The Royal College of Pathologists

Lay Advisory Committee

Allergy and allergy tests

A guide for patients and relatives

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SUMMARY

Your general practitioner (GP) will be able to deal with most of the common allergies. For more complex problems, referral to a hospital doctor who specialises in allergy may be worthwhile. Appropriate tests may help define the cause of a particular allergy.

Before any tests are done, it is most important that full and clear details of the allergic problems (the **medical history**) are considered. This information alone may indicate that a particular form of allergy is causing the symptoms, or may allow allergy to be confidently ruled out because the doctor or nurse recognises that a different (non-allergic) problem is being described.

Testing for allergy without first knowing a patient's **medical history** is poor practice and is likely to be unhelpful or even misleading. Some tests produce unreliable results. In eczema, **false positive** results are common. (An example might be a positive blood test for wheat allergy in someone who can eat wheat without any symptoms at all and certainly with no clear adverse effect on the eczema). Unorthodox practitioners who lack specialist allergy training may find it difficult to select the correct tests. For some allergies, there are no reliable tests available.

Reliable sources of advice about allergy tests can be obtained from a number of impartial, non-commercial authorities. Some of these are listed on page 7 of this booklet.

1. INTRODUCTION

According to the British Allergy Foundation, 40% of the population in the UK suffer from some sort of allergy. Some allergies (peanut allergy, for example) are becoming more common. The reasons for this increase are not clearly understood.

This guide aims to give you information about allergies and allergy testing.

Some of the words and phrases used here, shown in **bold**, are explained in the glossary (see Section 18).

2. WHAT IS 'ALLERGY'?

'**Allergy**' is a word used to describe an exaggerated (excessive) response to a substance, which is normally harmless. Usually the body's defence system (**immune system**) fights infections. An allergy develops when the allergy triggers, or **allergens** activate, the immune system. The immune system behaves as if the allergen is a dangerous invader and responds by producing an allergic **antibody** (**Immunoglobulin E**, or **IgE**). In parallel, allergen-reactive white blood cells develop. These include **mast cells**. IgE causes mast cells to release defence chemicals, which unfortunately cause unpleasant symptoms such as **irritation** and **inflammation** (**allergic response**).

3. WHAT IS AN 'ALLERGEN'?

An **allergen** is a substance that triggers the immune system to overreact. The type of allergen can vary. For example, it may be a wasp sting in one person, or penicillin in another. The allergen usually contains protein. Some allergens, such as some drugs, are not made up of protein, but cause a reaction when they attach themselves to natural proteins within a person's body. Some substances cause more problems than others. For example, many people are allergic to nuts, but few people are allergic to rice.

4. CAN I BE ALLERGIC TO LOTS OF DIFFERENT THINGS?

It is very unusual for anyone to be allergic to more than a small number of different items. The idea that someone may be so allergic to several hundred different agents that they need to live in an allergen-free 'bubble' is usually not allergy at all. It is more likely to be a fluctuating general malaise, incorrectly attributed to allergy. In some cases, a single isolated allergy, egg for example, may explain reactions to a wide range of different foods, each containing egg as a common ingredient.

5. CAN I CATCH AN ALLERGY?

No, but allergies can be seen more commonly in some families (see Section 7). Allergies cannot be passed from person to person by touch or through the air.

6. CAN ALLERGIES BE DANGEROUS?

The vast majority of symptoms caused by allergy result in discomfort and **irritation** rather than serious ill health. Some of these conditions can, however, be very distressing and unpleasant.

Death from a severe allergic reaction (**anaphylactic shock**) is thankfully a very rare occurrence. Such deaths are often highlighted in the press or on television, making them appear commoner than they really are. It is important to remember that each year, in England and Wales, less than one person in a million die as a direct result of an allergy. Half of these deaths occur in hospital as a complication of medical treatments (e.g. penicillin), investigations (e.g. certain injected X-ray test substances) or anaesthetics. Remember, however, all these severe reactions are very rare.

7. WHY DO SOME PEOPLE HAVE ALLERGIES WHILE OTHERS DO NOT?

Allergic conditions often run in families. The increased risk of allergy can be passed from parent to child (**genetic inheritance**). **Asthma** and eczema are commoner in these families. But specific allergies (like fish allergy) are not particularly likely in the brothers and sisters of affected people. Tests for the genes involved are not available. Those people who are more likely than others (predisposed) to develop allergy are said to have 'atopy' or be **atopic**. Atopic people often produce the allergy antibody **Immunoglobulin E** (or **IgE**) in larger quantities than people without atopy. The IgE can be measured in allergy tests.

8. WHAT IS THE DIFFERENCE BETWEEN 'ALLERGY' AND 'INTOLERANCE'?

Some problems turn out not to be true allergy after all. Some examples are shown in the table below. Many people with **asthma** or **urticaria** (**nettle rash**) do not have 'allergies', even though both these conditions are classical ways for allergy to show up. This again emphasises the need for a good **medical history** and expert interpretation.

'**Allergy**' involves the immune system and tends to occur on each and every exposure. Many allergy tests measure specific immune factors triggered by allergies.

'**Intolerance**' does not involve the immune system and so allergy tests will be useless. Sometimes the intolerance is scientifically understood (an enzyme deficiency and specific forms of food intolerance, for example), but more often the explanation is not clear. There is no blood test for 'petrol fumes' because, although these irritate the body, they do not trigger an **IgE** immune response. The problem is 'intolerance' relating to the fumes.

Examples

Condition	Symptoms	Possible allergic causes	Possible non-allergic causes
Asthma	Shortness of breath	House dust mite	Dust, fumes, exercise, cold air
Conjunctivitis	Swollen, red eyes	Pollens, pet hair	Contact lenses
Rhinitis	Blocked nose, runny nose, sneezing	House dust mite	Alcohol, infection
Urticaria (**Nettle rash**)	Itchy red rash with swelling (**wheals**)	Reaction to certain foods such as nuts	Sunshine/heat (prickly heat) or extreme cold
Angioedema	Swelling of the tongue, throat, lips and face	Bee sting, nut allergy	Side effect of certain drugs, e.g. some blood pressure pills

9. HOW DO I KNOW IF I HAVE ALLERGY?

In order to find out if you have allergy and identify what is causing the problem (symptoms), a doctor or specialist nurse will first need to know your **medical history**. Then he/she may arrange to have some **allergy tests** performed.

10. MEDICAL HISTORY

Details about the symptoms, such as when and where they occur and what seems to trigger them, are part of a person's **medical history**. This will show a doctor whether or not **allergy tests** might be helpful. Often there is no need for allergy testing. For example, egg allergy is unlikely if eggs are only associated with symptoms on some days but not others. Allergy tends to occur even with tiny doses. Sometimes an allergy is lost when a food is cooked. This may be seen, for example, with people who are allergic to apples.

11. ALLERGY TESTS

When a person's **medical history** shows that allergy might be a cause of the symptoms, then tests can either pinpoint or rule out various causes. This history also needs to be taken into account when any tests are interpreted.

It is vital that trained doctors or nurses, with the specialist knowledge to ensure that the correct tests are used perform testing.

There are three medically accepted tests (see Sections 12, 13 and 14), which can be helpful when used properly. All three are available in specialist NHS centres (the list is available from the BSACI, see Section 16 for details).

12. SKIN 'PRICK' TEST

The **skin 'prick' test** is probably the most commonly used **allergy test**. Twenty-five **allergens** can be tested in one session. Allergens are selected according to the **medical history**. The tests can be carried out on any age group, including babies, and are very safe.

Skin 'prick' tests give similar results to the blood test described below. Both detect **IgE antibody** but in this case it is present in the skin, rather than in the blood.

A drop of liquid (**allergen solution** or **extract**) is placed on the skin (usually the forearm) and the area is marked with a marker pen. The skin beneath the liquid is then gently scratched with the tip of a small needle. This allows the test liquid to enter beneath the skin and react with immune cells in the skin. This procedure is slightly uncomfortable but children often prefer it to a blood test. The skin 'prick' test gives an 'on the spot' answer and results can be interpreted within 15 minutes. If a red, itchy lump (**wheal**) develops where the liquid was scratched in, this suggests the person is allergic to that particular liquid. The average size of the wheal is typically 5–10 mm in diameter and is very itchy. It lasts around 30 minutes or so, before returning completely back to normal.

The skin 'prick' test will always also include positive and negative 'quality controls'.

The **positive control** is an artificial solution containing pure **histamine** (a simple chemical that the body produces when we develop allergy) and everyone is expected to react to this. If someone does not react to this solution, it could mean the medicines they are taking (**antihistamines** and others) are blocking the test. People are asked not to take medicines such as **antihistamines**, cough medicines and some **anti-depressants** during the 48 hours before the test.

The **negative control** is a sterile salt-water (saline) solution and nobody is expected to react to this. Any reaction would mean that the skin is extremely sensitive and **false positive** tests are a strong possibility. The test in these cases may need to be rejected as unreliable.

Although these tests are very safe, it is best if experts carry them out in hospital, especially if the person has previously had a severe reaction. Bad reactions in this test are very unusual but might involve a more widespread area of skin swelling or itching spreading up the forearm, again lasting 30 minutes or so.

13. BLOOD TEST

This test measures the amount of **IgE** allergy antibody (in a blood sample) for a suspected allergen. So, in a person suspected of being allergic to eggs, a doctor would ask for '**IgE** to egg'. A blood sample can be taken at your GP surgery or at a hospital. Blood is usually taken from a vein in the arm, using a fine needle and small syringe. The sample is sent to a central laboratory. Typically, results may not be available for a few weeks because testing in batches is most cost-effective.

Results are given in grades from 0 (negative), grade 1 (weak positive) up to grade 6 (strong positive). Note that higher values do not imply more serious allergy. The test is, however, useful in several ways. Negative test results help eliminate particular allergies.

The range of allergens available for testing is limited (a few hundred in total) and tests tend to be restricted to the more common allergies – cat, peanut, house dust mite, egg, etc. **IgE** blood tests are available for wasp or bee allergy, but are not routinely available for unusual culprits like fireflies, for example.

Blood tests are used when skin 'prick' tests are not available or in circumstances where they are not suitable, such as:

- if there is extensive eczema
- if antihistamine **medication** cannot be stopped for any reason
- when no skin test is available.

NB For some allergies, skin tests are superior to the equivalent blood test.

NB **IgG-based allergy tests** are best avoided. **IgG** antibodies (see Section 18) to foods, for example, are found commonly, even in healthy non-allergic individuals. For example, **IgG** antibody to wheat gluten is found in 10% of normal healthy people who eat wheat regularly without problem.

14. SKIN 'PATCH' TEST

This test is very different from the tests discussed above. Patch tests are especially useful in certain types of slow onset reactions, typically eczema: a nurse whose sore hands worsen during the working week but improve while she is on holiday may have a 'contact' eczema to a substance encountered at work. Possibilities might include rubber surgical gloves, handled iodine disinfectants or some other work-related substance. These tests are also useful for skin irritation localised to where jewellery, fabrics, cosmetics and other items touch the skin. Typically, the irritation takes hours rather than minutes to develop.

This test involves placing several circular test patches (measuring about 2 centimetres across) on the patient's skin, usually on their back. After two days, the patient must return to the hospital clinic for patch removal and test interpretation. The tests tend to be done in specialist hospital clinics dealing with skin problems (**dermatology clinics**) because the results can be complicated and difficult to interpret. They are only useful for allergies involving slow onset (delayed) rashes. By and large, these tests are not useful in cases of skin allergy occurring *immediately* on contact with an allergic trigger.

15. COMMERCIAL ALLERGY TESTS (from supermarkets, high street shops or by post)

These are *not* recommended. Some forms of postal testing (requiring hair or urine or other unorthodox samples) are of dubious scientific value. NHS-based laboratories and clinics are expected to perform to minimum standards and in so doing earn an accreditation certificate. Many commercial establishments operate to poorer quality standards.

Failure to limit test selection and failure to interpret test results against the details of the patient's symptoms and medical history leads to confusion and error and is strongly discouraged.

16. RELIABLE SOURCES OF ADVICE

Allergy testing is a specialist subject. People who are not specially trained may find it difficult to select the correct tests, so it is important to have reliable sources of advice. Lists of recognised specialist allergy clinics are available via the British Society for Allergy and Clinical Immunology (BSACI) (see below).

You could also approach:

- your GP (all have a copy of the handbook issued by the British Society for Allergy and Clinical Immunology, which lists all specialist UK allergy clinics)
- your practice nurse
- your health visitor
- school nurse
- NHS Direct (Tel: 0845 46 47)
- British Allergy Foundation (Tel: 020 8303 8583)
- British Society for Allergy and Clinical Immunology (tel: 0207 404 0278; email: info@bsaci.org).

17. SOME USEFUL WEBSITES

- The Anaphylaxis Campaign: www.anaphylaxis.org.uk
- The American Academy of Allergy Asthma and Immunology: www.aaaai.org
- The British Society for Allergy and Clinical Immunology: www.bsaci.org
- a site warning against bad advice: www.quackwatch.com

18. GLOSSARY OF TERMS

Allergen
The substance that triggers an abnormal excessive allergic immune response.

Allergen solution
A liquid form of a substance used in testing for allergy.

Allergic response
Unpleasant symptoms (itchy rash, sneezing, etc.) caused by an allergen.

Allergy
A word used to describe a body's response to a substance, which is normally harmless.

Allergy tests
There are three medically accepted tests which, along with a person's **medical history**, may be used to help diagnose allergy. The medical history is always the most useful pointer to the correct diagnosis.

Anaphylactic shock
A rare but life-threatening allergic reaction.

Angioedema
A reversible swelling, often occurring around the face or mouth, usually lasting 24 hours or less.

Antibody
A defence substance made by the human body's immune system to fight disease.

Anti-depressants
Drugs that help to stop people feeling depressed.

Antihistamine
Medication that helps reduce allergic symptoms.

Asthma
Reversible breathing problems, typically featuring wheezing or chest tightness. Sometimes caused by allergies, typically to allergens that are **inhaled**.

Atopic
A word is used to describe people who have a tendency towards allergy or 'atopy'.

Conjunctivitis
Irritation and inflammation around the outer lining of the eyes.

Dermatology clinic
A specialist hospital clinic dealing with skin problems.

Extract
A concentrated preparation (for example, of the allergen).

False positive
A test result which incorrectly shows a positive reading and may lead to a wrong diagnosis.

Genetic inheritance
A condition passed down generations of a family, from parent to child, through their genes.

Hayfever
Summertime tendency to **conjunctivitis** and **rhinitis** due to pollen allergy.

Histamine
A substance made in the body and released during allergic disease to cause allergy symptoms.

IgE
A short way of writing **Immunoglobulin E**.

IgG
Another type of antibody, different to **IgE** and not involved in allergy reactions.

Immune system
The human body's defence system.

Immunoglobulin E
An antibody made by the body's immune system and often involved in allergic reactions.

Inflammation
An unpleasant response of the body (heat, swelling, redness) to a trigger substance, e.g. allergen.

Inhaled
Breathed in.

Intolerance
Not acceptable/causing harm (to the human body).

Irritation
An unpleasant response of the body (itching) to a substance such as an allergen.

Mast cells
Cells in the body's immune system that release chemicals (histamine and others) that cause an allergic response.

Medical allergist
A medical doctor specially trained in allergy.

Medical history
Details of a person's symptoms, probably together with details of past illnesses and family medical history.

Medication
Any medicine (pills, tablets, liquid, sprays, inhalers) taken or used to reduce or prevent symptoms.

Negative control
Something which is not expected to provoke a reaction, and which can help check the true findings (believability) of test results.

Nettle rash
See **urticaria**.

Non-allergic cause
A cause which does not involve the immune system.

Positive control
A sample designed to give a clear positive result in a test. It is used to check that a test is working correctly.

Rhinitis
Nasal blockage and/or sneezing and/or dripping.

Sensitivity
More likely to react than other normal people. This is not allergy.

Skin 'patch' test
An allergy test. Full description on page 6.

Skin 'prick' test
An allergy test. Full description on page 5.

Urticaria
Red, raised, very itchy rash or wheal. Also known as **nettle rash**.

Wheal
The rash seen in **urticaria**.