

## Healthy Steps to Managing Airborne Allergies

Sneezing is not always the symptom of a cold. Sometimes, it is an allergic reaction to something in the air. Health experts estimate that 35 million Americans 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 in the United States. Worldwide, airborne allergens cause the most problems for people with allergies. The respiratory symptoms of asthma, which affect approximately 11 million Americans, are often provoked by airborne allergens.

Overall, allergic diseases are among the major causes of illness and disability in the United States, affecting as many as 40 to 50 million Americans.

	Allergies	Colds
<b>Symptoms</b>	Runny or stuffed nose, sneezing, wheezing, watery and itchy eyes.	Can include fever and aches and pains along with allergy symptoms.
<b>Warning Time</b>	Symptoms begin almost immediately after exposure to allergen(s).	Usually take a few days to hit full force.
<b>Duration</b>	Symptoms last as long as you are exposed to the allergen, and beyond, until the reaction triggered by the allergen ends. If the allergen is present year-round, symptoms may be chronic.	Symptoms should clear up within several days to a week.

### *What is an allergy?*

An allergy is a specific reaction of the body's immune system to a normally harmless substance, one that does not bother most people. People who have allergies often are sensitive to more than one substance. Types of allergens that cause allergic reactions include:

- Food
- House dust mites
- Insect venom
- Latex rubber
- Medicines
- Mold spores
- Pollens

### ***Why are some people allergic?***

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 defenses are lowered or weakened, such as after a viral infection or during pregnancy, seems to contribute to developing allergies.

### ***What is an allergic reaction?***

Normally, the immune system functions as the body's defense against invading germs such as bacteria and viruses. In most allergic reactions, however, 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 a type of antibody called immunoglobulin E, or IgE. Each IgE antibody is specific for one particular substance. In the case of pollen allergy, each antibody is specific for one type of pollen. For example, the immune system may produce one type of antibody to react against oak pollen and another against ragweed pollen. The IgE molecules are special because IgE 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 (and, in some cases, to produce) powerful chemicals like histamine, which cause inflammation. These chemicals act on tissues in various parts of the body, such as the respiratory system, and cause the symptoms of allergy.

The signs and symptoms of airborne allergies are familiar to many.

- “Allergic salute” (in a child, persistent upward rubbing of the nose that causes a crease mark on the nose)
- “Allergic shiners” (dark circles under the eyes caused by increased blood flow near the sinuses)
- Conjunctivitis
- Coughing and postnasal drip
- Itching eyes, nose, and throat
- Sneezing, often with a runny or clogged nose
- Watering eyes

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 airborne allergens. 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 histamine and other chemicals. The powerful chemicals contract certain cells that line some small blood vessels in the nose. This allows fluids to escape, which causes the nasal passages to swell - resulting in nasal congestion. Histamine also can cause sneezing, itching, irritation, and excess mucus production, which can result in allergic rhinitis.

Other chemicals released by mast cells, including cytokines and leukotrienes, also contribute to allergic symptoms.

Some people with allergy develop asthma, which can be a very serious condition. The symptoms of asthma include:

- Coughing
- Shortness of breath
- Wheezing

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 sometimes fatal. If wheezing and shortness of breath accompany allergy symptoms, it is a signal that the airways also have become involved.

### **Is it an allergy or a cold?**

There is no good way to tell the difference between allergy symptoms of runny nose, coughing and sneezing and cold symptoms. Allergy symptoms, however, may last longer than cold symptoms. Anyone who has any respiratory illness that lasts longer than a week or two should consult a healthcare provider.

### ***Pollen Allergy***

Each spring, summer, and fall, tiny pollen grains are released from trees, weeds, and grasses. These grains hitch rides on currents of air. Although the mission of pollen is to fertilize parts of other plants, many never reach their targets. Instead, pollen enters human noses and throats, triggering a type of seasonal allergic rhinitis called pollen allergy. Many people know this as hay fever. Of all the things that can cause an allergy, pollen is one of the most common. Many of the foods, medicines, or animals that cause allergies can be avoided to a great extent. Even insects and household dust are escapable. But short of staying indoors, with the windows closed, when the pollen count is high - and even that may not help - there is no easy way to avoid airborne pollen.

### ***What is pollen?***

Plants produce tiny - too tiny to see with the naked eye - round or oval pollen grains to reproduce. In some species, the plant uses the pollen from its own flowers to fertilize itself. Other types must be cross-pollinated. Cross-pollination means that for fertilization to take place and seeds to form, pollen must be transferred from the flower of one plant to that of another of the same species. Insects do this job for certain flowering plants, while other plants rely on wind for transport.

The types of pollen that most commonly cause allergic reactions are produced by the plain-looking plants (trees, grasses, and weeds) that do not have showy flowers. These plants make small, light, dry pollen grains that are custom-made for wind transport. Amazingly, scientists have collected samples of ragweed pollen 400 miles out at sea and 2 miles high in the air. Because airborne pollen can drift for many miles, it does little good to rid an area of an offending plant. In addition, most allergenic pollen comes from plants that produce it in huge quantities. For example, a single ragweed plant can generate a million grains of pollen a day.

The type of allergens in the pollen is the main factor that determines whether the pollen is likely to cause hay fever. For example, pine tree pollen is produced in large amounts by a common tree,

which would make it a good candidate for causing allergy. It is, however, a relatively rare cause of allergy because the type of allergens in pine pollen appear to make it less allergenic. In addition, because pine pollen is heavy, it tends to fall straight down from the tree and does not scatter in the wind, rarely reaching human noses.

Among North American plants, weeds are the most prolific producers of allergenic pollen. Ragweed is the major culprit, but other important sources are sagebrush, redroot pigweed, lamb's quarters, Russian thistle (tumbleweed), and English plantain.

Grasses and trees, too, are important sources of allergenic pollens. Although more than 1,000 species of grass grow in North America, only a few produce highly allergenic pollen. It is common to hear people say they are allergic to colorful or scented flowers like roses. In fact, only florists, gardeners, and others who have prolonged, close contact with flowers are likely to be sensitive to pollen from these plants. Most people have little contact with the large, heavy, waxy pollen grains of such flowering plants because this type of pollen is not carried by wind but by insects such as butterflies and bees.

### ***When do plants make pollen?***

One of the most obvious features of pollen allergy is its seasonal nature-people have symptoms only when the pollen grains to which they are allergic are in the air. Each plant has a pollinating period that is more or less the same from year to year. Exactly when a plant starts to pollinate seems to depend on the relative length of night and day and therefore on geographical location - rather than on the weather. On the other hand, weather conditions during pollination can affect the amount of pollen produced and distributed in a specific year. Thus, in the Northern Hemisphere, the farther north you go, the later the start of the pollinating period and the later the start of the allergy season.

A pollen count, familiar to many people from local weather reports, is a measure of how much pollen is in the air. This count represents the concentration of all the pollen (or of one particular type, like ragweed) in the air in a certain area at a specific time. It is shown in grains of pollen per square meter of air collected over 24 hours. Pollen counts tend to be the highest early in the morning on warm, dry, breezy days and lowest during chilly, wet periods. Although the pollen count is an approximate measure that changes, it is useful as a general guide for when it may be wise to stay indoors and avoid contact with the pollen.

### ***What is mold?***

There are thousands of types of molds and yeasts in the fungus family. Yeasts are single cells that divide to form clusters. Molds are made of many cells that grow as branching threads called hyphae. Although both can probably cause allergic reactions, only a small number of molds are widely recognized offenders. The seeds or reproductive pieces of fungi are called spores. Spores differ in size, shape, and color among types of mold. Each spore that germinates can give rise to new mold growth, which in turn can produce millions of spores.

### ***What is mold allergy?***

When inhaled, tiny fungal spores, or sometimes pieces of fungi, may cause allergic rhinitis. Because they are so small, mold spores also can reach the lungs. In a small number of people,

symptoms of mold allergy may be brought on or worsened by eating certain foods such as cheeses processed with fungi. Occasionally, mushrooms, dried fruits, and foods containing yeast, soy sauce, or vinegar will produce allergy symptoms.

### ***Where do molds grow?***

Molds can be found wherever there is moisture, oxygen, and a source of the few other chemicals they need. In the fall, they grow on rotting logs and fallen leaves, especially in moist, shady areas. In gardens they can be found in compost piles and on certain grasses and weeds. Some molds attach to grains such as wheat, oats, barley, and corn, which makes farms, grain bins, and silos likely places to find mold.

Hot spots of mold growth in the home include damp basements and closets, bathrooms (especially shower stalls), places where fresh food is stored, refrigerator drip trays, house plants, air conditioners, humidifiers, garbage pails, mattresses, upholstered furniture, and old foam rubber pillows.

Molds also like bakeries, breweries, barns, dairies, and greenhouses. Loggers, mill workers, carpenters, furniture repairers, and upholsterers often work in moldy environments.

### ***What molds are allergenic?***

Like pollens, mold spores are important airborne allergens only if they are abundant, easily carried by air currents, and allergenic in their chemical makeup. Found almost everywhere, mold spores in some areas are so numerous they often outnumber the pollens in the air. Fortunately, however, only a few dozen different types are significant allergens.

In general, *Alternaria* and *Cladosporium* (*Hormodendrum*) are the molds most commonly found both indoors and outdoors in the United States. *Aspergillus*, *Penicillium*, *Helminthosporium*, *Epicoccum*, *Fusarium*, *Mucor*, *Rhizopus*, and *Aureobasidium* (*Pullularia*) are common as well.

There is no relationship, however, between a respiratory allergy to the mold *Penicillium* and an allergy to the drug penicillin, which is made from mold.

### ***Are mold counts helpful?***

Similar to pollen counts, mold counts may suggest the types and number of fungi present at a certain time and place. For several reasons, however, these counts probably cannot be used as a constant guide for daily activities.

One reason is that the number and types of spores actually present in the mold count may have changed considerably in 24 hours because weather and spore distribution are directly related. Many common allergenic molds are of the dry spore type - they release their spores during dry, windy weather. Other fungi need high humidity, fog, or dew to release their spores. Although rain washes many larger spores out of the air, it also causes some smaller spores to be propelled into the air.

In addition to the effect of weather changes during 24-hour periods on mold counts, spore populations may also differ between day and night. Dry spore types are usually released during daytime, and wet spore types are usually released at night.

### ***Are there other mold-related disorders?***

Fungi or organisms related to them may cause other health problems similar to allergic diseases. Some kinds of *Aspergillus* may cause several different illnesses, including both infections and allergies. These fungi may lodge in the airways or a distant part of the lung and grow until they form a compact sphere known as a “fungus ball.” In people with lung damage or serious underlying illnesses, *Aspergillus* may grasp the opportunity to invade the lungs or the whole body.

In some people, exposure to these fungi also can lead to asthma or to a lung disease resembling severe inflammatory asthma called allergic bronchopulmonary aspergillosis. This latter condition, which occurs only in a small number of people with asthma, causes wheezing, low-grade fever, and coughing up of brown-flecked masses or mucus plugs. Skin testing, blood tests, x Rays, and examination of the sputum for fungi can help establish the diagnosis. Corticosteroid drugs usually treat this reaction effectively. Immunotherapy (allergy shots) is not helpful.

### ***Dust Mite Allergy***

Dust mite allergy is an allergy to a microscopic organism that lives in the dust found in all dwellings and workplaces. House dust, as well as some house furnishings, contains microscopic mites. Dust mites are perhaps the most common cause of perennial allergic rhinitis. House dust mite allergy usually produces symptoms similar to pollen allergy and also can produce symptoms of asthma.

House dust mites, which live in bedding, upholstered furniture, and carpets, thrive in summer and die in winter. In a warm, humid house, however, they continue to thrive even in the coldest months. The particles seen floating in a shaft of sunlight include dead dust mites and their waste products. These waste products, which are proteins, actually provoke the allergic reaction.

### ***What is house dust?***

Rather than a single substance, so-called house dust is a varied mixture of potentially allergenic materials. It may contain fibers from different types of fabrics and materials such as:

- Bacteria
- Bits of plants and insects
- Cotton lint, feathers, and other stuffing materials
- Dander from cats, dogs, and other animals
- Food particles
- Mold and fungus spores (especially in damp areas)
- Other allergens peculiar to an individual house or building

Cockroaches are commonly found in crowded cities and in the southern United States. Certain proteins in cockroach feces and saliva also can be found in house dust. These proteins can cause allergic reactions or trigger asthma symptoms in some people, especially children. Cockroach allergens likely play a significant role in causing asthma in many inner-city populations.

### ***Animal Allergy***

Household pets are the most common source of allergic reactions to animals. Many people think that pet allergy is provoked by the fur of cats and dogs. Researchers have found, however, that the major allergens are proteins in the saliva. These proteins stick to the fur when the animal licks itself.

Urine is also a source of allergy-causing proteins, as is the skin. When the substance carrying the proteins dries, the proteins can then float into the air. Cats may be more likely than dogs to cause allergic reactions because they lick themselves more, may be held more, and spend more time in the house, close to humans.

Some rodents, such as guinea pigs and gerbils, have become increasingly popular as household pets. They, too, can cause allergic reactions in some people, as can mice and rats. Urine is the major source of allergens from these animals.

Allergies to animals can take 2 years or more to develop and may not decrease until 6 months or more after ending contact with the animal. Carpet and furniture are a reservoir for pet allergens, and the allergens can remain in them for 4 to 6 weeks. In addition, these allergens can stay in household air for months after the animal has been removed. Therefore, it is wise for people with an animal allergy to check with the landlord or previous owner to find out if furry pets lived on the premises.

### ***Chemical Sensitivity***

Some people report that they react to chemicals in their environments and that these allergy-like reactions seem to result from exposure to a wide variety of synthetic and natural substances.

Such substances can include those found in:

- Carpeting
- Cigarette smoke
- Paints
- Perfumes
- Plants
- Plastics

Although the symptoms may resemble those of allergies, sensitivity to chemicals does not represent a true allergic reaction involving IgE and the release of histamine or other chemicals. Rather than a reaction to an allergen, it is a reaction to a chemical irritant, which may affect people with allergies more than others.

### ***Diagnosis***

People with allergy symptoms - such as the runny nose of allergic rhinitis - may at first suspect they have a cold, but the "cold" lingers on. Testing for allergies is the best way to find out if a person is allergic. Allergists (doctors who specialize in allergic diseases) use skin tests to determine whether a person has IgE antibodies in the skin that react to a specific allergen. The allergist will use weakened extracts from allergens such as dust mites, pollens, or molds commonly found in the local area. The extract of each kind of allergen is injected under a

person's skin or is applied to a tiny scratch or puncture made on the arm or back. Skin tests are one way of measuring the level of IgE antibody in a person. With a positive reaction, a small, raised, reddened area, called a wheal (hive), with a surrounding flush, called a flare, will appear at the test site. The size of the wheal can give the doctor an important diagnostic clue, but a positive reaction does not prove that a particular allergen is the cause of symptoms. Although such a reaction indicates that IgE antibody to a specific allergen is present, respiratory symptoms do not necessarily result.

### ***Blood tests***

Skin testing is the most sensitive and least costly way to identify allergies. People with widespread skin conditions like eczema, however, should not be tested using this method. There are other diagnostic tests that use a blood sample to detect levels of IgE antibody to a particular allergen. One such blood test is called the radioallergosorbent test (RAST), which can be performed when eczema is present or if a person has taken medicines that interfere with skin testing.

## **Prevention**

### ***Avoidance Pollen and Molds***

Complete avoidance of allergenic pollen or mold means moving to a place where the offending substance does not grow and where it is not present in the air. Even this extreme solution may offer only temporary relief because a person sensitive to a specific pollen or mold may develop allergies to new allergens after repeated exposure to them. For example, people allergic to ragweed may leave their ragweed-ridden communities and relocate to areas where ragweed does not grow, only to develop allergies to other weeds or even to grasses or trees in their new surroundings. Because relocating is not a reliable solution, allergy specialists do not encourage this approach. There are other ways to reduce exposure to offending pollens:

- Remain indoors with the windows closed in the morning, for example, when the outdoor pollen levels are highest. Sunny, windy days can be especially troublesome.
- Wear a face mask designed to filter pollen out of the air and keep it from reaching nasal passages, if you must work outdoors.
- Take your vacation at the height of the expected pollinating period and choose a location where such exposure would be minimal. Vacationing at the seashore or on a cruise, for example, may be effective retreats for avoiding pollen allergies.

### ***House Dust***

If you have dust mite allergy, pay careful attention to dust-proofing your bedroom. The worst things to have in the bedroom are:

- Blinds
- Closets full of clothing
- Dogs and cats
- Down-filled blankets
- Feather pillows
- Heating vents with forced hot air
- Stuffed animals
- Wall-to-wall carpet

Carpets trap dust and make dust control impossible.

- Shag carpets are the worst type of carpet for people who are sensitive to dust mites.
- Vacuuming doesn't get rid of dust mite proteins in furniture and carpeting, but redistributes them back into the room, unless the vacuum has a special HEPA (high-efficiency particulate air) filter.
- Rugs on concrete floors encourage dust mite growth. If possible, replace wall-to-wall carpets with washable throw rugs over hardwood, tile, or linoleum floors, and wash the rugs frequently.

Reducing the amount of dust mites in your home may mean new cleaning techniques as well as some changes in furnishings to eliminate dust collectors. Water is often the secret to effective dust removal.

- Clean washable items, including throw rugs, often, using water hotter than 130 degrees Fahrenheit. Lower temperatures will not kill dust mites.
- Clean washable items at a commercial establishment that uses high water temperature, if you cannot or do not want to set water temperature in your home at 130 degrees. (There is a danger of getting scalded if the water is more than 120 degrees.)
- Dust frequently with a damp cloth or oiled mop.

If cockroaches are a problem in your home, the U.S. Environmental Protection Agency suggests some ways to get rid of them.

- Do not leave food or garbage out.
- Store food in airtight containers.
- Clean all food crumbs or spilled liquids right away.
- Try using poison baits, boric acid (for cockroaches), or traps first, before using pesticide sprays.

If you use sprays:

- Do not spray in food preparation or storage areas.
- Do not spray in areas where children play or sleep.
- Limit the spray to the infested area.
- Follow instructions on the label carefully.
- Make sure there is plenty of fresh air when you spray.
- Keep the person with allergies or asthma out of the room while spraying.

### ***Pets***

If you or your child is allergic to furry pets, especially cats, the best way to avoid allergic reactions is to find them another home. If you are like most people who are attached to their pets, that is usually not a desirable option. There are ways, however, to help lower the levels of animal allergens in the air, which may reduce allergic reactions.

- Bathe your cat weekly and brush it more frequently (ideally, a non-allergic person should do this).
- Keep cats out of your bedroom.
- Remove carpets and soft furnishings, which collect animal allergens.
- Use a vacuum cleaner and room air cleaners with HEPA filters.

- Wear a face mask while house and cat cleaning.

### ***Chemicals***

Irritants such as chemicals can worsen airborne allergy symptoms, and you should avoid them as much as possible. For example, if you have pollen allergy, avoid unnecessary exposure to irritants such as insect sprays, tobacco smoke, air pollution, and fresh tar or paint during periods of high pollen levels.

### ***Air Conditioners and Filters***

When possible, use air conditioners inside your home or car to help prevent pollen and mold allergens from entering. Various types of air-filtering devices made with fiberglass or electrically charged plates may help reduce allergens produced in the home. You can add these to your present heating and cooling system. In addition, portable devices that can be used in individual rooms are especially helpful in reducing animal allergens.

An allergist can suggest which kind of filter is best for your home. Before buying a filtering device, rent one and use it in a closed room (the bedroom, for instance) for a month or two to see whether your allergy symptoms diminish. The airflow should be sufficient to exchange the air in the room five or six times per hour. Therefore, the size and efficiency of the filtering device should be determined in part by the size of the room. You should be wary of exaggerated claims for appliances that cannot really clean the air. Very small air cleaners cannot remove dust and pollen. No air purifier can prevent viral or bacterial diseases such as the flu, pneumonia, or tuberculosis.

## **Treatment**

If you cannot adequately avoid airborne allergens, your symptoms often can be controlled by medicines. You can buy medicines without a prescription that can relieve allergy symptoms. If, however, they don't give you relief or they cause unwanted side effects such as sleepiness, your health care provider can prescribe antihistamines and topical nasal steroids. You can use either medicine alone or together.

### ***Antihistamines***

As the name indicates, an antihistamine counters the effects of histamine, which is released by the mast cells in your body's tissues and contributes to your allergy symptoms. For many years, antihistamines have proven useful in relieving itching in the nose and eyes; sneezing; and in reducing nasal swelling and drainage.

Many people who take antihistamines have some distressing side effects such as drowsiness and loss of alertness and coordination. Adults may interpret such reactions in children as behavior problems.

Antihistamines that cause fewer of these side effects are available over-the-counter or by prescription. These non-sedating antihistamines are as effective as other antihistamines in preventing histamine-induced symptoms, but most do so without causing sleepiness.

### ***Topical Nasal Steroids***

You should not confuse topical nasal steroids with anabolic steroids, which athletes sometimes use to enlarge muscle mass and which can have serious side effects. The chemicals in nasal steroids are different from those in anabolic steroids. Topical nasal steroids are anti-inflammatory medicines that stop the allergic reaction. In addition to other helpful actions, they decrease the number of mast cells in the nose and reduce mucus secretion and nasal swelling. The combination of antihistamines and nasal steroids is a very effective way to treat allergic rhinitis, especially if you have moderate or severe allergic rhinitis.

Although topical nasal steroids can have side effects, they are safe when used at recommended doses.

### ***Cromolyn Sodium***

Cromolyn sodium is a nasal spray that in some people helps prevent allergic rhinitis from starting. When used as a nasal spray, it can safely stop the release of chemicals like histamine from mast cells. It has few side effects when used as directed and significantly helps some people manage their allergies.

### ***Decongestants***

Sometimes helping the nasal passages to drain away mucus will help relieve symptoms such as congestion, swelling, excess secretions, and discomfort in the sinus areas that can be caused by nasal allergies. Your doctor may recommend using oral or nasal decongestants to reduce congestion along with an antihistamine to control allergic symptoms.

You should not, however, use over-the-counter or prescription decongestant nose drops and sprays for more than a few days. When used for longer periods, these medicines can lead to even more congestion and swelling of the nasal passages. Because of recent concern about the bad effects of decongestant sprays and drops, some have been removed from store shelves.

### ***Immunotherapy***

Immunotherapy, or a series of allergy shots, is the only available treatment that has a chance of reducing your allergy symptoms over a longer period of time. You would receive subcutaneous (under the skin) injections of increasing concentrations of the allergen(s) to which you are sensitive. These injections reduce the level of IgE antibodies in the blood and cause the body to make a protective antibody called IgG.

About 85 percent of people with allergic rhinitis will see their hay fever symptoms and need for medicines drop significantly within 12 months of starting immunotherapy. Those who benefit from allergy shots may continue it for 3 years and then consider stopping. While many are able to stop the injections with good results lasting for several years, others do get worse after the shots are stopped.

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