



Asthma: Avoiding Triggers

INTRODUCTION — Asthma is a chronic lung condition that causes inflammation and constriction of the airways and difficulty breathing. Asthma attacks, or worsening of asthma symptoms, can occur after exposure to factors known as triggers ([show table 1](#)).

Not all patients with asthma have the same triggers. Finding out which factors trigger an attack and taking steps to avoid the triggers are important parts of good asthma management.

IDENTIFYING AND MANAGING TRIGGERS — One of the best ways to identify asthma triggers is to pay careful attention to the pattern of asthma symptoms. For example, if symptoms occur primarily at home, something in that environment may be involved. If symptoms flare in the spring or fall, an outdoor allergy is more likely to blame.

Using blood tests or skin tests can provide additional information about possible asthma triggers by determining if a person is sensitive (or allergic) to a particular substance.

Once asthma triggers have been identified, the person has several options:

- Avoid the trigger entirely.
- Limit exposure to the trigger if it cannot be completely avoided.
- Immunotherapy (allergy shots) can sometimes be helpful.

INDOOR TRIGGERS — Allergens are substances that can cause an allergic reaction and are major triggers in many people with asthma. Sensitivity to indoor allergens is especially common in asthmatics. The most common indoor allergens that affect asthmatics include:

- Dust mites
- Mold
- Animal danders (skin, fur, feathers, saliva)
- Cockroaches

The bedroom of the asthmatic person should be given special consideration because the greatest number of hours are typically spent there. However, to be effective, measures must be made to reduce allergens throughout the entire home.

Dust mites — Dust mites are microscopic organisms that are present in most households. They avoid light and absorb humidity from the atmosphere (ie, they do not drink). Mites may live in bedding, sofas, carpets, or any woven material if the humidity is high enough.

Measures that help limit exposure to dust mites are detailed in Table 2 and include the following:

- Create a physical barrier to the source of the mites by covering pillows and mattresses with plastic or another impermeable fabric cover. "Hypoallergenic" unbleached or organic cotton bedding covers are intended for people who have contact sensitivities to fabric dyes and are not recommended for containing dust mites.
- Decrease the population of dust mites in the home by washing bedding and pillows in warm water and detergent or drying them in an electric dryer on the hot setting once per week.
- Remove carpets from the bedroom. Minimize the number of stuffed toys in the child's bedroom and wash them weekly.
- Control humidity. Mites thrive in humid environments. Opening windows in dry climates and using air conditioning in humid ones decreases humidity in the home and reduces the number of mites. Avoid using a humidifier.

Mold — Mold spores can trigger symptoms of allergic rhinitis in allergic patients. Mold thrives in damp environments. Areas such as air conditioning vents, water traps, refrigerator drip trays, shower stalls, leaky sinks, and damp basements are particularly vulnerable to mold growth if not cleaned regularly.

To reduce the growth of mold, it is necessary to remove existing mold and reduce humidity to prevent future growth of mold. Humidity can be reduced by removing sources of standing water and persistent dampness by removing house plants, fixing leaky plumbing, correcting sinks and showers that do not drain completely, removing bathroom carpeting that is exposed to steam and moisture, and dehumidifying damp areas to levels below 50 percent.

Indoor garbage pails should be regularly disinfected, and an electric dehumidifier should be used to remove moisture from the basement. Old books, newspapers, clothing, and bedding should not be stored in the home. Water damaged carpets should be thrown out because it is difficult or impossible to eliminate mold in this

situation, even with thorough cleaning.

Mold thrives on soap film that covers tiles, sinks, and grout. Sinks, tubs, and other surfaces with visible mold growth should be cleaned at least every four weeks with dilute bleach (1 ounce bleach diluted in one quart of water). Other surfaces with visible mold growth should be also cleaned with a bleach solution. The use of bleach in people with asthma is discussed below. ([See "Irritants" below](#)).

Animal danders — Animal dander is made up of the dead skin cells or scales (like dandruff) that are constantly shed by animals. Asthma can be triggered by proteins from the "dander," saliva, and urine of common house pets such as cats and dogs. Any breed of dog and cat is capable of being allergenic, although the levels given off by individual animals may vary to some degree. In cats, the protein that causes most people's allergies is found in the cat's saliva, skin glands, and urinary/reproductive tract. Accordingly, short-haired cats are not necessarily less allergenic than long-haired animals, and furless cats have allergens that are similar to furred cats.

Other warm-blooded animals, such as rodents, birds, and ferrets can also trigger asthma in an allergic individual. Pets without feathers or fur, such as reptiles, turtles, and fish, rarely cause allergy, although deposits of fish food that build up under the covers of fish tanks are an excellent source of food for dust mite colonies.

If a person with asthma is found to be allergic to a pet, the most effective option is to remove the pet from the home. Limiting an animal to a certain area in the house is not effective because some allergens are carried on clothing or spread in the air. Once a pet has left a home, careful cleaning of carpets, sofas, curtain, and bedding must follow. This is particularly true for cat allergens because they are "sticky" and adhere to a variety of indoor surfaces. Even after a cat has been removed from a home and it has been thoroughly cleaned, it can take months for the level of cat allergens to drop. For this reason, it may take months for the allergic person's symptoms to fully reflect the absence of the pet.

If it is not possible to remove the animal, measures can be taken to decrease exposure to the animal dander ([show table 3](#)), although none of these methods is as effective as removing the animal.

Cockroaches — Cockroach droppings contain allergens that have been shown to trigger asthma in sensitive individuals. Cockroaches thrive in warm environments with easily accessible food and water. Unfortunately, efforts to control cockroach populations in infested areas are often less than successful. Still, certain measures are recommended, including:

- Use multiple baited traps or poisons
- Remove garbage and food waste promptly from the home
- Wash dishes and cooking utensils immediately after use
- Remove cockroach debris quickly
- Eliminate any standing water from leaking faucets or drains

The role of air filters — Air filtering devices, including HEPA filters, other mechanical filters, and electrostatic filters, are widely advertised to reduce indoor allergens. These may be marketed as components of heating or cooling systems, as individual units for use in a room or area, or as units that are worn by individuals. These devices are expensive and none have been scientifically proven to significantly improve allergy symptoms. Certain types of air filters (eg, ionizers) produce ozone, which is a respiratory irritant for some people. These devices have not been proven safe or effective and are not recommended (www.epa.gov/iaq/pubs/ozonegen.html).

There are several factors that interfere with how well air filters work, and these may partly explain why studies have shown mixed results:

- Most air filters probably can remove pollens and pet danders from the air because these allergens are light and do remain airborne. However, if there is a pet, carpeting, upholstered furniture, access to outside air, or some other reservoir of allergen in the vicinity, the allergen is continuously released from these items as people move around the house. There is far more allergen in these reservoirs than the air filter can remove. Therefore, allergens continuously enter the air, even as it is being filtered, and the benefit of an air filter is minimal.

- In contrast, in a room where there are no carpets, drapes, upholstered furniture, access to outside air, and pets are not allowed, running an air filter probably can improve air quality.

In addition, a vacuum cleaner with a HEPA (high-efficiency particulate air) filtration system and a double thickness bag can help to reduce allergen levels. This is recommended to avoid rebreathing the debris that is captured by vacuuming. A controlled trial has reported a reduction in cat and dog but not dust mite allergen levels and clinical improvement in asthma and allergic rhinitis symptoms in homes cleaned with vacuums equipped with HEPA filters, compared to vacuums without specialized filters [1].

CONTROLLING OTHER ASTHMA TRIGGERS — In addition to indoor allergens, other factors may be identified as asthma triggers.

Respiratory infections — Infections that cause airway inflammation can trigger asthma, including colds, influenza (flu), bronchitis, ear infections, sinus infections, and pneumonia. An asthma attack that occurs along with a respiratory infection may be more severe than one that occurs at other times. To reduce the risk of a

serious flare related to respiratory infection, a person with asthma should:

- Call a healthcare provider at the first sign of an infection.
- Get a flu shot once a year.
- Get a pneumonia vaccine (if needed based on other risk factors)
- Wash hands frequently, especially when in contact with an infected person, and avoid contact with infected people when possible.

- Use treatments prescribed for symptoms, such as nasal steroids and decongestants.

Allergies to food and medicine — Allergy to foods, especially foods containing sulfites (potatoes, shrimp, dried fruit, beer, wine) may trigger asthma in sensitive individuals. A food diary, listing all foods and drinks along with asthma symptoms, may help isolate sensitivity to a particular food. If a sulfite allergy has been identified, the patient should be sure to read food labels to make sure sulfites are not present.

Sensitivity to medications can also trigger asthma. In particular, [aspirin](#), some other anti-inflammatory drugs such as [ibuprofen](#) (Advil®, Motrin®) and [naproxen](#) (Aleve®, Anaprox®) and certain beta blocker heart medicines may cause an attack in certain individuals. [Acetaminophen](#) (Tylenol®) does not cause symptoms in most aspirin-sensitive patients.

Outdoor allergens — Asthma symptoms that worsen outdoors at certain times of year are likely to be triggered by an allergy to pollen or other plant material. Affected individuals should stay indoors as much as possible during the season when their asthma tends to flare, use air conditioning when possible, and keep windows closed. Exercising outdoors or participating activities that require exertion should be avoided when levels of air pollution are high.

Patients should also try to avoid cutting grass, digging around plants, or participating in other outdoor activities that seem to worsen asthma symptoms.

Irritants — A variety of irritants can trigger asthma. Irritants can be found inside or outside, and include:

- Cigarette smoke and ashes — A person with asthma should never smoke, smoking should not be allowed in the person's home, and second-hand smoke should be avoided whenever possible.
- Aerosol sprays, perfumes — Non-aerosol products should be used, and exposure to offending perfumes avoided.
- Gas stoves, fireplace smoke and cooking odors — Wood-burning stoves, fireplaces, and pellet stoves and unvented gas stoves or heaters can worsen asthma symptoms. Cooking areas should be well ventilated.
- Air pollution, car exhaust, gas fumes — Patients should avoid unnecessary exposure to car exhaust, and outdoor exercise should be avoided when pollution levels are high. United States air quality ratings can be obtained online (<http://airnow.gov/>).
- Formaldehyde and volatile organic compounds — Odors from new linoleum flooring, carpeting, particleboard, wallcoverings, furniture, and recent painting can worsen asthma symptoms in some people.

Chemicals — Industrial or occupational exposure to chemicals is responsible for about 15 percent of cases of asthma. If symptoms tend to flare in a workplace where chemicals are in use, the patient and healthcare provider can discuss strategies to limit exposure.

If possible, people whose asthma is triggered by strong odors should avoid the use of chlorine and bleach-based cleaning products. If these cleaners are needed to control the growth of mold in the home, ventilate the area thoroughly during and after use, and if possible, have a non-asthmatic person perform the cleaning.

Menstrual cycle — Between 20 and 40 percent of women with asthma report that their asthma symptoms worsen before or during their menstrual period. The reason for this phenomenon is unclear. Women with hormonally-triggered asthma tend to have more severe asthma than women whose asthma is unaffected by hormonal levels.

The optimal management of menstrual-associated asthma flares has not been determined, although women with a history of this problem are advised to increase their medication if necessary and avoid other potential asthma triggers.

Physical activity — Although exercise can trigger asthma in certain people, it should not be avoided. Exercise strengthens the cardiovascular system and may decrease sensitivity to asthma triggers. To minimize the effects of this trigger, asthmatics should:

- Take one or 2 puffs from an [albuterol](#) inhaler 5 minutes before beginning exercise
- Start any new exercise regime slowly, gradually building strength and endurance.
- Warm up gradually at the beginning of each exercise session.
- Take all medications on schedule.
- Avoid exercising outdoors in extremely cold weather and cover the mouth and nose with a scarf to help warm the inspired air when temperatures are low.

A detailed review of managing exercise-induced asthma is available separately. **SUMMARY**

- Asthma is a chronic lung condition that causes inflammation and constriction of the airways and

difficulty breathing. Asthma attacks, or worsening of asthma symptoms, can occur after exposure to factors known as triggers. Once asthma triggers have been identified, the patient has several options: avoid the trigger entirely, limit exposure to the trigger if it cannot be completely avoided, consult with a healthcare provider about taking an extra dose of medicine before exposure to the trigger, or consider immunotherapy (allergy shots), which can sometimes be helpful.

- Allergens are substances that can produce an allergic reaction in people who are sensitive (allergic) to them. Sensitivity to indoor allergens is especially common in asthmatics. The most common indoor allergens that affect asthmatics are dust mites, mold, animal danders, and cockroaches.

- In addition to indoor allergens, other factors may be identified as asthma triggers, including respiratory infections (colds, flu), allergies to food or medicines, outdoor allergens (pollen, grasses), irritants (cigarette smoke, aerosols, wood smoke, car exhaust), chemicals in the home or workplace, a woman's menses, or physical activity.

WHERE TO GET MORE INFORMATION — Your healthcare provider is the best source of information for questions and concerns related to your medical problem. Because no two patients are exactly alike and recommendations can vary from one person to another, it is important to seek guidance from a provider who is familiar with your individual situation.

This discussion will be updated as needed every four months on our web site (www.uptodate.com/patients). Additional topics as well as selected discussions written for healthcare professionals are also available for those who would like more detailed information.

Some of the most pertinent include:

- The National Library of Medicine (www.nlm.nih.gov/medlineplus/healthtopics.html)
- American Academy of Allergy, Asthma, and Immunology (www.aaaai.org)
- National Heart, Lung, and Blood Institute (www.nhlbi.nih.gov/)
- National Lung Health Education Program (www.nlhep.org)
- American Lung Association (www.lungusa.org)
- American College of Allergy, Asthma, and Immunology (allergy.mcg.edu/)

Avoidance measures for dust mites

First: Bedrooms

Cover pillows and mattresses with zippered covers which are impermeable to mites and mite allergens.

Wash sheets, pillowcases, and blankets in warm water with detergent or dry in an electric dryer on the hot setting weekly; when necessary, blankets should be replaced with those that can be washed. Comforters should be removed.

Use washable, vinyl, or roll-type window covers.

Remove clutter, soft toys, and upholstered furniture.

Where possible, carpets should be removed or replaced with area rugs that can be cleaned/washed.

Second: Rest of house

Reduce upholstered furniture, particularly old sofas.

Replace carpets with polished flooring where possible. Carpets on concrete slabs or over poorly ventilated crawl spaces are a problem and should be replaced with polished flooring if possible.

Vacuum weekly using a cleaner with a HEPA filtration system.

Window coverings should be washable, vinyl, or roll type.

Control humidity to <50 percent relative humidity at normal temperatures, ie, 68 to 72 ♦F.

Third: Changing houses*

In general, allergy sufferers should not be encouraged to move from their home except in those cases where they are living in basements or overtly damp housing.

Individuals who are allergic to mites (or molds) should be advised about the potential benefit of moving to an apartment (2nd floor or higher) or a house with 2nd floor bedrooms and wooden floors.

Assessment questions* for environmental and other factors that can make asthma worse

Inhalant allergens	Workplace exposures
Does the patient have symptoms year round? (If yes, ask the following questions. If no, see next set of questions.)	Does the patient cough or wheeze during the week, but not on weekends when away from work?
Does the patient keep pets indoors? What type?	Do the patient's eyes and nasal passages get irritated soon after arriving at work?
Does the patient have moisture or dampness in any room of his or her home (eg, basement)? (Suggests house-dust mites, molds.)	Do coworkers have similar symptoms?
Does the patient have mold visible in any part of his or her home? (Suggests molds.)	What substances are used in the patient's worksite? (Assess for sensitizers.)
Has the patient seen cockroaches or rodents in his or her home in the past month? (Suggests significant cockroach exposure.)	Rhinitis
Assume exposure to house-dust mites unless patient lives in a semiarid region. However, if a patient living in a semiarid region uses a swamp cooler, exposure to house-dust mites must still be assumed.	Does the patient have constant or seasonal nasal congestion, runny nose, and/or postnasal drip?
Do symptoms get worse at certain times of the year? (If yes, ask when symptoms occur.)	Gastroesophageal reflux disease (GERD)
Early spring? (Trees)	Does the patient have heartburn?
Late spring? (Grasses)	Does food sometimes come up into the patient's throat?
Late summer to autumn? (Weeds)	Has the patient had coughing, wheezing, or shortness of breath at night in the past 4 weeks?
Summer and fall? (Alternaria, Cladosporium, mites)	Does the infant vomit, followed by cough, or have wheezy cough at night? Are symptoms worse after feeding?
Cold months in temperate climates? (Animal dander)	Sulfite sensitivity
Tobacco smoke	Does the patient have wheezing, coughing, or shortness of breath after eating shrimp, dried fruit, or processed potatoes or after drinking beer or wine?
Does the patient smoke?	Medication sensitivities and contraindications
Does anyone smoke at home or work?	What medications does the patient use now (prescription and nonprescription)?
Does anyone smoke at the child's daycare?	Does the patient use eyedrops? What type?
Indoor/outdoor pollutants and irritants	Does the patient use any medications that contain beta-blockers?
Is a wood-burning stove or fireplace used in the patient's home?	Does the patient ever take aspirin or other nonsteroidal anti-inflammatory drugs?
Are there unvented stoves or heaters in the patient's home?	Has the patient ever had symptoms of asthma after taking any of these medications?
Does the patient have contact with other smells or fumes from perfumes, cleaning agents, or sprays?	
Have there been recent renovations or painting in the home?	

Avoidance measures for animal dander

Removing animals from the house
Keep animals outside, eg, in garage or kennel; restricting animals to certain rooms has not been shown to be effective.
Once animal has been removed, the premises should be cleaned thoroughly.
Controlling allergen with an animal in the house
Difficult because the animal contains 10-50 mg of major allergen, while the quantities of airborne allergen are only 5-20 ng/m ³ . Using an air filter can only reduce airborne allergen.
Reduce reservoirs: remove carpets, reduce upholstered furniture to a minimum, replace drapes with blinds, or/and vacuum clean weekly using a vacuum with good filtration, ie, double thickness bags and/or HEPA filtration.
Room air filters: HEPA or electrostatic (maintenance data are better defined for HEPA).
ashing cats does not reduce allergen levels significantly. Washing dogs twice a week may help.

