

## Introduction to Airborne Allergies

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Sneezing is not always the symptom of a cold. Sometimes, it is an allergic reaction to something in the air. Health experts estimate that over 10% of people suffer from upper respiratory tract symptoms that are allergic reactions to airborne allergens.

Pollen allergy, commonly called hay fever, is one of the most common chronic diseases. Worldwide, airborne allergens cause the most problems for people with allergies. The respiratory symptoms of asthma, which affect approximately one in twelve people, are often provoked by airborne allergens.



Overall, allergic diseases are increasing and are among the major causes of illness and disability, affecting as many 40% of children and 30% of adults.

Although the number of people suffering with an allergy has increased in the last few decades, there is more education and a greater understanding of the immense impact that allergies have on our lives, from allergy symptoms to causes to treatments.

There is no clear explanation for the increase in allergies; however there are two main theories. The first theory is that awareness and diagnosis have improved in recent years and the second is that the increase in general air pollution and indoor air pollution have made allergens more common.

## Allergies

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An allergy is characterised by an overreaction of the human immune system to a foreign protein substance (“allergen”) that is eaten, breathed into the lungs, injected or touched and which otherwise does not bother most people.

This immune overreaction can result in symptoms such as coughing, sneezing, itchy eyes, runny nose and scratchy throat. In severe cases it can also result in rashes, hives, lower blood pressure, difficulty breathing, asthma attacks, and even death.

People who have allergies often are sensitive to more than one substance. Types of allergens that cause allergic reactions include:

- Pollens
- House dust mites
- Mould spores
- Food
- Latex rubber
- Insect venom

- Medicines

Allergy is not necessarily the same as sensitivity or intolerance to a substance. This is particularly so in the area of food where, for example, lactose intolerance is not classed as a food allergy because the symptoms do not arise from the immune system.

## Allergy sufferers

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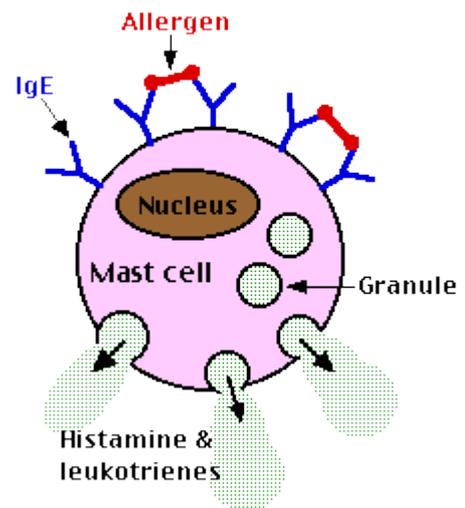
Scientists think that some people inherit a tendency to be allergic from one or both parents. This means they are more likely to have allergies. They probably, however, do not inherit a tendency to be allergic to any specific allergen. Children are more likely to develop allergies if one or both parents have allergies. In addition, exposure to allergens at times when the body's defences are lowered or weakened, such as after a viral infection or during pregnancy, seems to contribute to developing allergies.

## Allergic reactions

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Normally, the immune system functions as the body's defence against invading germs such as bacteria and viruses. In allergic reactions, the immune system is responding to a false alarm. When an allergic person first comes into contact with an allergen, the immune system treats the allergen as an invader and gets ready to attack.

The immune system does this by generating large amounts of immunoglobulin E (IgE), a type of antibody. Each IgE antibody is specific to one particular substance. In the case of pollen allergy, each antibody is specific for one type of pollen.



IgE is special because it is the only type of antibody that attaches tightly to the body's mast cells, which are tissue cells, and to basophils, which are blood cells. When the allergen next encounters its specific IgE, it attaches to the antibody like a key fitting into a lock. This action signals the cell to which the IgE is attached to release powerful chemicals, including histamine, which cause the symptoms of allergy.

## Symptoms

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The symptoms of airborne allergies are familiar to many:

- Sneezing, often with a runny or clogged nose
- Coughing and postnasal drip
- Itching eyes, nose, and throat

- Watery eyes
- Conjunctivitis
- “Allergic shiners” (dark circles under the eyes caused by increased blood flow near the sinuses)
- “Allergic salute” (in a child, persistent upward rubbing of the nose that causes a crease mark on the nose)

In people who are not allergic, the mucus in the nasal passages simply moves foreign particles to the throat, where they are swallowed or coughed out. But something different happens in a person who is sensitive to an airborne allergen.

In sensitive people, as soon as the allergen lands on the lining inside the nose, a chain reaction occurs that leads the mast cells in these tissues to release powerful chemicals, including histamine. These powerful chemicals contract certain cells that line some small blood vessels in the nose, causing fluids to escape and the nasal passages to swell—resulting in nasal congestion. Histamine can also cause sneezing, itching, irritation, and excess mucus production, which can result in allergic rhinitis.



Some people with an allergy develop asthma, which can be a very serious condition, whose symptoms include:

- Coughing
- Wheezing
- Shortness of breath

The shortness of breath is due to a narrowing of the airways in the lungs and to excess mucus production and inflammation. Asthma can be disabling and potentially fatal.

## Risk factors

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**Genetics:** The risk of having an allergy amongst the general population is around 10-20%. However, if one parent is allergic, a child’s risk rises to 50% and if both parents are allergic, to 75%.

**Age, sex, and siblings:** On average, children are more likely to suffer from allergy than adults (children can sometimes ‘grow out of’ allergic disease) and the onset can occur at any age. More boys than girls have atopic asthma and hay fever, although this difference reduces in adult life. Children from large families and those with older siblings are less likely to develop allergies, probably because they are more exposed to childhood infection, which makes the developing immune system less likely to over-react to an allergen.

**Early-life, or extreme/sudden, allergen exposure:** It has been suggested that exposure to allergens like cigarette smoke, traffic pollution, dust, pollen, mould and pet dander in early life may increase a child's risk of developing an allergy. For example breast feeding for six months or more has been shown to decrease the risk of asthma and other allergies in babies. Premature babies are also more at risk of developing allergies than full-term babies.

## **The most common allergic diseases**

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**Asthma** is a disease of the lungs that causes airways to become blocked or narrowed making it difficult for you to breathe. It's harder to breathe in than breathe out. Asthma attacks are caused by triggers which are either allergens (like house dust mite, mould, pet dander) or irritants like cigarette smoke, traffic pollution or cold air.

Asthma attacks are usually temporary, but if an asthma episode is severe, a person may need emergency treatment to restore normal breathing. Despite the far reaching effects of asthma, much remains to be understood as to what causes it and how to prevent it.

Asthma is potentially the most serious of the allergic diseases. In the UK, for example, during 2008-9, there were nearly 80,000 hospital admissions for asthma of which nearly half were of children aged 14 and under.

Although asthma can cause severe health problems, in most cases prevention and treatment can control it and allow a person to live a normal and active life.

**Hay fever** (seasonal rhinitis) is characterised by itchy nose and eyes, sneezing and runny nose. In the UK it is mainly caused by exposure to grass pollen (perennial rye and timothy grass).

**Perennial rhinitis** persists all year round. Sometimes people with perennial rhinitis do experience worse symptoms in the pollen season. Around 50% of those with perennial rhinitis have an allergy while the rest have some other problem with their nose or sinuses.

## The most common airborne allergens

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The most common allergens vary from location to location. In the UK for example, the most common inhaled allergens are, in the following order:

1. House dust mite
2. Grass pollen
3. Cat dander
4. Tree pollen

Asthma triggers also include:

- Traffic pollution
- Certain chemicals and gases such as VOCs
- Cigarette smoke



## The 'Allergy Season'

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If you are allergic to pollen, you will need to be aware of seasonal variations. Other allergens like house dust mite, traffic and other indoor pollution, tend to be present year-round.

The pollen season varies for different plants and, in the UK, it lasts from early Spring to late Autumn.