Allergies

Allergies are the body's response to a substance called an allergen. Allergens themselves may not be harmful. However, in some people, things that are usually harmless can provoke a reaction.

Allergic reactions vary and include many different symptoms. Some reactions can be severe and threaten life - this is called anaphylaxis. Some people have a condition called atopy which makes them prone to allergies. Testing for allergies can be complicated and is not always needed. Medication, including antihistamines, can work well for many types of allergy.

What causes allergies?

An allergy is a response by the body's immune system to something (called an allergen) that is not necessarily harmful in itself. Certain people are sensitive to this allergen and have a reaction when exposed to it. Some allergic reactions are mild and harmless, but others are severe and potentially life-threatening (anaphylaxis).

What is a food intolerance?

A food intolerance is not the same as a food allergy. Many people incorrectly use the words interchangeably. A food allergy occurs when the body's immune system reacts abnormally to specific foods. No allergic reaction takes place with a food intolerance. People with a food intolerance may have digestive symptoms such as diarrhoea, bloating and stomach cramps. These are quite common symptoms anyway. In food intolerance the symptoms may be caused by difficulties digesting certain substances in food. One example is lactose, a sugar found in milk and dairy products.

Differences between food allergy and intolerance include:

- The symptoms of food intolerance occur usually a few hours after eating the food. Allergic reactions happen much more quickly.
- With allergy, even a tiny amount of the food can cause an allergic reaction to take place. Some people with a severe allergy to nuts might experience anaphylaxis after eating something made in a factory that also handles nuts, or after kissing someone who has recently eaten nuts. With food intolerances you need a lot more of the food to cause the symptoms.
- Food intolerances are never life-threatening. Some allergies are - they can cause anaphylaxis.

See the separate leaflet called Food Allergy and Intolerance for more details.

How common are allergies?

Allergies are very common. About 1 in 4 people in the UK are affected by an allergy at some time during their lives. Each year the number of affected people increases.

It is estimated that half a million people in the UK have had an anaphylactic reaction to venom (from bees or wasps). Nearly a quarter of a million people under the age of 45 have had anaphylaxis due to nuts.

A manifesto from the European Academy of Allergy and Clinical Immunology (EAACI) published in 2017 is calling for concerted policy action to tackle the 'allergy crisis in Europe'. It points out that allergy is the most common chronic disease in Europe. Up to 1 in 5 patients with allergies live with a severe debilitating form of their condition; they struggle daily with the fear of a possible asthma attack, anaphylactic shock, or even death from an allergic reaction. The manifesto proposes a series of evidence-based recommendations to tackle the burden of allergy in Europe, foster allergy research and help strengthen Allergology as a medical specialty. It is available in 'Further Reading and References', below.

Who develops allergies?

Anyone can have an allergy. About half of people with allergy are children. Some people are more prone to allergic problems due to a condition called atopy (see below). Food is a common trigger in children whilst, in older people, medicines are common culprits.

Allergic reaction symptoms

Allergic reactions can vary and may include a number of different symptoms. So, with an allergy you may develop one or more of the following:

- **Inflammation of the nose (rhinitis)** - causes runny nose or nasal congestion and sneezing.
- **Inflammation of the eyes (conjunctiontivitis)** - leads to watering, itching and a hot feeling in the eyes.
- **Skin rashes** - the typical allergic rash is an urticarial rash, which is also known as hives or nettle rash. It is very itchy. Flushing of the skin is also common.
• **Swelling of the tissues (angio-oedema)** - this can include the lips, tongue, throat and eyelids. It can start with a tingling feeling. Angio-oedema is potentially very serious, as airway obstruction can occur (and so breathing might stop). People might have difficulty talking or swallowing.

• **Breathing difficulties** - these include wheezing, chest tightness and breathlessness, and can occur in severe allergic reactions and anaphylaxis. This can be life-threatening.

• **Cardiovascular collapse** - this can cause death. It is the end stage of anaphylaxis. The chemicals released by the body in an extreme allergic reaction can make blood pressure drop dramatically. This can lead to loss of consciousness and to the heart stopping (cardiac arrest). Resuscitation is required.

• **Other symptoms** - these can include:
  - A sense of impending doom.
  - Tummy (abdominal) pain.
  - Feeling sick (nausea).
  - Being sick (vomiting).
  - The feeling of having a 'thumping' heart (palpitations).

### Common allergens

Things that people are commonly allergic to include:

- Tree and grass pollens.
- House dust mite.
- Animals, especially domestic pets such as cats and dogs.
- Insect venom such as that contained in wasp and bee stings.
- Medicines - for example, the antibiotic penicillin.
- Foods, such as nuts and eggs.
- Chemicals such as latex.

See the separate leaflets called **House Dust Mite and Pet Allergy**, **Nut Allergy** and **Drug Allergy**.

Of course, there are a great many other allergens, too many to list. Most allergens are proteins; however, some (for example, medications) are not. These need to be bound to a protein once they are in the body before they can cause an allergic response.

### What happens in an allergic reaction?

During an allergic reaction, a complex series of events occurs within the body. These events are co-ordinated by the immune system. Sometimes the immune system 'goes into overdrive'. If this happens, the body can lose control of its vital functions, with catastrophic results. Such a severe reaction can cause death.

An allergen is regarded by the immune system as a foreign substance. When the immune system detects an allergen, it produces an immune system protein called an antibody. Antibodies are also called immunoglobulins. An immunoglobulin commonly involved is called IgE. The immune system stores this in its memory (this is called sensitisation). This means that you do not have an allergic reaction the first time you come into contact with a specific allergen.

If it meets this substance again, the immune system remembers the previous exposure. Antibodies help to attack the invading allergen the immune system believes to be dangerous. A chain reaction is set up whereby other chemicals are released by different blood cells. These chemicals cause the symptoms of an allergic reaction. Histamine is one such chemical (hence, antihistamines are medications often used to counter the effects of an allergic reaction).

### Do different allergies cause different symptoms

Substances which cause an immediate release of allergy chemicals such as histamine into the bloodstream cause generalised symptoms (for example, generalised itching of the body). However, some substances cause a local reaction, depending on which part of the body they first come into contact with.

Some people, for example, have a type of allergic reaction to certain foods that only causes symptoms in the mouth and throat. This involves itching, tingling, and swelling of the mouth, lips and throat. Fresh fruit, vegetables and nuts commonly cause this. It can be confused with anaphylaxis. It has the potential to be serious, as swelling in the mouth and throat can affect the ability to breathe, but this is rare. The symptoms start within minutes of eating and tend to settle completely within an hour. An ambulance should be called immediately if you feel faint, have difficulty breathing or feel like your throat is closing up.

Another example is pollen, which may cause localised symptoms such as stuffy nose, itchy eyes and wheezing.

### Anaphylaxis

| Anaphylaxis is a life-threatening allergic reaction. It is a medical emergency. If you suspect someone has anaphylaxis, you should dial 999/112/911 for an ambulance. |

The symptoms of anaphylaxis include:
• Breathing problems and a swelling of the tissues (angio-oedema).
• Collapse and loss of consciousness.

Look to see if the person is wearing a medical emergency bracelet or similar. Are they carrying an adrenaline (epinephrine) pen (for example, EpiPen®)? If they are, you could save their life by administering it.

See the separate leaflets called Anaphylaxis and Dealing with an Allergic Reaction for more details.

**Atopy**
Some families seem particularly prone to allergies. They have a condition known as atopy and are hence known as atopic individuals. People in atopic families can develop problems such as asthma, eczema and hay fever. It is an inherited problem and these people are more likely to develop an allergic disorder. Atopic individuals seem to produce more of the antibody IgE, related to allergic reactions.

See the separate leaflets called Asthma, Atopic Eczema and Hay Fever for more details.

**Allergy testing**
This is commonly requested, but not always useful.

It is often a fairly scarce resource in NHS hospitals and so there may not be any local facilities. Tests can be expensive and do not always reveal a cause. Many people mistakenly believe there is a blood test they can have to check for any specific allergy.

It is more useful to prove a suspected allergy, rather than to screen randomly for any allergy. This is because virtually anything can potentially cause an allergic reaction. There are an infinite number of allergens - certainly too many to test for. Most allergy tests involve testing for a few common allergies.

Current media attention seems very focused on allergies and intolerances. It is true that, as a nation, allergic disorders are becoming more common, and we are not exactly sure why. However, many people seem keen to diagnose themselves with allergies and intolerances. There are many unscrupulous (non-medical) individuals who are prepared to charge money for unproven, unscientific 'tests' to 'prove' such problems.

If you suspect you have a specific and significant allergy, you should discuss this with your GP. Commercial allergy testing kits are not recommended. This is because they are often of a lower standard than those done in the NHS or by reputable private clinics. Do not waste money on private non-medical testing, particularly tests bought from the internet or tests that involve analysing hair or electrical impulses in the fingers. Many people have been incorrectly diagnosed with allergies and intolerances this way and, as a result, exclude foods from their diet unnecessarily. Sometimes this can put their health at risk.

**Skin prick tests**
Skin prick allergy tests can be used to identify the cause of allergy in some circumstances. Suspected allergies to aero-allergens, especially animal danders and pollens, are particularly appropriate. Testing for some food allergies can be performed this way too.

The allergens are mixed with liquid to make a solution. A drop of each liquid is placed on the arm and a needle is used to prick the skin, beneath the droplet of fluid. This means that a tiny amount of allergen can breach the skin. The skin is observed for allergic reaction. A reaction is considered 'positive' when the skin becomes itchy and red, and there is a raised white swelling called a wheal surrounding the reddish areas. This settles down over a few hours.

See the separate leaflet called Skin Prick Allergy Test for more details.

**Blood tests**
Blood tests can be done in some circumstances, for some suspected allergies. They are sometimes called radioallergosorbent testing (RAST). The tests measure the amount of IgE antibody (the immunoglobulin protein made by the immune system) in the blood that has been produced against a suspected allergen. RAST is scored from 0 to 6, depending on the amount of allergen-specific IgE. A 6 means that there is an extremely high level of IgE for that allergen, so the person is very sensitive/allergic to that allergen.

Blood tests are safer in cases where a person has had a very extreme allergic reaction, such as anaphylaxis. Skin prick testing in these people would be potentially dangerous. Blood tests for allergies can be carried out whilst people remain on antihistamine medication (skin prick testing cannot). So it is useful if people have such severe symptoms that they cannot stop their medication.

**Patch testing**
This form of testing is used for cases of skin allergies. This is called contact dermatitis - a condition in which people develop patches of eczema (dermatitis) as a reaction to certain substances (allergens) that the skin is in contact with. This includes certain metals, plastics and rubbers, and chemicals found in products applied to the skin.

See the separate leaflet called Patch Testing for Contact Dermatitis for more details.
Allergic reaction treatment

Avoidance of the cause
Treatment with medication often works so well that you may not have much motivation or need to avoid the cause of the allergy. However, some people may wish to try to avoid the cause of the allergy, particularly if medication is not fully effective. There are a number of measures you can take to reduce the amount of common aero-allergens.

See the separate leaflet called House Dust Mite and Pet Allergy for more details.

Medication
Treatment with nasal sprays, eye drops and/or antihistamine tablets will often ease or clear the symptoms. The treatment is the same as for any cause of allergic rhinitis or allergic conjunctivitis.

See the separate leaflets called Persistent Rhinitis, Allergic Conjunctivitis and Antihistamines or more details.

Desensitisation (Immunotherapy)
This treatment is sometimes used, mainly in allergy cases that are most severe (such as reactions causing anaphylaxis) and where symptoms are not helped much by other treatments.

People with life-threatening reactions to wasp or bee stings, those with severe hay fever and some people with some animal allergies are suitable for immunotherapy. Immunotherapy is usually unhelpful if you have multiple allergies, food allergies or allergic rashes.

It is done using a series of injections to desensitise the immune system. The allergen you are allergic to is administered in tiny quantities, via an injection. The amount used is too small to provoke the allergic reaction, but enough to teach the immune system not to produce the huge quantities of IgE antibody. Increasing doses of allergen are given at regular intervals (usually weeks-months).

Immunotherapy is time-consuming and expensive, and carries a degree of risk. For this reason it needs to be carefully supervised by a specialist and performed in a hospital outpatient setting. It would only be tried if other methods had previously failed.

A newer technique involves placing the allergen under the tongue (drops or tablets). This type of immunotherapy is increasingly being used in allergy clinics but is still not widely available. Grass pollen allergy is being treated in this way in some areas. Often, long-term treatment (up to three years) is needed for this under-the-tongue (sublingual) method.

Further reading & references
- Anaphylaxis; NICE Clinical Guideline (December 2011)
- Drug allergy: diagnosis and management of drug allergy in adults, children and young people; NICE Clinical guideline (September 2014)
- Advocacy Manifesto; Tackling the Allergy Crisis in Europe - Concerted Policy Action Needed, The European Academy of Allergy and Clinical Immunology - EAACI, (July 2017)

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