th May 2026

Venue :
Hotel Holiday Inn, Agra



Organised by

IAP AGRA & IAP ALLERGY AND APPLIED IMMUNOLOGY CHAPTER

Contact-9319116128, 9837230443, 9897221007

Ped ALLERCON 2026

2nd Midterm Conference of IAP ALLERGY AND APPLIED IMMUNOLOGY CHAPTER

Organised by : IAP Agra under the auspices of AOP UP

Venue : Hotel Holiday Inn, Agra

09th - 10th May 2026

CATEGORY	Upto 15th Mar Basic + GST18%	Upto 16th Mar-15th Apr Basic + GST18%	Upto 16th Apr- 8thMay Basic + GST18%	SPOT Basic + GST18%
Member / Non Member	4000+720	5000+900	6000+1080	7000+1260
Accompanying Person	3500+630	4500+810	5500+990	6500+1170
PG Student	3500+630	4500+810	5500+990	6500+1170

Workshop(1.Pulmonary Function Test & 2. Skin Prick Test) Fees Rs 1200 incl.GST.
Conference Registration Mandatory for Workshop.

Click here to fill the Registration Form: Google Form Link

Bank Details:

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- Bank Name : Punjab & Sind Bank
- Account No : 07921000004664
- IFSC Code : PSIB0000792
- Branch : Ghatia Azam Khan, Agra - 282003

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9319116128	9837230443	9897221007	7065374040

8, Surya Nagar, Agra-282002 midtermpedallercon26@gmail.com

Membership Snapshot

Wish to join our membership?

ENROLL NOW

Join the IAP Allergy Chapter & Unlock Global Benefits

Become a member of India's premier paediatric allergy society and gain access to the European Academy of Allergy & Clinical Immunology – at a highly subsidised rate.

WHY JOIN

Benefits of IAP Allergy Chapter Membership

Global EAACI Access

Qualify for highly subsidised dual membership with the European Academy of Allergy & Clinical Immunology (EAACI).

Scientific Resources

Access cutting-edge journals, guidelines, and educational content on allergy and immunology from leading global experts.

Professional Network

Connect with a community of paediatricians and allergy specialists across India and internationally through EAACI.

CME & Training

Priority access to workshops, webinars, and continuing medical education events organised by the chapter.

Advocacy Platform

Contribute to shaping allergy care policy and paediatric immunology practice at national and international levels.

Clinical Guidelines

Stay updated with the latest evidence-based protocols in paediatric allergy, asthma, and immunology.

EXCLUSLVE OFFER

Apply for Subsidised EAACI Membership

What is the EAACI NAIS Dual Membership?

As a member of the IAP Allergy Chapter (affiliated with India — IAP Allergy Chapter under EAACI's National Allergy & Immunology Societies network), you are eligible for a heavily discounted EAACI dual membership. This gives you full EAACI membership benefits alongside your IAP Allergy Chapter membership.

1

First, join the IAP Allergy Chapter

Register at iapaai.com/registration-form to obtain your IAP Allergy membership number — you will need this for the EAACI application.

2

Go to EAACI's website

Visit eaaci.org and click on myEAACI → Click to Login.

3

Click "Register Now"

Create your myEAACI account if you do not already have one.

4 Fill in your details step by step

Complete: Personal details → Professional details → Membership details → Summary & Submit

Under
↳ **Membership Type**
↳ Select
EAACI NAIS Dual Member

Under
↳ **Society Membership**
↳ Select
"India (IAP Allergy Chapter)"

Under
↳ **Society ID**
↳ Enter your
IAP Allergy membership number

5 Complete Payment

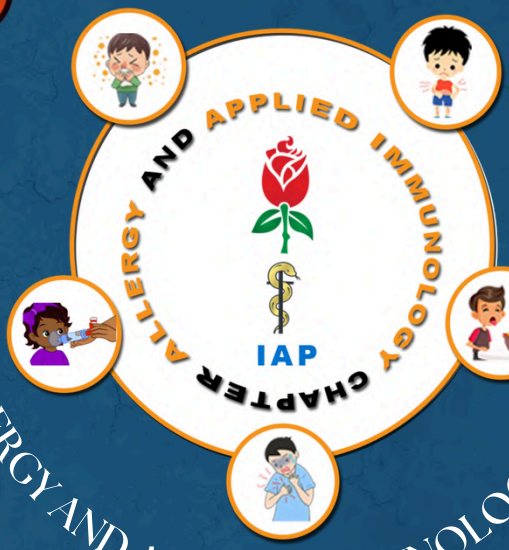
Proceed to payment to finalise your subsidised EAACI membership.

Ready to Become a Member?

Join the IAP Allergy Chapter today and take advantage of this exceptional opportunity to connect with allergy and immunology professionals worldwide.

Join IAP Allergy Chapter

Apply for EAACI Membership



About Us

IAP Allergy and Applied Immunology Chapter (IAPPAAI) aims to promote awareness, education, research, and best practices in the field of allergy and asthma. It also works to enhance access to care, provide support to healthcare professionals, and advocate for policies that benefit patients with these conditions.

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Don't Miss This Opportunity!

Join the IAP Allergy & Applied Immunology Chapter today and enhance your knowledge and expertise in the field of allergy and immunology.
For more information, contact us now!

Upgrade Your Expertise..!

ENROLL NOW

info@iapaai.com
paai.pedsallergy@gmail.com

www.iapaai.com