

Abington Pulmonary & Critical Care Associates, Ltd.

Background

To date there is debate whether one's genes or one's environmental exposures are the main factors in triggering asthma or rhinitis. Whether one has allergic or nonallergic triggers of rhinitis/asthma, inflammation is the root cause of the symptoms in rhinitis/asthma.

Inflammation is the swelling and heightened sensitivity of the mucous membrane irritant receptors to a variety of irritants including allergens and non allergenic irritants such as: dust, odors, infections, smoke, aspirin and some non steroid anti-inflammatory drugs, and from smoke. One must be diligent in reducing exposure to those elements that cause inflammation of the mucous membrane in order to control the symptoms of rhinitis/asthma.

Although hereditary factors are always present, environmental exposures seem to be critical in the development of inflammation. Twins who have been raised apart can have opposite reactions to environmental exposures even though they are identical genetically.

Atopy, the genetic predisposition in half the population to develop allergic antibodies on exposure to irritants, is a risk factor for the development of rhinitis/asthma. Those with atopy have a more pronounced reaction to any exposure than those without atopy. The critical time for allergic sensitization appears to be the first three years of life. In fact, studies are now investigating whether environmental interventions initiated during the third trimester in pregnancy in patients with a personal or family history of atopy could prevent or delay allergic sensitization and asthma in their infants.

Dust mite allergen.

House dust mites, which are microscopic spider like creatures, have been demonstrated to be powerful allergens/irritants. The particles seen floating in a shaft of sunlight include dead mites and their waste products. The major allergens of house dust mites come from their fecal waste particles and their glandular secretions. It is estimated that 90% of persons with allergies are



sensitive to house dust mites and over 70% of asthmatic patients are sensitive to dust mites. Dust mites thrive in human environments as the mites feed off human skin scales and animal dander. They are most commonly found in bedding (pillows, mattresses, box springs, comforters), carpets, and upholstered furniture. Studies have shown that when dust mite allergen is reduced to very low levels, dust mite sensitization can be prevented and asthma symptoms reduced. To create a dust-free bedroom, it is necessary to reduce the number of surfaces on which dust can collect.

Environmental interventions.

- Bedding encasements or particle-proof covers have been conclusively demonstrated to reduce dust mite exposure.
- Keep windows closed during seasons when pollen and mold are highest.
- To prepare the room for a dust-sensitive person, clean the room thoroughly and completely once a week; clean the floors, furniture, tops of doors, window frames, sills, etc., with a damp cloth or oil mop; air the room thoroughly; then close the doors and windows until the dust-sensitive person is ready to occupy the room.
- Low humidity has been found to reduce dust mite growth and production of allergen when the relative humidity is kept below 50%. Humidity below 30% can cause drying of the mucous membrane and also produce inflammation so the humidity target should be kept between 30% and 50%.
- Although not always affordable or practical, removing carpets and replacing them with tile, linoleum, or wood floors has been found to reduce the amount of indoor dust mite allergen.
- High-efficiency particulate air (HEPA) filters in vacuum cleaners significantly reduce dust. When combined with microfiltration bags, they leak significantly less amounts of the allergens than standard vacuum bags.
- Carpet treatments that denature or detoxify dust mite allergens reduce airborne dust mite allergens by 64% but do not have an effect on cat allergen. These include benzyl benzoate and tannic acid. Repeated

applications of tannic acid are necessary. In our opinion, they are of marginal effectiveness.

- Avoid products made with feathers, for example, pillows and comforters. Also avoid pillows, bedding and furniture stuffed with kapok (silky fibers from the seed pods of the silk-cotton tree).
- Wash sheets and pillowcases often (at least 130°F hot water).
- Avoid upholstered furniture.

Cat allergen and pets.

Pets can cause problems to allergic patients in several ways. Their dander, or skin flakes, as well as their saliva and urine, can cause an allergic reaction. The animal hair is not considered to be a very significant allergen. However, the hair or fur can collect pollen, dust, mold, and other allergens.

Cat allergen is released from the cat's sebaceous glands of the skin. It is present in the saliva and on the fur. It can stay suspended in the air for five or six hours and becomes airborne with minimal disturbance. Because cats are so clean and lick themselves constantly, the cat allergen sticks to the walls, clothing, shoes, carpets, bedding, and furniture, and is difficult to get rid of completely. Even after removing them from the home, residual cat allergen can be measured several months later. Studies have reported significant levels of cat allergen in homes where there are no cats, indicating that cat allergen can be brought from outside sources on shoes and clothing. There can even be cat allergen levels detected in the Antarctic where there are no cats and the relative humidity is very low. There is a strong association between dampness, passive smoke exposure, and cat exposure with the subsequent development of asthma.

Environmental interventions.

- The most cost-effective intervention for reducing cat or dog allergen exposure is to remove these animals from the home; but "it is easier to get rid of the Doctor than to get rid of a loved animal." Enough said? If

the family is unwilling to remove the pet, it should at least be kept out of the patient's bedroom.

- Freestanding HEPA filters can reduce airborne cat and dog allergen in the bedroom and living areas. However, in a patient with severe symptoms resulting from animal dander exposure, a HEPA filter is not an effective solution.
- Litter boxes should be placed in an area unconnected to the air supply for the rest of the home.
- Washing pets frequently may reduce allergen levels temporarily but this has not been recommended as an effective long-term solution for animal allergen exposure.
- Because it is so difficult to contain animal allergens, restricting animals from the bedrooms is of marginal effectiveness.

There is a life lesson to be learned for children about pets. The lesson is that one's health is most important and that one must prioritize issues that affect one's health. The fact is that animals are not "children or brothers/sisters" and that one cannot compromise one's health.

The most common household pets are dogs, cats, birds, hamsters, rabbits, mice, gerbils, rats and guinea pigs. Feathers and the droppings from the other animals can increase the allergen exposure. The allergic patient should not use feather pillows or down comforters. If a feather pillow is used, it should be encased in a particle impervious cover. An encasing with a zipper is recommended, so none of the feathers can escape.

Cockroach allergen.

Cockroaches are present in most homes even though they usually cannot be seen. There is evidence supporting a relationship between cockroach sensitization and asthma.

Environmental interventions.

Cockroach allergen levels persist for several months after extermination and there are no effective methods that can kill cockroach eggs. Extermination

was effective in killing cockroaches but standard housecleaning procedures are only partially effective in removing the residual cockroach allergen. Because of the long time period that is required to reduce cockroach allergen levels and the difficulty in killing cockroach eggs, one must perform extermination procedures regularly over more than six months.

Mold allergens.

There is a clear relationship between home dampness and increased respiratory illnesses associated with mold allergens. Potential health effects associated with mold exposure include sinusitis, asthma, rhinitis, and other respiratory complaints.

Environmental interventions.

There is no practical way to eliminate all mold and mold spores indoors. The way to control indoor mold growth is to control moisture.

- Reduce indoor humidity (to 30 percent to 50 percent) by venting bathrooms, dryers, and other moisture-generating sources to the outside; using air conditioners and dehumidifiers; increasing ventilation; and using exhaust fans whenever cooking, dishwashing and cleaning.
- Clean and dry any damp or wet building materials and furnishings within 24 to 48 hours to prevent mold growth.
- Clean mold off hard surfaces with water and detergent, and dry completely. Absorbent materials, such as ceiling tiles, which are moldy, may need to be replaced.
- Prevent condensation. Reduce the potential for it on cold surfaces (including windows, piping, exterior walls, roof, or floors) by adding insulation.
- In areas where there is a perpetual moisture problem, do not install carpeting (for instance, near drinking fountains, by classroom sinks, or on concrete floors with leaks or frequent condensation.)
- Molds can be found almost anywhere; they can grow on virtually any substance, providing moisture is present.

Strong odors and sprays

- Do not stay in your home when it is being painted. Allow enough time for the paint to dry and the smell to dissipate.
- Avoid perfume and perfumed cosmetics such as talcum powder and hair spray.
- Do not use room deodorizers.
- Use non-perfumed household cleaning products whenever possible.
- Reduce strong cooking odors (especially frying) by using a fan and opening windows.
- Avoid air pollution by staying indoors on days when the pollution count is high. Use the air-conditioner to help filter out the outside air.