



# Investigating the atopic child

Each month we present authoritative advice on the investigation of a common clinical problem, specially written for family doctors by the Board of Continuing Medical Education of the Royal Australasian College of Physicians.

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Over the past few decades there has been a noticeable increase in the prevalence of allergy-related conditions in both adults and children that cannot simply be explained by changes in diagnostic criteria or public education. Several studies have shown a doubling of numbers within the period of measurement (one generation – 25 years – for asthma and allergic rhinitis, and 10 to 15 years for atopic eczema and anaphylaxis).<sup>1-4</sup> At the same time, there have been significant advances in our understanding of the role of allergy in these conditions, and the result is an ever increasing demand for allergy testing from patients. For the general practitioner, it is important to know that not all of these patients will need a test, and each case should be considered on its merits.

Although the title of this paper relates to the atopic child, we have not limited our discussion to IgE-mediated disorders but have included a

number of other conditions that patients may think are allergy-related. The table lists these conditions, which are divided into six groups based on pathogenesis.

## Role of allergy investigation

A thorough history and relevant physical examination are essential before an allergy investigation should be considered. Most allergy tests have a high biological sensitivity but a relatively low specificity, so a positive test result without similar historical plausibility should be regarded with scepticism.

Atopy refers to the inherited tendency to make specific IgE responses to common environmental aeroallergens. Only atopic subjects develop IgE-mediated food reactions but both atopic and nonatopic subjects may develop IgE-type drug or insect sting allergy. For practical purposes, a

## IN SUMMARY

- The prevalence of allergic disorders is increasing rapidly.
- Testing for specific IgE-mediated hypersensitivity is indicated in those clinical conditions in which IgE has a role.
- The skin prick test is the gold standard for assessment of atopic sensitivities.
- The clinical significance of a positive allergy test result depends on the pretest plausibility of a causative relation.
- High risk and complex cases merit referral for specialist opinion.

**Table. Allergy-related conditions****Category A****Where IgE-mediated immediate hypersensitivity has an accepted role**

Seasonal and perennial allergic rhinoconjunctivitis  
 Extrinsic asthma  
 Acute or episodic urticaria  
 Acute gastrointestinal reactions  
 Anaphylaxis – foods, drugs, insect stings, latex hypersensitivity

**Category B****Involving IgE plus other hypersensitivity mechanisms**

Atopic eczema  
 Eosinophilic gastroenteritis

**Category C****Involving predominantly non-IgE-mediated hypersensitivity mechanisms**

Food protein intolerance  
 Contact dermatitis  
 Serum sickness and other delayed drug reactions

**Category D****IgE-type allergy masquerading as other conditions**

Frequent 'colds' or 'bronchitis'

**Category E****Conditions masquerading as IgE-type allergy**

Chronic urticaria or angioedema  
 Nonallergic rhinitis  
 Intrinsic asthma (uncommon in children)  
 Anaphylactoid drug reactions

**Category F****Controversial – role of allergy speculative and unproven**

Headaches, migraine  
 Irritability, hyperactivity  
 Fatigue  
 Myalgia, arthralgia  
 Urinary frequency, enuresis

subject is atopic if there is at least one positive reaction (either skin prick test or *in vitro* test for specific IgE) on testing to the most prevalent pollen, mould, house dust mite and pet in his or her environment. Approximately 99% of atopic individuals can be detected using this short list of allergens, with only marginal gains in detection of atopy being achieved from the use of more allergens.<sup>5</sup> If the subject is atopic, extended testing may yield further information about specific reactivities.

Testing for specific IgE-mediated hypersensitivity is usually indicated for conditions that are in categories A and B in the table; is sometimes necessary in assessing differential diagnoses for conditions in categories C, D and E; but is not conventional practice in category F conditions.

**Investigations****Tests related to IgE-mediated disorders****Skin prick test**

The skin prick test is positive when mast cell-bound IgE antibody specific to the allergen is present. For proper interpretation and safety, the test needs to be performed with appropriate technique, controls and precautions. Properly conducted, it is highly sensitive, and is regarded as the gold standard test for demonstration of specific IgE or atopy.

In the past, skin prick testing was avoided in infants. However, objective studies have now demonstrated that the skin of young children and infants, even newborns, produces reactions similar to those of older children and adults, but the reactions are smaller.<sup>6</sup> The performance and interpretation of skin tests in infants are more difficult than in older individuals, and such tests should be used selectively.

An article devoted to the skin prick test (including practical guidelines) will appear in a forthcoming issue of *Medicine Today*.

**Skin intradermal test**

The skin intradermal test is more traumatic than the skin prick test and is more likely to cause an anaphylactic reaction because a larger amount of allergen is injected into the skin. It is also more sensitive, but in atopic disorders the increased sensitivity comes at the cost of many positive results that are not clinically relevant. A specialist procedure, it is mainly used for investigating insect sting and drug allergies and for titrating the initial dose of diluted reagents for immunotherapy.

**The mixed reputation of allergy**

**testing results mainly from lack of appreciation of the clinical situations to which the tests are applicable**

**In vitro tests**

**Total serum IgE.** A measure of the total serum IgE level has a low sensitivity and specificity for atopy. Total serum IgE is often grossly elevated in subjects with concurrent atopic eczema and asthma.

**Phadiatop® test.** This test measures the aggregate specific IgE against a large number of allergens in a single solid phase, and is a more sensitive method than the total serum IgE level in determining whether a person is atopic.

**In vitro tests for specific IgE.** *In vitro* tests for specific IgE, such as the radioallergosorbent test (RAST), are designed to provide the same information as a skin prick test, but are less sensitive. Their advantages over the skin prick test are that no special training is necessary, they can be performed independently of medication or skin condition, and they can be used where even skin prick testing would carry a risk of anaphylaxis. The Medicare rebate constraints mean that multiple allergens are often grouped

in a single test (for example, grass mix, animal mix).

### Tests related to type IV or delayed hypersensitivity

#### Skin patch test

The skin patch test is used mainly in the investigation and confirmation of allergic contact dermatitis. It is not helpful in the investigation of allergic rhinitis, urticaria and asthma. Its usefulness in atopic eczema is under investigation, and its use is not established practice in this condition, except when classical contact dermatitis (to topical medications, for example) is a complication.

#### Other tests

##### Direct oral challenge test

The direct oral challenge test can be used in highly selected subjects to test for suspected drug (for example, antibiotic) and food allergy or intolerance. It should only be carried out under specialist supervision as potentially dangerous reactions may occur during the procedure.

#### Miscellaneous tests

Other laboratory tests available include cytology of secretions, measurement of mediators and eosinophil products (for example, eosinophil cationic protein), CT and MRI scans, and rhinoscopy. However, many of these are better left to the specialists.

#### Unproven diagnostic procedures

Notable examples of unproven diagnostic procedures are the Vega test, Bryan's cytotoxic test, iridology, applied kinesiology, hair analysis and a myriad of 'pseudotests'. These procedures should not be used as allergy tests because they do not have a scientific basis to their use for such a purpose.

### When to refer

A patient should be referred to an allergy or immunology specialist in the following situations:

- any anaphylactic or anaphylactoid reaction or other immediate systemic allergic reactions
- asthma – there is a case for evaluation of all subjects with asthma: priority should be given to those patients with brittle or anaphylactic features, levels of drug therapy which are causing concern, or significant concurrent atopic disorders

- atopic eczema in infants – most cases of food anaphylaxis come from this group of subjects
- troublesome rhinosinusitis or conjunctivitis, or frequent 'colds'
- when major environmental or dietary change is considered
- any patient considered for specific allergen immunotherapy
- drug allergy
- food allergy or intolerance
- chronic urticaria or angioedema
- where families have committed to an 'allergy' approach to a condition in which the role of allergy is speculative.

### Conclusion

The mixed reputation of allergy testing results mainly from lack of appreciation

of the clinical situations to which the tests are or are not applicable. Careful attention to this and the clinical pretest probability should enable discerning and useful application of allergy tests. **MT**

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### Further reading

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