



## Hay Fever (Allergic Rhinitis)

- What is hay fever? What are the symptoms and signs?
- Why does an allergic reaction occur?
- What causes allergic rhinitis?
- When and where does allergic rhinitis occur?
- How is allergic rhinitis diagnosed, and how are allergies identified?
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### Hay Fever At A Glance

Hay fever affects up to 30% of all Americans, including up to 40% of children and 10%-30% of adults. Over \$1 billion is spent each year in this country to treat this disorder, and millions of school and work days each year are lost by sufferers of hay fever symptoms. These figures are probably an underestimate because many of those affected may attribute their discomfort to a chronic cold. Although childhood hay fever tends to be more common, this condition can occur at any age and usually occurs after years of repeated inhalation of allergic substances. The incidence of allergic disease has dramatically increased in the U.S. and other developed countries over recent decades.

### What is hay fever? What are the symptoms and signs?

*Hay fever* is a misnomer. Hay is not a usual cause of this problem, and it does not cause fever. Early descriptions of sneezing, nasal congestion, and eye irritation while harvesting field hay promoted this popular term. *Allergic rhinitis* is the correct term used to describe this allergic reaction, and many different substances cause the allergic symptoms noted in hay fever. *Rhinitis* means "irritation of the nose" and is a derivative of *rhino*, meaning nose. Allergic rhinitis which occurs during a specific season is called "seasonal allergic rhinitis." When it occurs throughout the year, it is called "perennial allergic rhinitis."

Symptoms of allergic rhinitis, or hay fever, frequently include nasal congestion, a clear runny nose, sneezing, nose and eye itching, and excess tear production in the eyes. Postnasal dripping of clear mucus frequently causes a cough. Loss of the sense of smell is common, and loss of taste sense occurs occasionally. Nose bleeding may occur if the condition is severe. Eye itching, redness, and excess tears in the eyes frequently accompany the nasal symptoms. The eye symptoms are referred to as "allergic conjunctivitis" (inflammation of the whites of the eyes). These allergic symptoms often interfere with one's quality of life and overall health.

Allergic rhinitis can lead to other diseases such as sinusitis and asthma. Many people with allergies have difficulty with social and physical activities. For example, concentration is often difficult while experiencing allergic rhinitis.

## **Why does an allergic reaction occur?**

An allergic reaction occurs when the immune system attacks a usually harmless substance called an allergen that gains access to the body. To more simply describe this complex immune process, we will make an analogy to a war within the body. The immune system calls upon a protective substance called immunoglobulin E (IgE) antibodies ("E" for "erythema" or redness) to fight these invading allergic substances or allergens. Even though everyone has some IgE, an allergic person has an unusually large army of these IgE defenders -- in fact, too many for his/her own good. This army of IgE antibodies attacks and engages the invading army of allergic substances or allergens.

As is often the case in war, innocent bystanders are affected in battle. These innocent bystanders are special cells called mast cells. These cells are frequently injured during the warring of the IgE antibodies and the allergic substances. When a mast cell is injured, it releases a variety of strong chemicals into the tissues and blood, one of which is known as histamine. These chemicals frequently cause allergic reactions. These chemicals are very irritating and cause itching, swelling, and fluid leaking from cells. Through various mechanisms, these allergic chemicals can cause muscle spasm and can lead to lung and throat tightening as is found in asthma and loss of voice.

## **What causes allergic rhinitis?**

Any substance can cause an allergy if exposed to a person in the right way. But for all practical purposes and with few exceptions, allergic rhinitis is caused by proteins. Commonly, allergic rhinitis is a result of an allergic person coming in contact several times with protein from plants. Many trees, grasses, and weeds produce extremely small, light, dry protein particles called pollen. This pollen is spread by the wind. These pollen particles are usually the male sex cells of the plant and are smaller than the tip of a pin or less than 40 microns in diameter.

Even though pollen is usually invisible in the air, pollen is a potent stimulator of allergy. Pollen lodges in the nasal lining tissues (mucus membranes) and other parts of the respiratory tract where it initiates the allergic response. Up to 30% of Americans at times suffer from allergic rhinitis. A person is programmed to be allergic by his/her genetic makeup and is destined to be allergic from birth. Approximately one in four people with allergic rhinitis also has asthma.

## **When and where does allergic rhinitis occur?**

Since allergic rhinitis is frequently caused by pollen, symptoms occur when pollen is in the air. Trees primarily pollinate in the spring, while grasses pollinate in the spring and summer. Weeds usually pollinate in the late summer and fall. Of all allergy sufferers in the United States, 75% are allergic to ragweed, 50% are allergic to grasses, and 10% are allergic to trees. Of course, many people are allergic to other substances such as mold spores, animal protein, and mites, to name a few. Food is an uncommon cause of allergic rhinitis. If you wish to know the pollen count in your area, this information can often be found in the newspaper in the weather section or you can access the National Allergy Bureau's pollen count information at their Web site (<http://www.aaaai.org/nab/index.cfm>).

## **How is allergic rhinitis diagnosed, and how are allergies identified?**

If a person is experiencing the typical symptoms of hay fever, a consultation with an allergy specialist

can help identify the offending substances. Since the ideal way to manage an allergy is to avoid the substances that cause allergic reaction, it is therefore very important to first identify these substances (allergens). Many allergens can be suspected from information obtained in a patient's particular history. For example, if symptoms usually worsen with exposure to cats, then cat protein is a probable allergen causing the symptoms. If cutting grass is associated with the onset of symptoms, then grass allergy is probable. A patient's history of reactions is very important in determining his/her unique allergies.

Because the identification of allergens is important and often difficult to pinpoint, skin testing is often needed to identify exactly the specific substance causing the allergy. Skin testing is now done with minimal discomfort and is performed as follows:

- A small amount of the suspected allergy substance is placed on the skin.
- The skin is then gently scratched through the small drop with a special sterile needle. This is known as the prick-puncture method and is typically used for initial evaluations. A second method, known as the intradermal method, involves injection of a small amount of the test substance into the skin. Intradermal testing is more sensitive but also tends to lead to more false-positive results.
- If the skin reddens and, more importantly, swells, then an individual is said to be "sensitized" to the particular allergen. If typical symptoms occur when a sensitized individual is exposed to the suspected substance, then allergy to that substance is probable.
- The skin testing described is tolerated by the youngest of patients and should be the standard of testing.
- Skin testing is not indicated for people who are at risk of a severe (anaphylactic) allergic reaction, who have certain skin conditions, or who are taking certain medications.

A number of blood tests are also available to aid in the diagnosis of allergy. These blood tests may be useful in people who cannot be skin tested due to skin diseases, who are taking medications that interfere with skin testing, or who are at a high risk of having an anaphylactic reaction to skin testing. These blood tests typically use various techniques to look for IgE antibodies in the blood and by inference suggest allergy in the tissues. If the allergy testing agrees with the history of symptoms upon exposure to the substance, then a diagnosis of allergic rhinitis is likely.

### **How are allergies treated?**

Avoidance of identified allergens is the most helpful factor in controlling allergy symptoms. Attempts to control the environment and avoidance measures often significantly aid in resolving symptoms. However, allergy avoidance is often not easy. A thorough discussion with your physician is needed, and control measures may be required daily.

If avoidance is not possible or does not relieve symptoms, additional treatment is needed. Many patients respond to medications that combat the effects of histamine, known as antihistamines. Antihistamines do not stop the formation of histamine, nor do they stop the conflict between the IgE and antigen. Therefore, antihistamines do not stop the allergic reaction but rather protect tissues from the effects of the allergic response.

The first-generation antihistamines, such as diphenhydramine (Benadryl), chlorpheniramine (Chlortrimaton), dimenhydrinate (Dramamine), brompheniramine (Dimetapp and others), clemastine fumarate (Tavist, Allerhist), and dexbrompheniramine (Drixoral) frequently cause mouth dryness and sleepiness. Newer, so-called "non-sedating" or second-generation antihistamines are also available. These include loratadine (Claritin), fexofenadine (Allegra), cetirizine (Zyrtec), fexofenidine (Allegra), and azelastine (Astelin Nasal Spray). In general, this group of antihistamines is more expensive, has a slower onset of action, is longer acting, and induces less sleepiness. Discuss with your physician other antihistamine side effects that occasionally occur (for example, urine retention in males, fast heart rate, and others). You should always discuss the potential side effects of any medication with your physician and/or pharmacist. A thorough review of specific antihistamines can be found under the Medications Center and more in the Nasal Allergy Medications article.

Decongestants help control allergy symptoms but not their causes. Decongestants shrink the swollen membranes in the nose and make it easier to breathe. Decongestants can be taken orally or by nasal spray. Decongestant nasal sprays should not be used for more than five days without a doctor's advice, and if so, usually only when accompanied by a nasal steroid. Decongestant nasal sprays often cause a so-called "rebound effect" if taken for too long. A rebound effect is the worsening of symptoms when a drug is discontinued. This is a result of a tissue dependence on the medication.

Some people with allergies need specialized prescription medications such as corticosteroids, cromolyn, and ipratropium (Atropine-like) nasal sprays. These nasal sprays do not cause the rebound effect noticed with decongestant nasal sprays. Cortisone nasal sprays are very effective in reducing the inflammation which causes swelling, sneezing, and a runny nose. Cortisone can also stop the allergy "war" by halting the formation of the many allergy chemicals described above. Many cortisone nasal sprays are on the market through prescription only. Fluticasone (Flonase) is one example, but many preparations are available.

Cromolyn is also an anti-inflammatory medication. Although cromolyn is not as potent as cortisone, it has a very safe profile. Cromolyn must be used well in advance of anticipated allergy symptoms to be useful. Ipratropium nasal spray is available for drying a wet runny nose. It will not prevent allergic reactions. This is an atropine derivative and although usually very safe, a person sensitive to atropine should be cautious when taking this drug.

If antihistamines and nasal sprays are not effective or not tolerated by the patient, other modalities of therapy are available. Allergy desensitization or immunotherapy may be needed. Allergy immunotherapy stimulates the immune system with gradually increasing doses of the substances to which a person is allergic. Since the patient is being exposed to the allergy-inducing substance, an allergic reaction can occur, and this treatment should be supervised by an allergy specialist. Although the exact way allergy desensitization works is not completely known, allergy injections appear to modify or stop the allergy "war" by reducing the strength of the IgE and its effect on the mast cells. This form of treatment is very effective for allergies to pollen, mites, cats, and especially stinging insects (for example, bees). Allergy immunotherapy usually requires a series of injections and takes three months to one year to become effective. The required length of treatment may vary, but three years is a typical course. Frequent office visits are necessary.

The success rate of an allergy desensitization program in significantly reducing symptoms can be up to about 80%. The duration of the effect of allergy immunotherapy should last many years, if not a lifetime. Although rare (one in 2-5 million injections given), serious allergy reactions can occur while receiving allergy injections. One cannot predict who will have a severe reaction. Even after years of receiving allergy shots, a patient can experience a reaction.

### **Hay Fever At A Glance**

- Hay Fever (allergic rhinitis) is common.
- Allergy symptoms mimic chronic colds.
- Allergic rhinitis can lead to other diseases.
- The best way to treat an allergy is to identify the allergic substance and avoid it.
- Effective treatment is available in many forms.

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Reference: Allergic Rhinitis. *NEnglJMed*;2005;353:1934-44