

# Intradermal skin testing in a aeroallergic Thai children

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**Objective** : *To study the prevalence of sensitization to various aeroallergens in allergic Thai children*

**Design** : *Retrospective study*

**Setting** : *Out patient, Allergy clinic, Department of Pediatric, Faculty of Medicine, Chulalongkorn University.*

**Subjects** : *305 allergic Thai children, aged 6-15 years with moderate to severe symptoms of asthma and or allergic rhinitis had performed intradermal skin testing with 10 common aeroallergens during the period January 1992 and June 1997*

**Results** : *There were 100 females and 205 males with an average age of 8.9 years. 57.37% of the patients had asthma, 26.9% had allergic rhinitis and 15.73% had both diseases. 85.8% of the patients had positive family history of atopy. At least one positive skin test was 98.04%. The prevalence of sensitization to various aeroallergens were as follows; mite mixture 92.13%, house dust 89.18% cockroach 53.77% mixed grass 53.11%, feather 51.15%, kapok 42.62%, mixed mold 35.08%, acacia 34.09%, dog 27.87% and cat 13.77%*

**Conclusion** : *This findings highlight the association of specific aeroallergens with upper and lower respiratory allergy. The two most important aeroallergens were house dust and mite. So therapeutic efforts should be focused on education of the parents about relevant allergens and advising about techniques for reducing exposure especially in early childhood with a positive family history of atopy.*

**Key words** : *Allergen, Skin testing, Thai children.*

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**วัตถุประสงค์** : เพื่อศึกษาความชุกของสารก่อภูมิแพ้ในอากาศที่ทำให้เกิดการกระตุ้น  
ในผู้ป่วยเด็ก ที่เป็นโรคภูมิแพ้

**รูปแบบการวิจัย** : การศึกษาจากข้อมูลย้อนหลัง

**สถานที่** : คลินิกผู้ป่วยนอกโรคภูมิแพ้ ภาควิชากุมารเวชศาสตร์ จุฬาลงกรณ์  
มหาวิทยาลัย

**ตัวอย่างประชากร** : ผู้ป่วยเด็กโรคภูมิแพ้จำนวน 305 คน อายุระหว่าง 6-15 ปี ที่มีอาการ  
ปานกลางหรือรุนแรงของโรคหอบหืดและหรือโรคเยื่อจมูกอักเสบจาก  
ภูมิแพ้ ซึ่งได้รับการทำทดสอบทางผิวหนังด้วยสารก่อภูมิแพ้ในอากาศ  
ที่พบบ่อยจำนวน 10 ชนิด ในระหว่างเดือน มกราคม 2535 จนถึง  
เดือน มิถุนายน 2540

**ผลการศึกษา** : มีผู้ป่วยเด็กหญิง 100 คน เด็กชาย 205 คน อายุเฉลี่ย  $8.9 \pm 2.1$  ปี  
ร้อยละ 57.37 เป็นโรคหอบหืด, ร้อยละ 26.9 เป็นโรคเยื่อจมูกอักเสบ  
จากภูมิแพ้ และร้อยละ 15.73 มี อาการของทั้ง 2 โรค ร้อยละ 85.8 ให้  
ประวัติว่ามีโรคภูมิแพ้ในครอบครัว การทดสอบที่ให้ผลบวกต่อสารก่อ  
ภูมิแพ้อย่างน้อย 1 ตัว มีร้อยละ 98.04 ซึ่งความชุกของการกระตุ้น  
จากสารก่อภูมิแพ้ในอากาศที่พบบ่อยมีดังนี้ คือ ตัวไรฝุ่น ร้อยละ 92.13,  
ฝุ่นบ้านร้อยละ 89.18, ซากแมลงสาบ ร้อยละ 53.77, ดอกหญ้า ร้อยละ  
53.11, ขนนก ร้อยละ 51.15, นุ่น ร้อยละ 42.62, เชื้อรา ร้อยละ 35.08,  
กระถินณรงค์ ร้อยละ 34.09, รั้งแคสไนซ์ ร้อยละ 27.87 และรั้งแคแมว  
ร้อยละ 13.77

**วิจารณ์และสรุป** : จากการศึกษาพบว่า สารก่อภูมิแพ้ในบรรยากาศยังเป็นปัจจัยสำคัญ  
ในการก่อโรคภูมิแพ้ทางระบบทางเดินลมหายใจ และที่สำคัญ 2 ตัว คือ  
ไรฝุ่นและฝุ่นบ้าน ดังนั้นปัจจัยสำคัญในการรักษาผู้ป่วยนอกจากการใช้ยา  
แล้วนั้น การให้การศึกษาและแนะนำผู้ปกครองเด็กในการหลีกเลี่ยงและ  
ป้องกันสารก่อภูมิแพ้ที่พบบ่อยในอากาศเพื่อลดการกระตุ้นในวัยเด็ก โดยเฉพาะ  
ในครอบครัวที่มีประวัติภูมิแพ้ จะทำให้อุบัติการเกิดโรคภูมิแพ้  
ลดลงด้วย

Asthma and allergic rhinitis is increasing in frequency and severity, particularly among children and young adults, and has a higher prevalence in males. Asthma is also a leading cause for treatment in emergency departments, and school absenteeism among children. Newly released treatment guidelines highlight the use of anti-inflammatory agents to reduce airway inflammation. To further reduce the burden of asthma, greater emphasis will need to be placed on prevention. One aspect of prevention involves identifying and avoiding environmental exposures to aeroallergens. 75-85 per cent of asthmatic patients have positive immediate skin test reactions to common inhalant allergens,<sup>(1, 2)</sup> and severity is also correlated with the number of positive immediate skin tests.<sup>(3, 4)</sup> Skin testing provides a definite diagnosis of allergic sensitization. It is very easy, convenient, not expensive and rapid. Knowing the prevalence of allergic sensitization to common allergens is beneficial for better treatment planning and controlling of allergic diseases.

### Objectives

- To study the prevalence of sensitization to various common aeroallergens in allergic Thai children.

### Materials and Methods

305 allergic children attending the Allergy Clinic of the Department of Pediatrics, Faculty of Medicine, Chulalongkorn Hospital University,

Bangkok, Thailand between January 1992 and June 1997 were recruited into the study. All patients had moderate to severe symptoms of chronic wheeze and/or chronic rhinitis with nasal obstruction.

The diagnosis of asthma was defined as reversible airway obstruction with at least 20 percent reversibility of FEV<sub>1</sub>, or PEF on post bronchodilator testing or more than 6 asthmatic attacks in the past and a positive family history of atopy and/or associated atopic diseases. Allergic rhinitis was defined as chronic watery rhinitis with nasal obstruction and itching experienced for at least one year. Physical findings show pale and swollen inferior turbinates with eosinophilia on nasal smears. For at least one week prior to testing, all of our patients had stopped all antihistaminic drugs that might interfere with the result of skin test.

Intradermal skin tests were performed on the inner side of the forearm with 0.02 ml of allergen extract. An insulin syringe with needle sizes of 27 was used. The 10 allergenic extracts (Center Laboratories, Port Washington, U.S.A) with 1:1,000 concentrations included house dust, feathers, kapok, mixed mold, mixed grass, dog, cat, cockroach, acacia and mixed mite as well as histamine 1:1,000 and saline control. Reactions were read at 20 minutes, and the wheal was measured in two dimensions. A positive reaction was considered to be a wheal 5 mm. larger than that of the negative control. All skin

tests were performed by the same technician and read by the same physician.

**Statistics - Descriptive analysis**

**Results**

The demographics of the patients studied were presented in table I. A total of 305 patients

aged 6 to 15 years were evaluated in the allergy clinic and these patients had a mean age of 8.9 years with a 2.05:1 male to female ratio. Of all 305 subjects, 175 (57.37%) had asthma, 82 (26.9%) had allergic rhinitis and 48 (15.73%) had asthma and allergic rhinitis. 85.8% had positive family history of atopy. (Table 1)

**Table 1. Patient Demographics.**

Number of patients	age (yr)	male (no)	female (no)	asthma (no)	allergic rhinitis (no)	asthma & allergic rhinitis (no)
305	8.9 ± 2.1	205	100	175	82	48
				(57.37%)	(26.9%)	(15.73%)

At least one skin test was demonstrated in 299 children (98.04%). The other six patients that were negative, had not an allergic cause. The prevalence of sensitization to various allergens was as follows (Table 2), mite mixture 92.13%, house dust 89.18% cockroach 53.77%, mixed grass 53.11%, feathers 51.15%, kapok

42.62%, mixed mold 35.08%, acacia 34.09%, dog 27.87% and cat 13.77%. The prevalence of monosensitization was 17 per cent and polysensitization was 81 per cent. The major allergen causing monosensitization was house dust mites and for polysensitization were house dust mites and house dust.

**Table 2.** Prevalence of positive skin test for each allergen.

Allergen	positive skin test	
	number	percent
Mite mixture	281	92.13
House dust	272	89.18
Cockroach	164	53.77
Mixed grass	162	53.11
Feather	156	51.15
Kapok	130	42.62
Mixed mold	107	35.08
Acacia	104	34.09
Dog	85	27.87
Cat	42	13.77

## Discussion

In the Pediatric Allergy Clinic of Chulalongkorn Hospital University we used intradermal skin testing instead of the prick skin test. This was because the prick skin test had more technical error<sup>(5)</sup>, and less sensitivity and reproducibility<sup>(6)</sup> than intradermal testing. Also, we had only aqueous allergen extracts for use with intradermal skin tests and immunotherapy, so that saved on costs.

In this study group, males numbered about twice the females, as in the previous study.<sup>(7)</sup> The prevalence of atopy defined by at least one positive skin test was 98.04 per cent and that is higher than in any other reports from Thailand.<sup>(8-12)</sup> It could be due to selection of patients that had moderate to severe symptoms

which had received some medical treatments but didn't response well to that treatment. Therefore, this skin testing was to emphasize to the parents the need for environmental controls and to obtain immunotherapy in cases of failed medical treatment and uncontrollable environments. However, when we compared our results to previous studies of common aeroallergens in Thailand in the past 20 years (Table 3), house dust and mite causes were found to have doubled from about 40-50 percent to 90 percent. This may be because the climate in Thailand is hot and humid and encourages the proliferation of mites. They were the most common potential indoor allergens which cause asthma worldwide.<sup>(13, 14)</sup> The most prevalent mite species in Thailand is *Dermatophagoides pteronyssinus*.<sup>(15)</sup> Two

studies in Asia from Taipei<sup>(16)</sup> and Indonesia<sup>(17)</sup> showed that positive skin tests for house dust and mites were 88-93% and 90-93%, respectively, and that is close to our study results. Cockroaches were the next most important indoor allergen in Thailand. It rose from 26 percent to 53.77% in importance in the two studies. It is a problem all over the world, and as reported from the U.S.A<sup>(18)</sup>, Spain<sup>(19)</sup> and Taiwan<sup>(20)</sup>, and they are very difficult to eradicate of cockroaches from the house. Dead cockroaches and/or the excreta may remain in the house for a longer periods, depending on the degree of the infestation by cockroaches and the hygienic status of the house.<sup>(18)</sup> Gelber, et al,<sup>(21)</sup> concluded that cockroach hypersensitivity has been recognized

as a major risk factor of asthma, particularly among lower socioeconomic groups in crowded multi-family dwellings. Mixed grass is still a significant problem in Thailand but kapok had a prevalence rate which lowered from 77.24% to 42.62% due to the use of synthetic materials for bedding. Feathers were studied in this paper because some patients had a history of exposure to feathers due to their parents' occupations and the result was positive reactions of about 50 percent. That was higher than our expectation, and might be due to birds around the houses. Mixed mold was a bit decreased. Animal danders (dog, cat) had lower prevalences as compared to western countries<sup>(3)</sup>, and this may be due to different life style, and most of the Thai parents

**Table 3.** Comparison of the allergen skin tests from the other studies in Thailand.

Allergen	Ngamphaiboon J.	Kraisarin C.	Kongpanichkul A.	P. Malaisri	M. Tuchinda	M. Tuchinda
	1998 (n = 305)	1997 (n = 521)	1997 (n = 100)	1992 (n = 312)	1987 (n = 350)	1976 (n = 68)
- Mite	92.13	73	67	87.17	61.43	40.12
- House dust	89.18	75	-	95.19	74.86	54.4
- Cockroach	53.77	18	44	-	46	26.47
- Mixed grass	53.11	50	14	59.61	48.86	22.06
- Feather	51.15	-	-	-	-	-
- Kopok	42.62	41	-	77.24	16.29	22.06
- Mixed mold	35.08	55	7	52.56	54.57	-
- Dog	27.87	-	5	-	-	-
- Cat	13.77	-	10	-	-	13.24
+ ve at least one allergen	98.04	87	74	-	93.7	72.06

had some experience with animal danders. Other factors that lead to low exposure to animal danders are that Thai residents usually do not keep pets in the house and the climate is not as cold as in western countries.

Intradermal skin testing is not a routine laboratory screening procedure diagnosis for allergic diseases. But knowing the prevalence of common aeroallergens in Thailand is helpful for education of the parents. In addition to genetic factors, exposure in early childhood to house-mites and other allergens is important for the clinical expression of asthma.<sup>(22)</sup>

## Conclusions

Our data supports that mites and house dust are the most important aeroallergens among allergic Thai children. Cockroaches are the next major cause of allergic problems here. Therapeutic efforts should be focused on education of the parents about relevant allergens and advising about techniques for reducing exposure, especially in early childhood, in families with a positive history of atopy.

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